

American Society of Andrology Celebrating 40 Years

40♂ and forward



1976
Worcester, MA
1ST Annual Meeting



2015
Salt Lake City, UT
40th Annual Meeting

American Society of Andrology Celebrating 40 Years: 40 and forward

1976 - 2015

THE ASA ARCHIVES & HISTORY COMMITTEE



For further information about the American Society of Andrology visit our
Web site at <http://andrologysociety.org>

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INTRODUCTION

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THE ASA ARCHIVES & HISTORY COMMITTEE



The ASA Archives and History Committee has the duty to preserve the history of the American Society of Andrology and to make this history available and alive in promoting the field of Andrology for future generations. It has been our pleasure to help the Society celebrate the 40th year anniversary and to honor our founding members. Toward this goal, we publish this book, *"40 and Forward"*, which traces the origin of the ASA and displays its unique diversity, including a strong recognition of *Women in Andrology*. It is our hope that this collection of history and photos from past meetings reminds us of the tremendous potential the future holds, as the ASA continues to advance forward.

Steven M. Schrader, Chair
Rex A. Hess
Jean Fourcroy
David S. Karabinus
Carol S. Sloan
James Ford, Jr.
Anna Steinberger
Angela Reese
Sophie La Salle
Camilla Ribeiro
Naazish Alladin
Susan A. Rothmann

PRESIDENT'S INVITATION



Forty years! The American Society of Andrology is now 40 years old. While 40 often signifies the beginning of middle age, there is no evidence that our society is slowing down. That is why I am excited to invite you to the 40th Annual Meeting of the ASA, entitled "A Lifetime of Male Reproductive Health," which will be held at the Little America Hotel in Salt Lake City, Utah, this April 18-21, 2015. Our Program Chairs, Dr. Edward Kim (University of Tennessee-Knoxville) and Dr. William Wright (Johns Hopkins Bloomberg School of Public Health), have put together a fantastic lineup of speakers, talks, and topics. Additionally, there promises to be cutting edge research presented by our members, trainees, and other scientists from all over the world.

Some of the highlights of our upcoming meeting include:

- Special Symposium: Controversies in Testosterone Therapy
- Emil Steinberger Memorial Lecture: Genomic Imprinting (Maternal vs. Paternal Alleles)
- AUA Lecture: Reproductive Genetics and the Aging Male
- Symposia regarding stem cells, reproductive health and aging
- Lectures featuring world-renowned speakers on reproductive toxicology, fertility preservation
- Special talks on diversity, women in andrology and male rejuvenation
- European Andrology Association Lecture: Mechanisms of Mammalian Post-Testicular Infertility
- ASA Awards, Trainee Mixer and, of course, the Annual Banquet
- And much more.

The ASA is a special society, bringing together basic scientists, translational research and clinicians in a unique environment. Come help us celebrate our 40th birthday (remember, 40 is the new 30). I'm sure it will be a memorable meeting. I look forward to seeing you there.

Jay I. Sandlow, MD
President, American Society of Andrology



THE WHITE HOUSE
WASHINGTON

May 12, 2015

I am pleased to join in celebrating your 40th anniversary.

In America, history is not only made by presidents and generals. Change often comes when caring and engaged individuals join together to build a brighter, stronger future for themselves and for the generations to come.

For years, you have carried forward a proud tradition. By daring to imagine the world as it could be and working tirelessly to realize that vision, you are helping America reach a better tomorrow.

Congratulations on your anniversary. As you reflect on your years of service to your community, I hope you take pride in what you have achieved. I wish you all the best for the years ahead.

A handwritten signature in black ink, appearing to be 'B. Obama', written on a light gray background.



Ralph Becker

Mayor



Ralph Becker

Mayor

WHEREAS, the American Society of Andrology (ASA) is a unique scientific society that brings together basic scientists, translational scientists, physicians and veterinarians to share scientific advances, discuss emerging male reproductive health issues and problems, and effectively communicate the latest science and technology to patients; and

WHEREAS, the ASA will celebrate its 40th anniversary at its annual meeting being held in Salt Lake City, April 18-21, 2015, by honoring its rich history and discussing the endless possibilities of the future; and

WHEREAS, over the last 40 years, scientists and clinicians from the ASA have played key roles in the research and implementation of major advances in Infertility Intervention; Assisted Reproductive Technologies; Contraception; Reproductive Toxicology; Male Sexual Development; Male Sexual Function; Testicular Cancer and Prostate Cancer; and

WHEREAS, Salt Lake City is pleased to welcome the American Society of Andrology, an international leader in the promotion, education and discovery of male reproductive health.

NOW, THEREFORE, I, Ralph Becker, Mayor of Salt Lake City, do hereby proclaim April 18, 2015 as

ANDROLOGY AWARENESS DAY IN SALT LAKE CITY

Dated _____ 5th of _____ March _____, 2015

Handwritten signature of Ralph Becker in blue ink.

MAYOR





Gary Richard Herbert
Governor



STATE OF UTAH

OFFICE OF THE GOVERNOR
SALT LAKE CITY, UTAH
84114-2220

GARY R. HERBERT
GOVERNOR

SPENCER J. COX
LIEUTENANT GOVERNOR

April 18, 2015

Dear Members of the American Society of Andrology,

As governor of the great state of Utah, I extend a warm welcome to Salt Lake City. It is our pleasure to host you here as you celebrate your organization's 40th Anniversary.

I commend your leadership in advancing education and medical research of male reproductive health. In particular, your efforts to disseminate knowledge through scholarship, academic collaboration, and public health promotion help improve men's health and make a positive difference people's lives. In addition, your programs to encourage young people to pursue science and medical careers in andrology, including veterinary medicine, through mentoring, scholarships, and student membership are noteworthy. Thank you for your valuable service in Utah and throughout the country.

Utah offers what we call "Life Elevated." During your stay, I encourage you to take advantage of world-class shopping at The Gateway and City Creek shopping areas and Park City's historic Main Street, and enjoy diverse offerings at a bevy of fine restaurants, and various sports and arts events, as well our beautiful mountain ski resorts and Olympic venues.

Again, congratulations on the 40th Anniversary of the American Society of Andrology. Best wishes for a successful conference and a memorable visit in Utah.

Sincerely,

A handwritten signature in black ink that reads "Gary R. Herbert".

Gary R. Herbert
Governor

ASA Executive Council Officers

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AMERICAN SOCIETY OF ANDROLOGY PRESIDENTS



32nd Annual Meeting - Tampa - April 2007

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American Society of Andrology FIRST ANNUAL MEETING March 31- April 2, 1976

OFFICERS-1975

PRESIDENT: Emil Steinberger
 VICE PRESIDENT: S.J. Behrman
 SECRETARY: E.S.E. Hafez
 TREASURER: Nancy Alexander
 PROGRAM CHAIR: : Eugenia Rosemberg



MEMBERS OF COUNCIL-1975

Andrzej Bartke
 Joseph Carriere
 F.C. Derrick, Jr.
 T. Evans
 Donald Fawcett
 C. Alvin Paulsen
 Richard Sherins
 Anna Steinberger
 Larry Zaneveld



The American Society of Andrology was founded in Detroit, Michigan, April 25, 1975, in response to a growing need for closer interaction among American scientists and clinicians specializing in the study of the male reproductive tract.

Founding Members:

196 U.S.A

47 Europe

ANDROLOGIA was the first publication affiliation

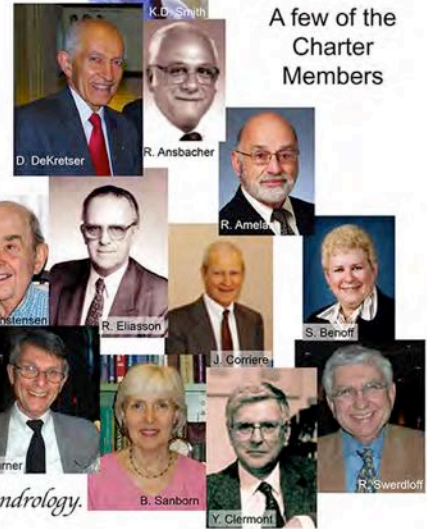
Proceedings of the first meeting:
Andrologia Suppl.1, Vol.8, 1976

In 1979, President Nancy Alexander asked J.B. Lipincott to publish the official ASA journal, which was named the *Journal of Andrology*. Council elected Andrzej Bartke as the first Chief Editor, and the first issue appeared in January-February, 1980, as Volume 1, No. 1

Reference: Rosemberg E. 1986. American Society of Andrology. Its beginnings. J Androl 7(1): 72-75.



A few of the Charter Members



This was a poster presented at the Annual Meeting

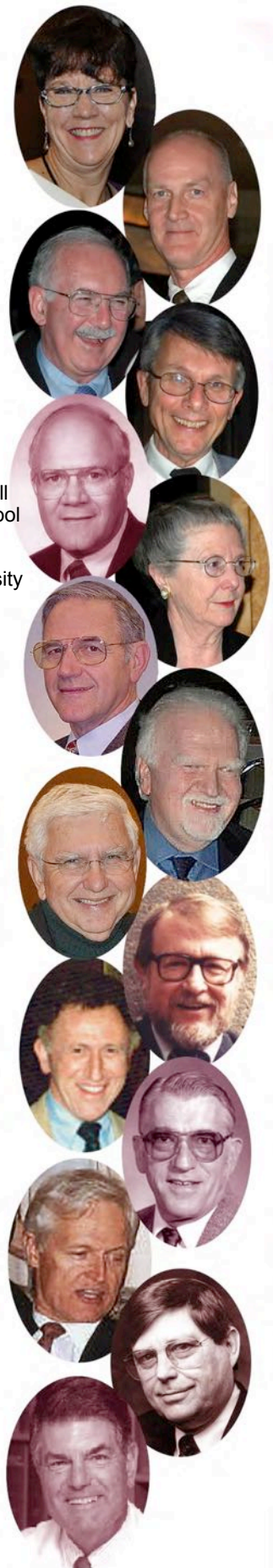
ASA *Presidents*

Date	Name	Address When Serving
2015-2016	Vassilios Papadopoulos, PhD	McGill University Health Centre Dept. of Biochemistry, Dept. of Medicine, Montreal, QC, CANADA
2014-2015	Jay I. Sandlow, MD	Department of Urology Medical College of Wisconsin Milwaukee, WI
2013-2014	Erwin Goldberg, PhD	Dept. of Biochemistry, Molecular & Cell Biology, Northwestern University Evanston, IL
2012-2013	Donna L. Vogel, MD, PhD	Professional Development Johns Hopkins Medical Institutions Baltimore, MD
2011-2012	Gail A. Cornwall, PhD	Texas Tech University Health Sciences Center, Dept. of Cell Biology & Biochemistry, Lubbock TX
2010-2011	Paul Jacob Turek, MD	The Turek Clinic San Francisco CA
2009-2010	Dolores J. Lamb, PhD	Department of Urology Baylor College of Medicine Houston TX
2008-2009	Wayne J.G. Hellstrom, MD	Department of Urology Tulane University School of Medicine New Orleans LA
2007-2008	Terry R. Brown, PhD	Division of Reproductive Biology Johns Hopkins Bloomberg School of Public Health, Baltimore MD
2006-2007	Christina Wang, MD	Dept. of Medicine Harbor-UCLA Medical Center Torrance CA
2005-2006	Sally Perreault Darney, PhD	US Environmental Protection Agency Research Triangle Park, NC
2004-2005	William J. Bremner, MD, PhD	University of Washington Chairman Department of Medicine Seattle WA
2003-2004	Gail S. Prins, PhD	Department of Urology, College of Medicine, University of Illinois, Chicago, Chicago IL
2002-2003	Jon Lee Pryor, MD	Dept. of Urologic Surgery University of Minnesota Medical School, Minneapolis, MN
2001-2002	Barry R. Zirkin, PhD	Division of Reproductive Biology, Dept. of Biochemistry and Molecular Biology, Johns Hopkins School of Public Health, Baltimore, MD



ASA Presidents

Date	Name	Address When Serving
2000-2001	J. Lisa Tenover, MD, PhD	Emory University Wesley Woods Center Atlanta, GA
1999-2000	Barry T. Hinton, PhD	Department of Cell Biology University of Virginia Charlottesville, VA
1998-1999	Richard Van Clark, MD, PhD	Clinical Andrology GlaxoSmithKline R & D Research Triangle Park NC
1997-1998	Terry T. Turner, PhD	Depts. Urology and Anatomy & Cell Biology, University of Virginia School of Medicine, Charlottesville
1996-1997	Arnold M. Belker, MD	Urology, Dept. of Surgery University of Louisville School of Medicine, Louisville, KY
1995-1996	Marie-Claire Orgebin-Crist, PhD	Vanderbilt University School of Medicine, Center for Reproductive Research, Nashville TN
1994-1995	Glenn R. Cunningham, MD	Baylor College of Medicine Dept. of Medicine Houston TX
1993-1994	Bernard Robaire, PhD	Dept. of Pharmacology and Therapeutics, McGill University Montreal, QC, CANADA
1992-1993	Ronald Swerdloff, MD	Division of Endocrinology Harbor-UCLA Medical Center Torrance CA
1991-1992	David W. Hamilton, PhD	Dept. of Cell Biology and Neuroanatomy, University of Minnesota, Minneapolis, MN
1990-1991	Howard R. Nankin, MD	Medical and Research Services W.J.B. Dorn Veterans Hospital Columbia, SC
1989-1990	Rupert P. Amann, PhD	Animal Reproduction Laboratory Colorado State University Fort Collins, CO
1988-1989	C. Wayne Bardin, MD	The Population Council New York, NY
1987-1988	Larry L. Ewing, PhD	Dept. of Population Dynamics Johns Hopkins University Baltimore MD
1986-1987	William D. Odell, MD, PhD	Department of Medicine Univ. of Utah School of Medicine Salt Lake City, UT



ASA

Presidents

Date	Name	Address When Serving
1985-1986	Anna Steinberger, PhD	Depts. of Reproductive Biology and Endocrinology, Univ. of Texas Medical School, Houston, TX
1984-1985	Rudi Ansbacher, MD	Dept. of OB/GYN, Women's Hospital Univ. of Michigan Medical Center Ann Arbor MI
1983-1984	Andrzej Bartke, PhD	Dept. OB/GYN Univ. Texas Health Science Center San Antonio, TX
1982-1983	Richard J. Sherins, MD	Reproductive and Developmental Endocrinology, NICHD Bethesda, MD
1981-1982	Richard M. Harrison, PhD	Delta Regional Primate Research Center, Tulane University Covington, LA
1980-1981	Philip Troen, MD	Department of Medicine Montefiore Hospital Pittsburgh School of Medicine, Pittsburgh, PA
1979-1980	Nancy J. Alexander, PhD	Depts. of Ob/Gyn and Urology University of Oregon Health Sciences Center, Portland, OR
1978-1979	C. Alvin Paulsen, MD	Department of Medicine University of Washington and USPHS Hospital, Seattle, WA
1977-1978	Don W. Fawcett	Department of Anatomy Harvard Medical School Boston, MA
1976-1977	Emil Steinberger, MD	Depts. of Reproductive Biology and Endocrinology, Univ. of Texas Medical School, Houston, TX
1975-1976	Emil Steinberger, MD	Depts. of Reproductive Biology and Endocrinology, Univ. of Texas Medical School, Houston, TX



ASA

Secretaries

Date	Name	Address When Serving
2013	Jacquetta Trasler, MD,PhD	Montreal Children's Hospital Research Institute, Montreal, QC CANADA
2010	Patricia L. Morris, PhD	Population Council Rockefeller University, New York, NY
2007	Janice L. Bailey, PhD	Dept. des Sciences Animales, Universite Laval Pavillon Paul-Comtois, Québec, QC CANADA
2004	Steven M. Schrader, PhD	CDC/ National Institute for Occupational Safety and Health, Reproductive Health Assessment, Cincinnati, OH
2001	Terry R. Brown, PhD	Division of Reproductive Biology, Johns Hopkins Bloomberg School of Public Health, Baltimore MD
1998	Dolores Lamb, PhD	Department of Urology, Baylor College of Medicine, Houston TX
1995	Rex A. Hess, PhD	Dept. of Veterinary Biosciences, University of Illinois, Champaign-Urbana
1992	Barry T. Hinton, PhD	Department of Cell Biology, University of Virginia, Charlottesville, VA
1989	Terry T. Turner, PhD	Dept. of Urology and Anatomy & Cell Biology, University of Virginia School of Medicine, Charlottesville, VA
1986	Joel L. Marmar, MD	Division of Urology, Cooper Hospital/ University Medical Center, Rutgers Medical School, Camden, NJ
1983	Rupert Amann, PhD	Animal Reproduction Laboratory Colorado State University, Fort Collins
1980	Howard R. Nankin, MD	Medical and Research Services, W.J.B. Dorn Veterans Hospital, Columbia, SC
1977	Rudi Ansbacher, MD	Dept. of OB/GYN, Women's Hospital, Univ. of Michigan Medical Center, Ann Arbor MI
1975	E.S.E. Hafez, PhD	Depts. of Gynecology-Obstetrics and Physiology, Wayne State University School of Medicine, Detroit, MI



3-year appointments

ASA

Treasurers

Date	Name	Address When Serving	
2014	Rex A. Hess, PhD	Dept. of Veterinary Biosciences University of Illinois, Champaign-Urbana, Urbana, IL	
2011	Rex A. Hess, PhD	Dept. of Veterinary Biosciences University of Illinois, Champaign-Urbana, Urbana, IL	
2008	Erwin Goldberg, PhD	Dept. of Biochemistry, Molecular & Cell Biology, Northwestern University Evanston, IL	
2005	Janice P. Evans, PhD	Dept. of Biochemistry and Molecular Biology, The Johns Hopkins University School of Public Health Baltimore, MD	
2002	Gail A. Cornwall, PhD	Texas Tech University Health Sciences Center, Dept. of Cell Biology & Biochemistry, Lubbock TX 79430	
2000	Chris DeJonge, PhD	Dept. of Obstetrics and Gynecology University of Minnesota, Minneapolis, MN	
1997	Terry R. Brown, PhD	Division of Urology Department of Surgery, University of Louisville School of Medicine, Louisville, KY	
1993	Gail S. Prins, PhD	Department of Urology, College of Medicine, University of Illinois, Chicago Chicago IL	
1990	Arnold Belker, MD	Division of Urology Department of Surgery, University of Louisville School of Medicine, Louisville, KY	
1985	Brian H. Vickery, PhD	Department of Physiology, Institute of Biological Sciences, Syntex Research Palo. Alto, CA	
1981	Tom Lobl, PhD	Fertility Research, The Upjohn Company Kalamazoo, MI	
1978	Richard J. Sherins, MD	Reproductive and Developmental Endocrinology, NICHD, Bethesda, MD	
1975	Nancy J. Alexander, PhD	Depts. of Ob/Gyn and Urology, University of Oregon Health Sciences Center, Portland, OR	

3-year appointments

ASA

Program Chairs

Dates	Names	Dates	Names
2015	<i>Edward Kim</i> <i>William Wright</i>	1995	<i>Terry Turner</i>
2014	<i>Barry Zirkin</i> <i>Robert Brannigan</i>	1994	<i>Barry Zirkin</i>
2013	<i>Vassilios Papadopoulos</i> <i>John Amory</i>	1993	<i>Shelander Bhasin</i>
2012	<i>Janice Evans</i> <i>Ajay Nangia</i>	1992	<i>Martin Dym</i>
2011	<i>Janice Bailey</i> <i>Darius Paduch</i>	1991	<i>Richard Santen</i>
2010	<i>Kate Loveland</i> <i>Mark Sigman</i>	1990	<i>Howard Nankin</i>
2009	<i>Dana Ohl</i> <i>Dolores Lamb</i>	1989	<i>Johannes Veldhuis</i>
2008	<i>Paul Turek</i> <i>Gail Cornwall</i>	1988	<i>Glenn Cunningham</i>
2007	<i>Al Matsumoto</i>	1987	<i>Rupert Amann</i>
2006	<i>Robert Oates</i>	1986	<i>Donald Eward</i>
2005	<i>Christina Wang</i>	1985	<i>Robert Newton</i>
2004	<i>Debbie O'Brien</i>	1984	<i>Gerald Bernstein</i>
2003	<i>Sally Perreault Darney</i>	1983	<i>Joel Marmar</i>
2002	<i>Erv Goldberg</i>	1982	<i>Howard R. Nankin</i>
2001	<i>Carlos R. Morales</i>	1981	<i>Richard M. Harrison</i>
2000	<i>Terry Brown</i>	1980	<i>Larry J. D. Zaneveld</i>
1999	<i>Bill Bremner</i>	1979	<i>Anna Steinberger</i>
1998	<i>Barry T. Hinton</i>	1978	<i>Marie-Claire Orgebin-Crist</i>
1997	<i>Dolores Lamb</i>	1977	<i>William Odell</i>
1996	<i>Michael Griswold</i>	1976	<i>Eugenia Rosemberg</i>

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Comments of Past Presidents

Numerous Charter and Founding members went on to serve as Executive Officers of the American Society of Andrology. Their responses are published here.

Retrospective on the American Society of Andrology

Richard J. Sherins, MD
July 6, 2014

The Archives & History Committee of the American Society of Andrology asked me to write a retrospective on why I became an Andrologist and to address the nature of my association with ASA during the past 40 years since its founding in 1975. Recollections regarding our Society are surely worth recording as time dulls memory quickly. Without a recorded history, young investigators do not get to know what enticed the founders to charter our Society, learn anecdotes about their personalities and understand the key contributions they made to launch the Society's success that we take for granted today.

(1) What was the stimulus for you to become a physician?

I'm often asked about why I chose to become a physician. It seems that I always wanted to be a doctor; my twin brother Robert S. and I were the first in our extended family to do so. As a good student and always wanting a career in science, my high school biology teachers all strongly suggested that I become a physician in the context of having a science-based career while also being able to transfer that knowledge to patients in need. It seemed like a natural fit.

(2) What brought you to the study of male reproduction, having been trained as an internal medicine physician?

My path into the field of Andrology evolved slowly beginning in college. To best understand how and why I made this choice, I want to emphasize the great importance of mentors who served as critical role models in this process. I was blessed to associate with five outstanding teachers in basic science and medicine who helped guide my path.

It all began in 1957 after my introduction to Professor Clair Szego at UCLA, who invited me into her advanced Endocrinology year-long class to be taken during my junior year. This was an incredibly fortuitous event as she was a well recognized pioneer in the field of estrogen biology and an inspiring teacher. I not only learned about the marvels of hormone actions but also was taught the art of using animal models to study science, and how to perform experiments that were well planned and meticulously executed. This served me well during my entire career. She was a champion of bioassay; the only method available at that time to evaluate hormone action. I was hooked!

My avid interest in Endocrinology continued during medical school at UCSF (1959-1963) as well as during my medical residency back at UCLA (1963-1967). There I met Dr. Richard Horton who, during his training at the Worcester Institute with Dr. James Tait, developed the first assay to measure testosterone levels in small volumes of blood using a double isotope derivative technique. This was novel. While we only worked together for about a year; we published on testosterone levels in normal men and I learned that after secretion testosterone served as a pro-hormone for estradiol

and dihydrotestosterone production in men; and that opened the door to my studying male reproductive physiology in the years to come.

The Vietnam War began to heat up by the time I was Chief Resident in Medicine at UCLA in 1966/1967. So I joined the US Public Health Service, and was stationed at the USPHS Hospital in Seattle with a joint appointment in the Division of Endocrinology at the University of Washington. The ability to combine endocrine subspecialty training with my military draft obligation was like "a gift from God". As I was also soon to learn, the Chief of Endocrinology, C. Alvin Paulsen, MD, was a thought leader in male reproductive medicine. He was renowned for his studies on Klinefelter syndrome, the biological effects of radiation on testicular function and semen analysis. So I saw an open playing field in male reproductive biology using newly available hormone assays as tools to study reproductive endocrine physiology. We take for granted today that rapid assays of hormone levels in biological fluids were always available. Not so!

In Paulsen's laboratory, I set up the Horton serum testosterone assay; and shortly thereafter we adopted the first radioimmunoassay (Reese Midgley, MD) to measure serum LH. A serum FSH assay was soon to follow; allowing indepth studies of endocrine physiology to begin.

Paulsen's mentorship in the field was invaluable; and his leadership qualities were inspiring. He showed, by example, the importance of recognizing the contributions of one's entire staff to the success of an investigator's research. He was inclusive with praise, had the staff meet together frequently and embraced the concept of a working family both scientifically and socially. He had great empathy and respect for all of his staff and his leadership principles remained with me during my career. His enthusiasm about male reproductive disorders encouraged my interest in Andrology significantly.

When offered the opportunity to consider a faculty position at the University of Washington, I felt the need to first obtain more intense laboratory training and wrote a two-year special NIH research grant that was accepted by Dr. Mortimer Lipsett, MD, Chief of the Endocrinology Branch at the National Cancer Institute in Bethesda. I began my work studying androgen-dependent protein synthesis in the rat under the direct tutelage of C. Wayne Bardin, MD. This was my first exposure to a multitude of highly sophisticated laboratory techniques; but Dr. Bardin also taught me how to write a scientific paper properly and how to present an abstract at a national meeting. These were invaluable tools which I carried forward subsequently to my own students.

Fate seemed to have guided my hand during my short tenure with Wayne Bardin. About half way through the first of my two-year position, Wayne was offered a Professorship and Chair of the Division of Endocrinology at the new Medical School in Hershey, Pennsylvania; and I was then offered his

position at NIH that he had unexpectedly vacated. I could not refuse a salaried job that offered a laboratory, a technician, the opportunity for career research funding without the need to apply for grant support and the ability to choose my own research path. It was like being given “three wishes by a genie in a bottle”.

My desire to develop a career path in male reproductive biology had not waned. So, with new methods to assess physiology, I set up both a laboratory and an infertility clinic in 1970 to study the hormonal regulation of human spermatogenesis and feedback regulation of gonadotropin secretion. I also introduced semen analysis and began to recruit patients with then poorly understood male infertility. This was an ambitious program but it allowed me to train fellows and publish extensively in the field.

In 1988, I retired from the NIH and took my Andrology team into the private sector at the Genetics & IVF Institute in Fairfax, VA. There, I continued my research along with a serious commitment to provide comprehensive quality care to patients with andrological disorders. This was not a hasty decision; rather, one based on the need to follow the field into the private sector where in vitro fertilization was feasible given that the US Congress had legislated that no federal funding for research was permitted for IVF. This was a vitally important step in my later Andrology career as it allowed me to make research contributions regarding sperm function critical to sperm entry into the egg through the zona pellucida, the launching of IVF with intracytoplasmic sperm injection and the development of a technique for testicular sperm retrieval for ICSI using fine-needle sperm aspiration (in collaboration with Dr. Arnold Belker). Since 2006, I have continued my work as Director of Andrology at Columbia Fertility Associates in Washington, DC.

(3) Describe how your charter membership in the Society came about. How were charter memberships chosen? Describe how your actual invitation took place.

In 1975, only five years after beginning my work in male reproductive medicine, I was approached by Emil Steinberger, MD from the University of Texas, to help in forming a new scientific society focused on male reproduction; the American Society of Andrology.

To better understand how my charter membership in ASA came about, it is important to understand the twenty-five-year process that preceded the founding of our Society. The term “Andrology” had only been coined in 1951 by Harold Siebke a Professor of Gynecology in Bonn, Germany and the first scientific journal dedicated to Andrological topics (Andrologie) was introduced in 1969 by Carl Schirren of Hamburg, Germany. In 1970, at the time I began my NIH research, the Comitè Internacional de Andrologia (CIDA) was formed in Europe, under the principle efforts of Drs. Puigvert and Pomerol of Barcelona and Mancini of Buenos Aires, to promote the study of male reproduction; CIDA adopted Andrologie as its publication arm. Meanwhile, in North America, efforts in this regard began during the 1960s, when Warren O. Nelson from the Rockefeller Institute in New York City and Charles LeBond from McGill University in Montreal, formed the Male Reproductive Biology Club; which later was renamed the Warren O. Nelson Club, a small

gathering of like-minded individuals interested in discussing topics on male reproductive biology/disorders. Emil Steinberger became actively involved in the organization of the “Club” and soon thereafter became passionately involved in trying to gather a larger group to form a national society for this purpose. This was further helped along by the enthusiastic international participation in the first Testis Workshop, a satellite symposium sponsored by the NIH that was held in Washington, DC in 1972 in conjunction with an International Congress of Endocrinology. I was one of several NIH team members tasked to organize the Testis Workshop.

I am always amused when I think back as to how Emil Steinberger actually introduced what he wanted me to do in 1975. With an arm on my shoulder, he said “Richard, I now dub you an Andrologist”. I had no idea what he was talking about as “Andrology” was not yet part of my scientific lexicon. We met at NIH and talked extensively about his perceived need for us to create a national scientific forum focused on male reproductive biology and medicine; a Society that brought together scientists and physicians from a broad spectrum of relevant fields. Such a national forum did not exist at that time; but was seriously needed to make significant progress in the field. I was intrigued by the concept of an American Society of Andrology pollinated by “worker bees” from a broad array of fields. This had been the intramural NIH model for success; bringing investigators together in close proximity from a broad array of scientific disciplines to share new concepts and methodologies on the scientific horizon; and above all to establish fruitful collaborations.

Emil recruited about 250 persons to be charter members of ASA both from the United States and abroad; who were recognized for scientific work or clinical interest in the fields of biology, anatomy, endocrinology, urology, gynecology and animal science. While some were long established academic thought leaders or clinical specialists, a number of us (me included) were young investigators. The diversity of the charter member group was remarkable; the first organizing meeting taking place in Fort Collins, CO in July 1975. The first scientific meeting of ASA took place in April, 1976 in Worcester, MA. As Shakespeare wrote, “What’s past is prologue”! The experiment worked!

(4) What do you consider to be your most important contribution (the contribution of which you are most proud) to the Society? Secondary important contributions?

During the past 40 years, I have had a continuing close relationship with ASA. I was invited to be on the first Executive Council in 1975, and subsequently held all of the executive leadership positions; that included being acting secretary at first, then treasurer and finally President 1982/1983. I served on a number of committees including International Liaison, Archives and History, Endowment and Development, Future Meetings Committee (Chair) twice over a ten-year period and lead the working group that set up the III International Congress of Andrology meeting that was held in Boston in April/May 1985.

However, I am proudest of two other contributions to ASA. In 1982, during my tenure as President, I launched the Past Presidents Breakfast group. Since the Bylaws of the

Society allow Past Presidents to attend Executive Council meetings; it became clear that as the ASA grew, there potentially could be more Past Presidents attending Council than elected members of Council. So the Breakfast was a way for Past Presidents to meet and serve as advisors to the standing President, to provide corporate memory and advice, without interfering with the authority of the standing President or the Executive Council. I am equally proud to have launched the Distinguished Service Award in 1994 to honor those members of ASA who have made extraordinary contributions to the workings of our Society; members who gave considerable time and effort to enhance the productivity and efficiency of the Society.

(5) What in your opinion is the greatest contribution that the Society has made?

The principles upon which the American Society of Andrology was founded were solid and have served the Society well. One continues to see the energetic interaction of a broad coalition of basic scientists and physicians. ASA set the bar high and attracted cutting edge science and open discussion. Its greatest contribution, however, is the stimulation of international recognition of Andrology as an important scientific/medical discipline. Following the establishment of ASA, similar national societies were founded throughout the world using ASA as the model. International participation at ASA grew dramatically which facilitated the formation of an International Society of Andrology in 1981. ISA meets every four years; now supported by 40 member societies representing 10,000 Andrologists worldwide. ASA also facilitated financial support for the conjoining of the Testis Workshop with ASA every two years; the Testis Workshop that began in 1972 was originally supported as a self-standing event by NIH; but has since continued as a biannual conclave associated with the ASA annual meeting.

(6) How would you describe your legacy to the Society?

It would seem that one's legacy to the American Society of Andrology would be judged by the quality of research, training of students and fellows, and administrative leadership. My research career has been productive; focused on several major areas that included: 1) determining the hormonal requirements of human spermatogenesis; 2) ascertaining feedback regulation of gonadotropin secretion; 3) determining the reproductive consequences of chemotherapy and radiation on human gonadal function; 4) establishing a clinic for the evaluation and management of the infertile male; 5) establishing specialized sperm function testing as adjunctive procedures to semen analysis; and 6) developing the technique of fine needle aspiration of testicular sperm extraction for in-vitro fertilization.

A number of students and fellows trained under my direction many of whom continue in Andrology. I am particularly proud of several who evolved to leadership positions within ASA. These included Richard Clark and Donna Vogel; both of whom were elected to be Presidents of our Society.

I've described my Society leadership roles in the above text which included being acting Secretary, Treasurer and President as well as an active committee member and

Committee Chair; but also to have launched the Past Presidents advisory group and the Distinguished Service Award.

(7) What is your fondest memory regarding the Society?

My fondest memory regarding the Society is my having been selected to receive the Distinguished Andrologist Award in 1994; the highest honor offered by ASA for meritorious research and contributions to the field. To receive such an accolade from your peers has no equal.

(8) What is the funniest/most unique thing to have occurred regarding the Society or at its meetings?

(9) What would you describe as the most unique thing to have occurred at a Society Meeting? Funniest? Saddest? Scariest? Worst?

Following from the old proverb that "all work and no play makes Jack a dull boy", our Society has had a number of members who championed the pleasure principle and brought humor into every meeting. The banquet has served this purpose well in bringing the membership together for a jolly good time with food, dance, drink and some sport; without any speeches. However, without a doubt, the funniest happening in our Society, which has morphed into an annual event, is the conferring of the "condom hat" to the Young Andrologist following presentation of the award. The first awardee was Stuart Ravnik in 1999; this special emblem of success has been continued to the present time, one of the highlights of the meeting, always captured by an appropriate photograph kept for posterity.

The saddest events at ASA, of course, have been the passing of a number of our Society members over the years. Death at any age is never timely; we always deeply mourn colleagues with whom we've worked so closely.

(10) What advice would you give to the Society at this time?

(11) What are your concerns for the Society?

The Emil Steinberger formula for creating an academic society comprised of a balance of individuals from basic science and clinical medicine disciplines was correct in providing for a vital and energetic academic forum to advance Andrology. This must be continued to ensure ongoing success. My major concern in achieving this goal relates to the two most critical changes in science/medicine today: 1) the progressively, increasing difficulty in obtaining grant support and 2) changes in the practice of medicine with downward pressure on fee-for-service which erodes patient/physician interaction. As such, matriculation of scientists into biology and physicians into the cognitive medical specialties is falling as a secure future is increasingly elusive. Accordingly, every effort must be made to maintain the highest quality of both the annual meeting program and the journal, to proactively attract membership from relevant fields, to grow the wealth of the Society through endowments and donations to unrestricted funds to ensure financial stability and to market Andrology to the public to stimulate knowledge and interest in the discipline. These principles are in fact the core of ASA's Strategic Plan.

(12) What was your personal vision for the Andrology Society at the time the Society was founded?

At the time ASA was initially founded, I had high expectation that the Society would be successful. My feelings were toned by my having been one of several at NIH asked to help administer the formation and maintenance of the Testis Workshop which Mortimer Lipsett, MD launched in 1972. The Workshop immediately drew a large attendance and international interest in male reproductive science. ASA differed from the Testis Workshop in its encompassing clinically oriented physicians as well as basic scientists; and in its attraction of members from a much broader range of disciplines. The depth of topics from the broad spectrum of internationally recognized speakers from the very first meeting of ASA in Worcester was awe inspiring; and enhanced my vision for great accomplishments from the Society in the years to come.

(13) What is your current vision for the future of the Society, and how does that differ from your initial vision?

My initial enthusiastic vision for the projected future success of the American Society of Andrology has been borne out. ASA has become an epicenter of learning in the field and an inspiration for Andrologists worldwide to organize similar forums of excellence in their respective countries. We document the scientific excellence of the Society by the consistently outstanding programs at the annual meeting that attract a large attendance with international participation, and the high quality of the papers published in our journal. The recent merger of our original Journal of Andrology with the International Journal of Andrology to form "Andrology" brings together a larger group of dedicated Andrologists that encourages membership and greater success of ASA.

(14) If you were King of the Society, and omnipotent, what would you decree to occur?

My concern for the Society today is that the current organization will become complacent with its earlier success. If I could, I would mandate continued aggressive efforts to grow membership, maintain a close relationship between the Past Presidents and the Society to provide corporate memory and experience to help guide incoming Presidents, to grow the Society's wealth in the form of endowments and non-restricted funds to provide financial stability and to market Andrology more aggressively to the general public and funding sources to improve awareness of the importance of maintaining male reproductive health, increase research funding and enhance patient access to trained medical professionals.

(15) Many of the charter members of the Society were well established in their careers upon the founding of the Society. How would you counsel/encourage new/young members regarding their participation in the Society vis á vis the stage of progression in their careers?

(16) What single piece of advice would you give to a new or prospective member of the Society?

Students and young investigators now witness ASA as a mature and sophisticated organization that goes out of its way to encourage young scientists and clinicians in the field who would like to develop their careers. The founders of our Society shared the same sentiment for those of us who were junior at the time our Society was formed. The relatively small size of ASA and the breadth of topics presented at the annual meeting facilitate interaction among all members and stimulate new ideas in the field. Thus, I would recommend to any new or prospective member of the Society not only to join, but also to participate actively. Introducing oneself to more experienced members creates opportunities in terms of learning new methods, critiquing data and opening job opportunities. Poster discussions can be an ideal forum for such discussion; but coffee breaks, social functions and on-the-floor Q & A present other opportunities for this as well. Don't be shy. Bring your intellect, ideas and energy to the Society. The established investigators and clinicians in ASA are fully dedicated to encouraging the careers of young members of our Society. As in my own career development, attach yourself to a mentor(s) who you feel exemplifies the best in science, good skills in teaching and strong leadership qualities. ASA knows that the young members are the future of the Society. So, help to make continued success happen!

Richard J. Sherins, MD

Past President: 1982-1983



Retrospective on the American Society of Andrology

Anna Steinberger, PhD
March 24, 2015

What was your personal vision for the Andrology Society at the time the Society was founded?

To create a society so basic and clinical scientists and practicing physicians could share valuable information to improve patient's care and advance research in the male reproductive system.

What is your current vision for the future of the Society, and how does that differ from #1?

I believe the basic goals remain similar with a continuing challenge to get more members involved.

What are your concerns for the Society?

Competition by other societies, like the AUS, for attracting more members.

What single piece of advice would you give to a new or prospective member of the Society?

Get more involved with its programs!

Describe how your charter membership in the Society came about. How were charter members chosen?

Describe how your actual invitation took place. It was a dream and vision of Emil Steinberger, MD and other charter members to create a forum for bringing basic scientists and practicing clinicians together for their mutual benefit, so I got involved from the beginning.

What advice would you give to the Society at this time?

Continue offering high quality programs/lectures and workshops and useful mentoring for younger members.

What, in your opinion, is the greatest contribution that the Society has made?

It brought a spotlight to male reproductive issues, but to this day most people know what is GYNECOLOGY but very few know what is ANDROLOGY

What do you consider to be your most important contribution (the contribution of which you are most proud) to the Society? Secondary important contributions?

Developing "In Vitro" models to study regulation of spermatogenesis and factors adversely affect it (used most successfully by a group at Yokohama City, School of Medicine, Japan) Secondary contribution was recruiting many new members to ASA and serving the Society in several elected positions.

What brought you to the study of male reproduction?

Primarily by wanting to conduct research in collaboration with my husband, Emil Steinberger, MD.

If you were King Of The Society, and omnipotent, what would you decree to occur?

There are still many unsolved issues in Andrology, so go for it!!

What is your fondest memory regarding the Society?

Maintaining contact and meeting regularly with people who shared common interests, and enjoying the camaraderie of members.

What is the funniest/most unquing thing to have occurred regarding the Society or at its meetings?

There were too many making it difficult to choose one!

How would you describe your legacy to the Society?

I hope I have made a small but lasting contribution.

Many of the charter members of the Society were well established in their careers upon the founding of the Society. How would you counsel/encourage new/young members regarding their participation in the Society vis a vis the stage of progression their careers?

It's never too early or too late to join ASA

What would you describe as the most unique thing to have occurred at a Society meeting? Funniest? Saddest? Scariest? Worst?

The scariest probably was to present some of my new research finding on INHIBIN at an annual meeting held in Vanderbilt Univ. after reading a fortune cookie in a Chinese restaurant the night before stating: "Be cautious giving information at a risk of your reputation". I used that quote to start my presentation!

What was the stimulus for you to become a physician/scientist/educator?

Since I was ~8yrs old, my dream was to be like Marie Currie, devoting my professional life to research and teaching. I am happy that I was able to accomplish both despite many complications caused by WWII.

Anna Steinberger

Past President: 1985-1986



Retrospective on the American Society of Andrology

Andrzej Bartke, PhD
March 24, 2015

What was your personal vision for the Andrology Society at the time the Society was founded?

Creating a forum for regular meetings (and other interactions) of those interested in the male reproductive functions.

What are your concerns for the Society?

Younger people seem to be more interested in huge meetings (cell biology, genetics, neuroscience) or in very specialized research meetings (Gordon Research Conferences, Keystone Symposia) – same for choice of journals and the race to get into those with the highest profile/impact factor.

Describe how your charter membership in the Society came about. How were charter members chosen?

I knew people working in male “repro” from the meetings of the Endocrine Society and SSR. The emerging interest in ANDROLOGY as a distinct field was a common topic of conversation with such leaders as Emil Steinberger, Eugenia Rosenberg and Alvin Paulsen, and I was included in talking about the plans for creating ASA.

What advice would you give to the Society at this time?

Please refer to No. 3 above. I think that careful monitoring of who attends the ASA meeting and who publishes in Andrology is needed to be “in tune” with the interests and needs of the members and (importantly!) prospective members.

What, in your opinion, is the greatest contribution that the Society has made?

Increasing the visibility of andrology as a field in the U.S.

What do you consider to be your most important contribution (the contribution of which you are most proud) to the Society?

Secondary important contributions?

Starting the journal and helping it survive the first few years.

What brought you to the study of male reproduction?

The observations on the impact of prolactin on male fertility that I made as a graduate student in the early '60s in Lawrence, Kan., and the training I had at the Worcester Foundation for Experimental Biology in Massachusetts that included a visit in Dr. Yves Clermont's lab at McGill.

What is your fondest memory regarding the Society?

Friendly suggestion from one of the members of the Council (Fred Naftolin) that I buy a book on Roberts Rules of Order and learn how to run a meeting. Parliamentary procedures were not included in my education on the other side of the “Iron Curtain,” and learning these rules helped me on many occasions later on, when I chaired faculty meetings and various board/council meetings of a study section.

What was the stimulus for you to become a physician/scientist/educator?

I was impressed with scientists I met as an undergraduate student. Once I had a chance to do research work, I found I enjoyed it greatly, and I was lucky to get some results that I found exciting, and, gratefully, they attracted some interest from others. And there was also my oversized ego that I still try to conceal ...

Andrzej Bartke

Past President: 1983-1984



Retrospective on the American Society of Andrology

Terry T. Turner, PhD
March 24, 2015

1. What was your personal vision for the Andrology Society at the time the Society was founded?

I thought it was to be a marriage between the basic sciences addressing male reproductive biology and the clinical practices [urology, endocrinology, gynecology, etc. (including animal/veterinary science and practice)] addressing male reproductive issues.

2. What is your current vision for the future of the Society, and how does that differ from #1?

The vision is the same, but with the sober realization that we have essentially lost the animal/veterinary sciences and practice. This includes the zoo/wildlife reproductive biologists and veterinarians. Serious efforts ought to be made to recapture those scientists and practitioners.

3. What are your concerns for the Society?

See the above. Also, see the white paper, attached, that was sent to the Past Presidents and others a year ago.

4. What single piece of advice would you give to a new or prospective member of the Society?

Be more assertive than you are comfortable being. Don't hesitate to reach out to others, especially to more senior members, with your interests and your questions. Enthusiasm goes a long way. As Nelson Mandela said, you have no right to hide your candle.

5. Describe how your charter membership in the Society came about. How were charter members chosen? Describe how your actual invitation took place.

Stuart Howards told me about a society that was forming to be focused on male reproductive biology and clinical practice. I forget if he had been to the 1975 conference organized by Emil Steinberger where the society was formed or if he had only heard about it. Anyway, he and I joined the newly formed group and attended the first annual meeting held in 1976. Anyone who joined within that first year was a charter member.

6. What advice would you give to the Society at this time?

See the attached.

7. What, in your opinion, is the greatest contribution that the Society has made?

It has persisted in having basic scientists and clinicians participating in society affairs and contributing to the annual meeting on an equal basis. This has its difficulties. Basic scientists want more and better science and clinicians want more and better clinical contributions. The tension between

the two does not go away, but it gives both scientists and clinicians a unique opportunity to learn from each other.

8. What do you consider to be your most important contribution (the contribution of which you are most proud) to the Society?

At the behest of the Executive Council I informally began the "student" activity that was originally a mixer set up specifically for trainees (grad students, post docs, residents, etc.) to meet and chat with senior members of the society. The activity was eventually formalized and became the Trainee Affairs Committee and its activities.

9. Secondary important contributions?

I forget the specific details, but Barry Hinton and I (he was secretary when I was president, if I recall correctly, and he was vice-president when I was immediate past president) initiated a specific out-reach to Latin American Andrologists with the Latin American lectureship. Years later the Executive Council broadened the scope by making it the International Lectureship.

10. What brought you to the study of male reproduction?

In my graduate department, one could focus on one of three or four different areas including reproductive biology. I chose a mentor, Doyle Johnson, who worked mostly in testis physiology. As a separate venture he got me to pay attention to the epididymis.

11. If you were King of The Society, and omnipotent, what would you decree to occur?

That all the men be smart and handsome, that all the women be smart and beautiful, and all the posters be interesting.

12. What is your fondest memory regarding the Society?

Meeting year after year the same, small group of friends at the ASA meeting, gathering for a great meal and drinks, all the while talking about our science. These and the so-called "Zaneveld parties" that would go on until 3-4 o'clock in the morning form my fondest memories.

13. What is the funniest/most unique thing to have occurred regarding the Society or at its meetings?

In Louisville, we had a President's reception; I think it was, in a bank's facility on the top of one of the city's tallest buildings. The space had a fancy toilet in a glass-fronted stall that looked out over the city. You could see out through the glass wall, but no one could see in because you were higher than everyone else. You could sit on the toilet "throne" do our business while looking out over empty space and the city below--very cool.

14. How would you describe your legacy to the Society?

Modest.

15. Many of the charter members of the Society were well established in their careers upon the founding of the Society. How would you counsel/encourage new/young members regarding their participation in the Society vis a vis the stage of progression their careers?

I was just beginning my career, but I found ready acceptance from the more established members. The society has always been one that welcomed young investigators and trainees, especially with the easy availability of well-known, senior members. I would tell newbies to not hesitate to get involved, to not hesitate to speak to senior members and get to know them, and to not hesitate to challenge established ideas (politely, of course). Done well, it makes its mark.

16. What would you describe as the most unique thing to have occurred at a Society meeting? Funniest? Saddest? Scariest? Worst?

Unique/funniest: Larry Zaneveld, the meeting organizer, cheerfully handing out condoms on a riverboat banquet during an annual meeting in New Orleans. He was clearly doing it as a joke, but then again... Well, I haven't seen it done anywhere else!

17. What was the stimulus for you to become a physician/scientist/educator?

I had been interested in the biological sciences since high school. When I returned from army service in Vietnam I decided I wanted to go to graduate school, mostly because I thought I'd like to teach at the college level, but then I got into a lab and realized how much I enjoyed research. I stuck with a career that had a major focus on research and less emphasis on teaching though I always enjoyed the teaching.

Terry T. Turner, PhD

Past President: 1997-1998



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Comments by Past Presidents of the ASA

“As ASA celebrates its milestone 40th anniversary, I want to express my warmest congratulations for the Society's many accomplishments! Over 40 yrs ago, the Charter members including myself and Emil Steinberger, MD (my husband of blessed memory who served as ASA's founding president) foresaw the many benefits of creating a Society where clinicians and basic scientists could share their concerns and derive benefits from their observations by either treating patients or performing laboratory research in the field of male reproduction. It was a unique initiative in this country that proved to generate many significant scientific advances and better care of male patients. My heart is filled with extreme pride, and I wish ASA and all of you much continual success!!”

Anna Steinberger, PhD, ASA President, 1985-1986

“It was my privilege to serve as President of the American Society of Andrology 1980-1981. It has been professionally and personally rewarding to be part of the ASA as it has grown into a vibrant organization with significant impact on the field of male reproductive health. On this occasion of the ASA 40th Anniversary I wish continued success for the Society as it supports the ability of our dedicated members to enhance the health span and quality of life of men. Congratulations to the ASA!”

Philip Troen, ASA President 1980-1981

“Wow, I can't believe that it has been 40 years! I clearly remember being involved in the organization discussions. Congratulations and best wishes.”

Nancy Alexander, PhD, ASA President 1979-1980

“Congratulations ASA on the 40th year celebration. Emil Steinberger's vision has been fulfilled in having a robust Society focused on the highest quality of male reproductive science. As I, ASA should be very proud. We should look forward to many years of continued success.”

Richard J. Sherins, MD, ASA President 1982-1983

“I am very grateful for having had the opportunity to witness the formation of the American Society of Andrology, to participate in the annual meetings, develop many wonderful and lasting friendships and to serve the Society. Starting the Society's journal was an exciting and rewarding experience I will never forget. In the last two decades the interests of our laboratory have shifted away from reproduction and it became difficult for me to attend ASA meetings but I hope to be back next year. With warmest wishes for this special Anniversary meeting.”

Andrzej Bartke, PhD, ASA President 1983-1984

“Having been one of the original “fathers” who met in Worcester, Massachusetts, I think that I am the remaining Ob-Gyn member of the Society. The many advances in Andrology have maintained me as a member, since I lecture and teach residents, medical students, and others about the male aspects of reproduction. Therefore, the materials presented at our annual meetings have kept me up to date on what has developed in our field. I wish that we could reach out to those who work with infertile couples and couples who have repetitive pregnancy losses, and attract them to join our membership.”

Rudi Ansbacher, MD, MS, ASA President 1984-1985

“To the ASA, Happy birthday. The ASA has led the march on fundamental knowledge and clinical applications that have enhanced men's health. The future is bright.”

Ronald S. Swerdloff, MD, ASA President 1992 - 1993

Congratulations to ASA! I am honored to have been part of this Society that serves as a unique bridge between basic and clinical male reproductive sciences. Many years, great trainees, wonderful friends, excellent collaborators. The field of Andrology has become a well-recognized discipline. Best wishes for the next 40 years.

Bernard Robaire, ASA President 1993-1994

“ASA friends: As most of you know there are adages: (1) do it right and (2) do it while you can. Looking at "Nature Methods" and Bayesian approaches to developing optimum conditions to run & validate a diagnostic test (see pp 277-278) or select a storage medium, it is evident that hopefully a new generation of andrologists will do it far better than we did, armed with a whole bunch of proteomic (also genomic) exclusion or detection probes. In respect to the do it while you can, I have been blessed by ability to ignore the ticking clock or ill health; this ended in Jan and after several concussive events and subdural hematoma sequellae am trying to adapt to a slower pace, being a test subject rather than testor, and altered mind. I reflect on many great things that ASA helped accomplish and wish very best for the next decade or even 40 more years. Best wishes to all.”

Rupert Amann, PhD, ASA President 1989-1990

“Dear Colleagues, I congratulate our founders for recognizing the need and opportunities for the ASA and our members and leaders who over the years have worked to achieve worldwide recognition of the Society. The size and interdisciplinary membership make our Annual Meeting a special event. Congratulations on our 40th Anniversary Meeting!”

Glenn Cunningham, MD, ASA President 1994-1995

“In the mid-60's, when about 20-25 of us were gathering for a few hours around Warren O Nelson and Anna and Emil Steinberger either before or after the Endocrine meeting, it would have been hard to imagine that the "Testis Club", as it was dubbed, would evolve into a full-fledged Society, with an International Journal, meeting back to back with an equally fully-fledged "Testis Workshop". This was the result of the wisdom of the senior Andrologists at that time and the enthusiasm of the younger ones. The same recipe will do wonders for the next 40 years. It has been a privilege for me to serve the Society and to the young Andrologists I will simply say: "Bon Vent!"

Marie-Claire Orgebin, PhD, ASA President 1995-1996

“For many years, ASA has been my favorite organization. I regret that during the last 7 years since my retirement I have not attended meetings. However, the interchange between basic scientists and clinicians has been the highlight of my years of activity with the ASA. Another important feature of attending ASA meetings for me has been the friendships that I have made with attendees living in this and other countries. I send my fondest wishes to the ASA members and my hopes that the ASA flourishes for many years to come.”

Arnold Belker, MD, ASA President 1996-1997

“In 1975, we never would have imagined sperm cells could be collected from the efferent ducts or the epididymal tubules and used to inseminate eggs leading to term pregnancies. We would not have imagined spermatogonia and primary spermatocytes could be microinjected into Sertoli cell-only seminiferous tubules and move in the antiluminal direction across the Sertoli cell (blood-testis) barrier to reestablish spermatogenesis in those tubules. We would never expected to be able to analyze gene and protein expressions using microchip technology, and we would not have imagined that we would have the ability to generate so much data that a significant challenge to scientific advancement would be our limited ability to analyze and comprehend it. In the last forty years all those things and many more have come true. There is much more to come. Hang on.”

Terry T. Turner, PhD, ASA President 1997-1998

“From my first ASA meeting in 1980 to celebrating ASA's 40th anniversary in Salt Lake City. Wow, what a journey with you. Congratulations ASA!!”

Barry Hinton, PhD, ASA President 1999-2000

“My hearty congratulations to ASA on this 40th Anniversary Annual Meeting. From my first meeting as a fellow in 1981, this has been a formative society for me, and provided the opportunity to meet so many superb scientists in both clinical and laboratory research. And with whom, I was able to develop many long and rewarding friendships. Our society's Annual Meeting

provides a terrific forum for interaction among our members and opportunities for our younger members. I think our founders would be pleased that the Society has flourished and developed a clear identity. I also think they would be amazed at where the field has gone, and at the progressive quality of research in the area.”

Richard V Clark, MD, PhD, FACP, ASA President 1998-1999

“Larry Ewing introduced me to ASA almost 40 years ago. He would have been delighted with the remarkable and real interactions that occur between clinicians and basic scientists. I've never seen anything quite like it. The mutual respect that the two 'groups' have for each other is just as it should be – and it happens perfectly naturally in the setting of ASA's meetings. The friendships and scientific interactions resulting from association with ASA are wonderful. It is not an accident that the North American Testis Workshop has become affiliated with the ASA!”

Barry Zirkin, PhD, ASA President 2001-2002

“Congratulations on your 40th birthday! ASA is such a unique and wonderful society, combining expert clinical science with cutting edge basic and translational science. ASA brings together a diverse group of specialties that all can have an interest in the field of Andrology. ASA is a welcoming society and provides strong support of young scientists and clinicians. ASA Annual Meetings have been my favorite of scientific meetings, stimulating the mind and allowing for the nurturing of established friendships while facilitating the making of new friends. I consider my support for ASA to be essential. May you “live long and prosper”!”

J. Lisa Tenover, MD, PhD, ASA President 2000-2001

“Forty years is an amazing milestone for ASA and I am humbled to have been a participant in this journey from its early years to the its current position as the preeminent Andrology Society in the world.”

Gail S. Prins, PhD, ASA President 2003-2004

“Congratulations on 40 excellent years! It is always a pleasure to return to the meeting and see friends who work in basic science, clinical science and in patient care related to health problems in the male. All best wishes for the next 40 years and beyond!”

Bill Bremner, ASA President 2004-2005

“It is with regret that I cannot attend the 40th Anniversary Meeting of the ASA. It seems like just yesterday that I went to the ASA as a resident in urology and was meeting all the “gods” of the field and fell in love with the Society. Every meeting I attended henceforth, I was in heaven. It was a diverse group and the right size that fostered a rich environment for learning and exchanging information- if that did not seal my commitment to ASA,

certainly Larry Zaneveld passing out condoms like candy on a ASA welcome gala, or dancing with Donna Vogel, or the Stuart Ravnik, Chris DeJonge, Terry Turner parties made me an ASA convert. I actually use the ASA as an example of a well-functioning group and how it shaped my thoughts on the importance of getting out of your comfort zone, mixing it up with people in other specialties and taking information from one field and applying it to another. I still think about the pathophysiology of varicoceles, genetics of infertility, epididymal sperm maturation- and thanks to all of you, those musings will never leave me. Please realize, though not directly active in andrology, I will always be supportive of the ASA and the great work you do. Finally, for the many of you who had a role in my education and helped form who I am today, the inquiry, the scientific methods, the critical thinking you instilled in me all play a continued role in my new life as a healthcare leader. Thanks and have a wonderful meeting- I promise I will make a toast to the ASA and all of you.”
John Pryor, MD, ASA President 2002-2003

“In wishing ASA a happy and healthy 40th Anniversary it gives me pleasure to reflect upon how the Society has risen to the grand challenge of linking basic science and clinical practice. In serving as Program Chair, President and Co-Editor I not only learned important life lessons but, even better, made wonderful friends. Thank you, ASA.”
Sally Perreault Darney, PhD, ASA President 2005-2006

“ASA made large steps in the past 40 years. Looking forward to huge strides forward in the next 40.”
Christina Wang, MD, ASA President 2006-2007

“Congratulations ASA on 40 years! ASA epitomizes the best of what a scientific society should be -collegiality, collaboration, inclusion and relationships that propel and invigorate research, practice and dissemination of knowledge in the field of andrology. To members of the past 40 years –Thank You! – to those of the present – Keep up the good work! Have a great meeting in Salt Lake City.”
Terry Brown, PhD, ASA President 2007-2008

“Looking forward to the 50th anniversary of the ASA”
Wayne Hellstrom, MD, ASA President 2008-2009

“Congratulations ASA on 40 years! Emil Steinberger and his team of ASA “fathers” (and mothers!) had the foresight 40+ years ago to envision a society focused on the melding of basic, translational and clinical research with clinicians and scientists working together to ultimately improve men’s health. How wonderful to see how the society has grown and developed to realize their dreams for ASA 40 years ago! ASA has supported me and my trainees throughout the years and the ASA

continues to play a central role in our career development and scientific advancement. I look to the future and envision even greater achievements for ASA in their next 40 years!”

Dorrie Lamb, PhD, ASA President 2009-2010

“From Bellbottoms to Bluetooth and from Atari to Apple, the American Society of Andrology has seen it all over the last 40 years. Congratulations to the Society for being at the forefront of our field and a home for both clinicians and researchers in andrology for almost a half a century!”

Paul Turek, MD, ASA President 2010-2011

“Happy 40th Anniversary to the ASA! I am proud to be a part of such a wonderful community of scientists and clinicians. I look forward to seeing the ASA grow even more over the next 40 years and continue to lead discovery and education in male reproductive health.”

Gail Cornwall, PhD, ASA President 2011-2012

“What is ASA for me? The “home” Society of which I’ve been a member since my postdoc. The site of my first talk at a national conference. The source of so many wonderful friends and colleagues. Meetings with too many stories I can’t repeat. A place to always be a mentor and mentee, life-long. An opportunity to serve in an organization where the impact is meaningful. A Society that by putting its confidence in me as a leader, confirmed there are many pathways to success. A genuinely diverse group where disciplinary barriers evaporate in the interest of advancing science and health.”

Donna L. Vogel, MD, PhD, ASA President 2012-2013

“It was a privilege for me to preside over ASA as the society grew older but better.”

Erv Goldberg, PhD, ASA President 2013-2014

“To the ASA members, past, present and future: Congratulations to one of the most unique societies, where basic scientists, clinicians, and translational researchers can come together to share their thoughts, experiences, and (most importantly) good times. Here’s to another 40 years (at least)!”

Jay Sandlow, MD, ASA President 2014-2015

Supplement: American Andrology: *Quo Vadis?*

Terry T. Turner, PhD

Department of Urology, University of Virginia School of Medicine

A religious legend from the Christian tradition says the Apostle Peter was in Rome when he went afoul of the law and was threatened with death. Fleeing the city, he met a man he believed to be the Messiah, and concerned that the man or vision was headed toward the dangers of Rome rather than away from them, Peter asked, “*Quo vadis?*” or in modern English, “Where are you going?” Peter’s question came from his concern for the embodiment of a dearly held idea; because of that story, the question, *Quo Vadis?* has been used through the centuries to ask valued individuals or groups, where are you going, what’s the plan, what’s the direction? In the discussion below, I ask the *quo vadis* question relative to the American Society of Andrology (ASA) and phrase it, where are we going?

I ask the question because to me the ASA is also a dearly held idea and I am concerned about the society and the andrology it represents. My concern comes from questions in five areas: the ASA’s identity, research funding in andrology, publishing opportunities for Andrologists, trends in ASA membership, and trends in ASA funding. It is in relation to each of these areas I ask, where we are going? I do not mean to be pedantic and I do not suppose the questions to be unique to me. Neither do I suppose my ruminations are unique; some of them I am sure are quite common. Nevertheless, having written them down, I send them on hoping might be of some modest use for thought and discussion.

Where are we going with our identity?

What is our identity? Even, what is andrology? Interestingly, the ASA has never directly defined the word. The Oxford English Dictionary (OED) says andrology means, “the branch of medicine and physiology concerned with male reproductive function and with diseases and conditions particular to men.” The European Academy of Andrology (EAA) gives a definition that is similar: andrology is “the branch of medicine concerned with men’s health, particularly male infertility and sexual dysfunction.” Of interest to Andrologists in North America, both of these definitions say andrology is about the study or treatment of men, i.e. the human male, and the EAA definition limits the word to signifying a branch of medicine without any reference to basic science. Both of these definitions are at variance with andrology, as it is understood in North America.

While it is true that the ASA has never directly defined what andrology means, its definition can be inferred from several of the society’s official sources. The ASA Strategic Plan, for example, says the society’s mission is “to advance...andrology, the study of male reproductive health, through cross-fertilization and integration of...basic and clinical science.” Also, the Society’s Facebook page says the Society is “focused on Male Reproductive Biology and

Medicine” and is “a unique partnership of scientists and clinicians to study the biology and medicine of male reproduction.” It is specifically stated that the Society’s “specialty fields include male reproduction, endocrinology, urology, anatomy, gynecology/obstetrics, biochemistry, animal science, veterinary medicine, molecular and cell biology and reproductive technologies.” This official usage is consistent with the idea that andrology is the basic and clinical science of male reproduction regardless of species and the practice of human or veterinary medicine dealing with male reproductive health. There are two important points in this use of “andrology” as it is understood in North America: 1) it involves basic science and clinical medicine as equal partners and 2) the species of the male studied or treated is not limited to humans. Since the ASA and EAA differ on both points, it would be helpful if the ASA developed and highlighted a definition of andrology consistent with its accepted norms. While those differences may seem trivial on the surface, they illustrate a cultural divide that affects decisions and directions of both societies.

Pointing out that the EAA and ASA have different views of the meaning of andrology is not meant as an indictment of either; rather, the differences are understandable because the two organizations arise from different histories. The EAA was founded by physicians who took on the difficult mission of making andrology in Europe a recognized clinical specialty within human medicine; thus, their focus has always been on the human male. From their perspective, andrology needed to become a medical specialty for men’s reproductive health just as gynecology has long been a clinical specialty for women’s reproductive health. Both areas of medicine have their unique concerns and diseases and their unique medical and surgical treatments. As a result of hard work over many years those founders’ plan came to fruition and now throughout much of Europe an andrologist is understood to be a physician with a clinical specialty in male reproductive medicine. It should come as no surprise then that basic science and basic scientists, while present in the EAA, play no important institutional role. While that may be unfortunate from the scientific perspective, it is a practical fact.

The ASA has a different history and a different view of what it means to be an andrologist. Its understanding that andrology includes the basic sciences and is not species specific comes from its formation by a combination of clinicians and scientists bent on maximizing each specialty’s interaction with the other. In the ASA, physiologists, cell biologists, and other basic scientists are a part of andrology on par with urologists, endocrinologists, and other clinicians. The fact that half the presidents of the ASA and a similarly high proportion of other officers and the Executive Council have been basic scientists is a testament to that fact.

The ASA's definition of andrology and, importantly, the promotion of that definition are important because it connects directly to the general recognition of the field. The ASA has now been on the biomedical scene for over thirty-five years, but it seems we have not done an effective job of relating to the public or to other scientists who and what we are. It is still common to have lay people and even biomedical professionals (scientists, physicians, nurses, etc.) ask what Andrology is. The Fertility/Infertility Branch (formerly Reproductive Sciences) of the United States' National Institute for Child Health and Human Development (NICHD) used to have an Andrology program, but a few years ago that was changed to Male Reproductive Health because "nobody knew what andrology meant." This is stinging indictment of our failure to communicate to others what andrology is, at least in the United States. This failure has effects beyond being recognized within the federal granting agencies; potential corporate donors or foundations with interests in human or animal reproductive health are also not likely to automatically think "andrology" when it comes to issues in male reproduction.

On the other hand, if they do think of andrology, what do they think? Do they take the EAA's view or the ASA's? Or, even more limiting, do they accept what has become a *de facto* meaning in many clinical settings, i.e. andrology refers only to a clinical laboratory where semen analysis occurs and an andrologist is one who does the analysis. Such a narrow understanding is detrimental to the wider world of andrology, not because a clinical lab's semen analyst isn't an andrologist, but because andrology is so much more than that.

If the above limitations are true symptoms of a problem, what can we do? At a minimum, we can improve public information. We can get the word out more aggressively than in the past. For an excellent example of what can be done, see Andrology Australia (<https://www.andrologyaustralia.org>) or Andrology (<http://andrology.com>). The former has already been mentioned in the Executive Council and the latter is a private clinic's andrology page. It has its information biases, but it works as a site designed for public information. Through such sites the public's knowledge of andrology can be improved, which means they will be more aware and can ask more questions of themselves, their physicians, their educators, and even their public representatives. All of that makes it easier for those public representatives to support andrology funding at sources like the National Institutes of Health (NIH), the United States Department of Agriculture (USDA), and elsewhere. A higher public profile for andrology would also likely have a positive impact at private foundations with interests in reproductive health issues.

No amount of public relations will make up for a failure of clinical Andrologists to address important health issues or for a failure of basic scientists to ask important biological questions. Clinically, the practical fact in North America is that andrology is parceled out among urology, endocrinology, general internal medicine, and even gynecology. That detracts from the field's having a unified image in either the public's or medical community's mind. With regard to basic science, it has sometimes been said that reproductive biology, andrology included, does too much derivative science, too much of the

cautious and incremental, to have made a solid image for itself. Some may regard that as a canard, but the perception can only change through there being a high standard of research from individual scientists and through a high standard of training for young investigators.

As suggested above, the issue of identity is important because it has an influence on research funding. The little known or poorly regarded get little funding because they get little notice from an institute's or agency's advisory groups, special emphasis panels, or intramural administrative staffs. There can be little question that andrology is a relatively small field. Broad evidence for that can be seen in the number of journal articles published on andrological topics relative to other areas of biomedicine with a similar focus on a unique organ or tract. For example, a Medline search for articles published in 2012 under the headings of brain/neuroscience finds 60, 245 articles, under renal/kidney 22,270 articles and under pulmonary/lung 23, 518 articles. Grouping testis or epididymis or spermatozoa or prostate in one query retrieves only 4,192 articles. That comparison is far from perfect, but is sufficient to illustrate the point that research on andrological topics occurs in a relatively limited space. That is an important reason why building a clear, high quality image of ourselves is vitally important to our future.

That future depends on a continuing stream of basic and clinical research, both of which require funding in a time of science budget constraints everywhere. Andrology is a part of the biomedical spectrum and funding for its research and clinical programs has to be obtained through competitive mechanisms. For that reason it is important to ask:

Where are we going with research funding?

This is not a question directed at the ASA, specifically, but at the field, in general. In many countries, science budgets have been under stress for years. Senior scientists in those countries, including the United States, find the situation difficult enough, but young scientists find it even worse. Graduate students seeking assistantships, post-docs seeking fellowships, and senior post-docs applying for their first faculty positions are all finding the challenges of a career in science to be daunting, and that is not even to speak of the junior faculty members applying for their first independent research grants. Science is suffering through a funding drought and when droughts are prolonged the thinnest horses die first. They are the ones that were never sufficiently developed or sufficiently nourished to make it through the dry times. That same thing is true for young scientists or even more senior scientists already existing on short rations. Further, what is true for young scientists is true for young scientific disciplines. Neither the young scientist nor the young disciplines have the body mass to survive long periods without adequate sustenance. Reductions in funding that do only moderate harm to the well established and easily recognized areas of science can be catastrophic or even lethal to smaller, less recognized areas.

The NICHD is the most prominent nationally competitive grant source for American reproductive sciences. At that institute the payline for major independent grant awards (R01s) has been 9%, 10%, 9%, 10%, and 13% for the

years, 2013, 2012, 2011, 2010, and 2009, respectively. The five-year average is 10.2%. In other words, only those grant scores in the upper 10 percent of the class are considered a meaningful “pass” to funding. All other members of the class fail. No area of science, indeed, no area of human endeavor can be sustained at such a failure rate. It is a massacre of hope, and it is especially harmful to areas of science that were never large in the first place.

In hard times, scientists in the most poorly rewarded areas of biomedical research might understandably fall to the temptation to move their inquiries elsewhere hoping for more generous paylines. While this can be regretted, it cannot be blamed; no field of science can rightly demand martyrdom. An even worse outcome is when good scientists feel compelled to leave science entirely. This causes an unrecoverable loss of a scientific resource that has already cost much in years of training and previous research support. Either of these types of losses are difficult for andrology because it is still a small, not widely known area of biomedical research. Neither andrology, in general, nor the ASA, in particular, can afford to lose investigators and remain viable for long.

The average 10% payline mentioned above for the NICHD is for that institute, in general; but how has that affected the number of grants actually funded by the Male Reproductive Health (formerly Andrology) Program within the NICHD’s Reproductive Sciences Branch? A sampling of data going back over a decade provides a snapshot impression (Table 1). The numbers of new R01 (investigator initiated) grants supported and the dollars spent on them in more recent years (Table 1; 2013, 2010) are lower by half, on average, than in the earlier years (2005, 2000), though once a grant is obtained, the funding for the noncompetitive renewal years has remained less hazardous. While it is true that the funding trend since 2005 has been downward, at least the decline has not been precipitous. Rather, the decline from moderately dry to drought has been slow and steady, and is still a dangerous process threatening the field.

One never wants to let poor advertising or identity recognition take the blame for a lack of research funding when other factors, e.g. the quality of grant applications, are the real culprit; nevertheless, the rationales within funding decisions sometimes border on the occult and in that environment the identity issue discussed previously can sometimes become relevant. The issue was illustrated above by contrasting the perceptions of Andrology in North America and Europe and the way in which the ASA and EAA self-identify. The difference between the two Andrologies can also affect scientific decisions and careers through science publishing: what to publish, how to publish, where to publish. All of those beg the question:

Where are we going with publishing opportunities?

This is an important issue not only because of the need for Andrologists to have a high quality outlet for publication, but because a high quality journal helps with the image issue just mentioned. Two years ago the ASA agreed to the merger of its flagship journal, the *Journal of Andrology* (*JA*), with the EAA’s journal, the *International Journal of Andrology* (*IJA*)

to form the new journal, *Andrology*. That merger required a lot of dedicated work by ASA and EAA leaders, for which they should be congratulated; however, one might wonder whether that merger has resulted in a journal that best fits the ASA’s goal of providing a quality publishing opportunity for its members, who are Andrologists as understood within the ASA). I do not bring this topic up to disturb done decisions, but to address a potential problem going forward. Others may, and likely do disagree.

While *JA* belonged solely to the ASA and its policies could be set for the best interests of its members, the new journal is the child of both the ASA and the EAA, two societies that, as already mentioned, can have different opinions about selected issues. It might be doubted that any of those issues will ever touch the journal and it is a given that devoted editor-scientists on both sides of the ocean are unified in wanting *Andrology* to be the premier journal in its field. Nevertheless, recruiting high-quality papers, especially basic science papers, is apparently turning out to be a challenge that might prove persistent unless strategies are developed to overcome it.

At least four things influence where scientists want to publish their results: 1) a journal’s history of publishing in the scientist’s area of interest; 2) the scientist’s perception of a journal’s publication quality, 3) the journal’s quantitative impact factor; and 4) the scientist’s brand loyalty, i.e. that intangible affinity that can exist between a scientist and a favored journal due to anything from a previous positive publishing experience to a feeling of loyalty to the journal’s sponsoring society.

In recent years, a journal’s impact factor has gained a powerful influence on basic and clinical scientists’ publication decisions. That is a circumstance detrimental to andrology journals, in general, because impact factors have an inherent prejudice against publications representing relatively small fields of scientific interest. The impact factors of both the *JA* and *IJA* were moderate at best (2.5-3.5 for most issues) relative to leading journals in reproductive biology, e.g. *Biology of Reproduction*, 4.0-4.1; *Human Reproduction*, 4.5-4.6, and very low relative to major journals like *Cell* (32-34) or *Science* (31-32). It was hoped by both the ASA and EAA that the merger of their two modestly impactful andrology journals would result in a single publication with an improved impact factor. One hopes this will happen, but at least two issues remain in question: 1) Will an ASA member’s brand loyalty extend to the joint publication? If an ASA member was publishing in *JA* despite its modest impact factor because he or she wanted to help support the unique flagship journal of the society, that motivation has likely slipped. 2) Will *Andrology* be seen as a publication outlet for high quality basic science? *IJA*, reflective of its sponsoring society, was largely a clinical journal while *JA*, reflective of its sponsoring society, maintained a mix of basic and clinical science. Now that *JA* has been merged with *IJA* which result will obtain? At present, *Andrology* still gives the impression of being a largely clinical journal. That impression is not going to encourage basic scientists to publish there, especially those scientists who do research appropriate for the journal but who are not members of ASA or EAA. The two factors together, a

diminished sense of brand loyalty and a concern that basic science publications will not be appropriately respected in a largely clinical journal, can put further downward pressure on basic science submissions to the new journal, especially when scientists are already having to withstand an increasing prejudice at their institutions against journals with low impact factors.

Strategies to relieve that downward pressure might be helpful. One element of the strategy could be to reinforce the idea to ASA members that brand loyalty includes *Andrology* and to point out the ways the membership can help raise the impact factor of their journal, the prime example of which is to submit excellent papers! To do this well will likely require a campaign, not just an occasional statement.

Implicit in any strategy to improve the society's journal is the understanding that the larger the ASA becomes the more basic and clinical scientists there will be to take interest in the journal, which makes for a larger potential audience and a larger the pool of potential contributors; thus the need to have a growing society, which suggests the question:

Where are we going with society membership?

The ASA was founded in 1976 and ended that year with 200 members. Membership peaked in 1994 at 855 members, but through the remainder of the '90s membership declined well into the 600's and in 2000 was at 670 (Table 2). In 2005, there was membership resurgence, but by 2010 another decline had set in and now in 2013, the society has 591 members. That is a 25% reduction from that 2005 improvement (Table 2). Another sign of difficulty is that, approximately half of the present active members of the society are international (not shown). While our international members are one of the *causes célèbre* of the society, from the standpoint of domestic membership it means that the society has grown very little over the last thirty years. That is a weak performance for a society that encompasses all of male reproductive biology and medicine.

One encouraging note is that the number of trainees is trending upward (Table 2), but the funding difficulties already discussed are a constant threat to the ability of those trainees to transition to active membership. For that reason the society cannot depend on simply expanding from within. We need to expand by making ourselves known in those regions of science where we remain relatively unknown. We also have to recognize that even where we are known or should be known there is competition for attention. The Society for Male Reproduction and Urology (a sub-society of the American Society of Reproductive Medicine), the Society for the Study of Male Reproduction (a sub-society of the American Urological Association), the Men's Health Network, and the newly formed American Society for Men's Health all serve the same or a similar audience as ASA. That being so, a case needs to be made for the uniqueness and value of ASA and that message ought to be known by every ASA member. It ought to be on every member's lips and tattooed on their foreheads. Surely the case for ASA includes the fact that we are the only society in which basic science, clinical science, and clinical practice meet on equal terms and where sharing information occurs across species and across specialties.

It was pointed out earlier that the North American view of andrology includes male reproductive biology and medicine in any species and it is certainly true that in the earlier years of the society, Andrologists in the animal and veterinary sciences and in conservation biology were active participants. Those members' numbers were never as large as they could have been and they still represent an audience that has remained largely untapped. In fact, the numbers of ASA members who are active in the animal sciences, conservation biology, or veterinary medicine have dwindle to virtually nothing and their absence diminishes the breadth of scientific exchange envisioned by the ASA founders. Correcting this would be a reasonable target for the society's improvement, but that is an idea that has been discussed in numerous settings with no significant action, perhaps because of the difficulties involved. Outreach at those scientists' and clinician's primary meetings through program participation or advertising would be one way to attract attention; being sure to include programs or activities within the ASA annual meeting that target audiences find attractive is another. To give credit where credit is due, both approaches have been used in the past and may be a part of current program planning.

There are also scientists in the cell and developmental biology communities, in the toxicology community, and among clinicians and scientists in the human male infertility arena who could be important contributors to the society but who have remained either uninterested or recruited. There may be other groups, as well, so in determining where we are going with societal membership, it will be important to know whom we are missing, whom we want to recruit, and how much attention or resources should be committed to that recruitment. This will not be easy and cannot be done absent the commitment of the society's officers and Executive Council representatives.

The size of a society's membership strongly affects the number of registrants at its annual meeting, and for the ASA that number has remained relatively flat since the turn of the century (Table 2), the biennial benefit of meeting with the North American Testis Workshop being noted. The annual meeting is another reason to reach out more effectively to the broad andrology community; increasing the size of the society would help maintain a dynamic annual meeting where scientists and clinicians in all areas of andrology would want to attend, share ideas, and interact socially.

An increased annual meeting attendance is important to the society financially through registration fees and through exhibitors whose interest in exhibiting at any society's annual meeting varies directly with the size of the exhibitor's potential audience. All the things already discussed, the society's identity, research funding, publishing, and membership affect the financial picture of the society. Planners for the present day and for the future want to know, how much money do we have, how much do we need, and how do we get it? For this current discussion a general question is:

Where are we going with Society funding?

Money. Brother, can you spare a dime? The ASA, like many of its sister societies, depends on donations to fund a variety of its activities. For the ASA this includes a number of trainee awards, specific lectures in the annual program, the Distinguished Service Award and the Distinguished Andrologist Award. The more donations the society receives, the more activities it can advance; thus, the society is engaged in a constant search for new sources of donor funding whether they be from interested individuals, institutes, corporations, or foundations. That work has born fruit.

The value of the society's endowment funds has increased not only numerically since the turn of the century, but has improved somewhat relative to the society's net assets (Table 3, E/A). It has increased even more relative to the size of the annual expense budget (Table 3, E/B). Endowment donations per year have improved tremendously (Table 3), which is largely due to the intentioned efforts of the society's officers, the development committee, and members who have believed strongly in the society's mission. Nevertheless, for the sake of comparison it is interesting to note that the current, comparable E/A ratio of the Society for the Study of Reproduction (SSR) is 0.356. Granted, the SSR is a larger and older society than ASA, but the 0.356 value gives the ASA's current 0.272 (Table 3) a relative context and demonstrates there is room for improvement.

We are an aspiring society and want to do more with our endowments than rest on the patterns of the past. Yes, we need donations to fully fund program activities already designated, but donations are also needed for addressing new directions as opportunities present themselves. Such opportunities abound: funds for special programs attendant to the annual meeting but not a part of it, funds for special programs not associated with the annual meeting, funds to support membership expansion, funds to support emergency needs, and so on. The question, as always, is where are those donations going to come from? Therein lies the problem.

It is difficult to predict a significant increase in giving from the membership when membership numbers are declining or being held static. Further, long-time, loyal members who have made significant contributions in the past can be asked to do only so much, and anecdotal evidence suggests that resource is currently becoming tapped out. Such observations suggest that the society's fund raising must reach outside the ASA to include foundations, corporations, or private individuals interested in helping the society achieve its mission. That means those foundations, corporations and private individuals must believe in the mission and must

believe the society can achieve the mission. For that, they will want to see evidence that progress is being made toward achieving the mission and we must be able to show them how it is being done.

How? First, we go back to an issue already discussed. We must articulate who we are, where we are going, how we are going to get there, and why it's important. Potential donors are unlikely to become actual donors unless those points can be clearly made. A big help will be that the society now has a strategic plan. We should be able to show progress toward achieving that plan and answer questions relative to it. Given that the society adopted a 5-year strategic plan in April of 2012, a donor might ask, for example, what has the society's progress been toward achieving the plan over the last year? Who is detailed to carry out what tasks? What is the mechanism for insuring persistence in pursuit of the plan given that important officers come and go? One imagines the society's senior leadership knows cogent answers, but that information would be helpful to anyone helping the society develop new donors.

According to the minutes of a 2001 Executive Council meeting, it was agreed that the society should establish a foundation to receive donations, if that would be beneficial. The suggestion was apparently made because some donors cannot give directly to support an annual meeting, which the ASA endowment funds do. Such a foundation has never been established and it may be an example of an idea ventured, agreed to, and then let drift away into the fog of memory. If having a foundation is important for the enhancement of donations, perhaps that idea should be activated. The ASA's recently renewed Endowment and Development Committee (EDC) should be able to suggest what is best in that regard. Among other things, the EDC is charged with creating policies for establishing endowment funds, cultivating potential donors, and developing capital campaigns, among other things. Fully active, it will help the society toward achieving its endowment goals, which, in turn, should help expand ASA programs, boost its membership, and increase its recognition as the place to be in male reproductive biology and medicine.

Acknowledgments: Thanks to Drs. Rex Hess and Gail Prins for help in finding some of the society's historical financial data, to Dr. Alan Diekman for help in finding some of the society's membership data and, would you believe it, the NIH's Freedom of Information Office for finding some of the historical funding data for male reproductive health.

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Table 1: Funding for Male Reproductive Health (Andrology) within the Reproductive Sciences Branch of the NICHD.

Year	New Grants Funded		Noncompeting Grants Funded		Total Grants Funded	
	Number	Dollars	Number	Dollars	Number	Dollars
2013 ^a	4	1,252,451	27	8,460,930	33	10,258,067
2010	5	1,604,368	35	10,219,571	39	11,823,939
2005	14	4,083,592	45	13,827,065	59	17,910,657
2000	9	2,073,379	23	5,478,220	32	7,551,599

Table 2: Sample memberships of the American Society of Andrology over the last thirteen years.

Year	Total Members	Total Trainees	Domestic Trainees	International Trainees	Total Meeting Attendance
2013	591*	92	62	30	391**
2010	540	51	42	9	316
2005	735	134	88	46	409**
2000	670	59	33	26	328

*In 2013, half of the active members, i.e. excluding trainees, emeritus, etc., were international.

**Meetings held in conjunction with the North American Testis Workshop.

Table 3: Selected ASA financial data since 2000.¹

Year	Net Assets (A)	Operating Expenses (B)	Endowment Donations	Value of Endowment (E) ²	Ratio E/A	Ratio E/B
2013	\$1,266,113	\$590,801	\$26,775 ³	\$345,000	0.272	0.584
2010	866,405	609,160	58,018	256,398	0.296	0.421
2005	569,437	571,853	7,418	135,943	0.239	0.239
2000	310,825	419,492	440	67,539	0.217	0.161

¹All values are extracted from annual reports or monthly reports as available from the historical record, but values should be assumed to be estimates only.

² Increases in value are due to donations plus investment income.

³ An "on track to receive" value estimated from the donations received in the first third of the year.

FIRST
ANNUAL MEETING
American Society of Andrology

3

[Back to Index](#)

INTRODUCTION

The First Annual ASA Meeting Program Worcester, MA, March 31 -April 2, 1976

Richard J. Sherins, MD

In 1975, only five years after beginning my work in male reproductive medicine, I was approached by Emil Steinberger, MD from the University of Texas, to help in forming a new scientific society focused on male reproduction; the American Society of Andrology.

To better understand the impact of the first Annual ASA Meeting held with scientists focused on male reproduction, it is important to understand the twenty-five-year history that preceded the founding of our Society. At that time, I was a young clinical investigator at the NIH having been given the opportunity to develop a program to study the physiology of male reproductive function and infertility. This was only a few years after it was possible to measure hormones in small volumes of blood, where only a few senior investigators existed scattered around the world, where there were few medical school or university programs focused on male reproductive subject material, and where presentation of new scientific information occurred mainly in large scientific forums diluted by the co-existence of a broad array of other scientific disciplines.

The term "Andrology" itself had only been coined in 1951 by Harold Siebke a Professor of Gynecology in Bonn, Germany and the first scientific journal dedicated to Andrological topics (Andrologie) was introduced only in 1969 by Carl Schirren of Hamburg, Germany. In 1970, the scientific organization "Comite Internacional de Andrologia" (CIDA) was formed in Europe, under the principle efforts of Drs. Puigvert and Pomerol of Barcelona and Mancini of Buenos Aires, to promote the study of male reproduction; CIDA adopted Andrologie as its publication arm.

Meanwhile, in North America, efforts in this regard began during the 1960s, when Warren O. Nelson from the Rockefeller Institute in New York

City and Charles LeBlond from McGill University in Montreal, formed the Male Reproductive Biology Club; which later was renamed the Warren O. Nelson Club, a small gathering of like-minded individuals interested in discussing topics on male reproductive biology/disorders. Emil Steinberger became actively involved in the "Club" and soon thereafter became passionately involved in trying to gather a larger group of scientists to form a national society for this purpose. His efforts were helped along by the enthusiastic international participation in the first Testis Workshop, a satellite symposium sponsored by the NIH that was held in Washington, DC in 1972 in conjunction with an International Congress of Endocrinology.

I am always amused when I think back as to how Emil Steinberger actually introduced what he wanted me and others to do in 1975. With an arm on my shoulder, he said, "Richard, I now dub you an Andrologist". I had no idea what he was talking about, as "Andrology" was not yet part of our scientific lexicon. We met at NIH and talked extensively about his perceived need for us to create a national scientific forum focused on male reproductive biology and medicine; a Society that brought together scientists and physicians from a broad spectrum of relevant fields. Such a national forum did not exist at that time; but was seriously needed if one were to make significant progress in the field. I was intrigued by the concept of an American Society of Andrology based on the above principles as this had been the intramural NIH model for success; bringing investigators together in close proximity from a broad array of scientific disciplines to share new concepts and methodologies on the scientific horizon; and above all to establish fruitful collaborations.

Emil recruited about 250 persons to be charter members of ASA both from North

America and abroad; who were recognized for scientific work or clinical interest in male reproduction among the fields of biology, anatomy, endocrinology, urology, gynecology and animal science. While some of the Charter Members were long established academic thought-leaders or clinical specialists, a number of us (including me) were young investigators. The diversity of the charter member group was remarkable; the first organizing meeting taking place in Fort Collins, CO in July 1975 and the first scientific meeting of ASA took place in March/April, 1976 in Worchester, MA.

While time dulls memory after 40 years, thinking about the first ASA meeting in Worchester as an attendee and part of the program committee does bring back strong feelings. The first and most important was that the meeting was truly a conclave of a large number of international experts scattered among a very enthusiastic group of young investigators where the entire 3-day meeting was devoted to the topic of male reproduction. This was novel. Thought-leaders abounded in the crowd; there were provocative discussions after each presentation that led to even more vigorous discussions at happy hour. A broad array of topics were presented from guest speakers and symposia as well as individual papers; that included steroid metabolism, ultrastructure anatomy, cell biology, prostate biology, disorders of sexual development, endocrine physiology, and male infertility to name a few. The second remembrance was the enthusiasm, which I felt to return to the lab and clinic to pursue further studies and to return to the next ASA meeting. Friendships and collaborations developed quickly; the benefits of which have lasted throughout my career.

As Shakespeare wrote, "What's past is prologue"! ASA continues to bring together a broad spectrum of international experts in Andrology with a purposeful mix of basic and clinical science.

*Richard J. Sherins, MD
Past President 1982-1983*



**AMERICAN SOCIETY
OF
ANDROLOGY**

PROGRAM

FIRST ANNUAL MEETING

MARCH 31 - APRIL 2,

1976

**WORCESTER
Massachusetts**

UNIVERSITY OF MASSACHUSETTS

MEDICAL SCHOOL

SESSION SCHEDULE
UNIVERSITY OF MASSACHUSETTS
SCHOOL OF MEDICINE

AMPHITHEATER I.		
DAY	MORNING	AFTERNOON
March 30		<u>Registration</u> 2:00-7:00 1. Salisbury Room Sheraton - Lincoln Inn 2. Main Lobby Medical School
March 31	<u>Registration</u> 8:00-8:30 Medical School Lobby 8:30 - Opening Remarks 8:50 - <u>Symposium Paper</u> 9:50 - <u>Coffee Break</u> 10:05 - <u>Session III.</u> Short Communications	2:00 - <u>State of the Art Lecture</u> 3:00 - <u>Coffee Break</u> 3:15 - <u>Session V</u> Short Communications <hr/> 7:00 - Reception
April 1	<u>Registration</u> 8:00-8:30 Medical School Lobby 8:30 - <u>Symposium Paper</u> 9:30 - <u>Coffee Break</u> 9:45 - <u>Session VII</u> Short Communications	2:00 - <u>Session VIII.</u> Short Communications 4:00 - <u>Coffee Break</u> 4:15 - Business Meeting <hr/> 7:30 - Annual Banquet Presidential Address
April 2	8:30 - <u>Clinical Session</u> 10:30 - <u>Coffee Break</u> 10:45 - <u>Panel Discussion</u> 12:00 - Closing Remarks	

American Society of Andrology

PROCEEDINGS

FIRST ANNUAL MEETING

SPONSORS

THE MEDICAL SCHOOL, UNIVERSITY
of MASSACHUSETTS; THE MEDICAL
RESEARCH INSTITUTE of WORCESTER
INC; and THE SERONO RESEARCH
FOUNDATION, U. S. A. INC.

EDITOR

Eugenia Rosemberg, M.D.
PROGRAM CHAIRMAN
American Society of Andrology

American Society of Andrology

PROGRAM COMMITTEE

1975 - 1976

CHAIRPERSON:

Eugenia Rosenberg, M.D.

MEMBERS:

H. Maurice Goodman, M.D.

Leo E. Reichert, Jr., Ph.D.

Richard J. Sherins, M.D.

Anna Steinberger, Ph.D.

Philip Troen, M.D.

SCIENTIFIC PROGRAM

Wednesday, March 31
Morning

SESSION I

Amphitheater 1

8:30 a.m. **OPENING REMARKS**

Eugenia Rosenberg, M.D.
Program Chairman

Roger J. Bulger, M.D.
Dean
University of Massachusetts Medical School

Edward Budnitz, M.D.
President, Serono Research Foundation, USA, Inc.

Rune Eliasson, M.D.
President, CIDA

SESSION II: SYMPOSIUM PAPER

Amphitheater 1 - 8:50 a.m.

Hormonal and Genetic Factors Affecting the
Development of the Male Genital System

Alfred Jost, M.D.
Professeur au Collège de France et de
l'Université P. et M. Curie, Paris, France

9:50 a.m. Coffee Break

SESSION SCHEDULE

UNIVERSITY OF MASSACHUSETTS
SCHOOL OF MEDICINE

AMPHITHEATER I.		
DAY	MORNING	AFTERNOON
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American Society of Andrology

March 1976

The American Society of Andrology was founded in Detroit, Michigan, on April 25, 1975, in response to a growing need for closer interaction among American scientists and clinicians specializing in the study of the male reproductive tract.

At this, the first Annual Meeting of the Society, we are bringing together the basic scientific and clinical disciplines which comprise the study of andrology. The program promises to be outstanding with presentations by three guest lecturers, a well-rounded selection of short communications to be given by members and guests of the Society, as well as a didactic clinical session. A panel discussion is also scheduled.

We are indebted to those dedicated scientists and individuals who have served on the Local Committee on Arrangements and on the Ladies' Committee. Their combined efforts are responsible for the efficient execution of our meeting. They are named in the following pages. We wish to also thank the members of the Society who will chair the various sessions at this meeting and ensure its success.

This meeting could not have taken place without the support of the University of Massachusetts Medical School which will host the scientific sessions, nor without the cooperation of the staff of the Medical Research Institute of Worcester, Inc., which was operative in the preparation and execution of this meeting. We are particularly grateful to the Serono Research Foundation, U.S.A., Inc., an educational and scientific non-profit institution established under the laws of the Commonwealth of Massachusetts, for the generous financial support of this, the first Annual Meeting of our Society.

Eugenia Roseberg, M.D.

Program Chairman

American Society of Andrology

1975-1976

OFFICERS

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Vice-President
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Treasurer
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Emil Steinberger, M.D.
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E. S. E. Hafez, Ph.D.
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C. Alvin Paulsen, M.D.
Richard J. Sherins, M.D.
Anna Steinberger, Ph.D.
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FINANCE

S. Jan Behrman, M.D.
Andrzej Bartke, Ph.D.
S. Jan Behrman, M.D.
Donald W. Fawcett, M.D.
Eugenia Rosemberg, M.D.
S. Jan Behrman, M.D.

INVITATION TO MEMBERSHIP

The Society invites clinicians and scientists interested in research, diagnosis, and treatment of disorders of the male reproductive and associated systems to participate in its activities. Applications for Membership may be obtained at this Meeting at the Registration Desk, or by writing to E.S.E. Hafez, Ph.D., Secretary of the American Society of Andrology, C. S. Mott Center, 275 East Hancock Avenue, Detroit, Michigan 48201.

GENERAL INFORMATION

Headquarters for the 1976 Meeting of the American Society of Andrology will be at the University of Massachusetts Medical School, 55 Lake Avenue North, Worcester, where all meetings will be held.

On March 30, 1976, registration for the Annual Meeting for participants who have not registered in advance will be from 2:00 to 7:00 p.m. at the University of Massachusetts Medical School. Participants who have registered in advance will obtain their badges and Program Books at the Sheraton-Lincoln Inn, Salisbury Room, 500 Lincoln Street, Worcester, from 2:00 to 7:00 p.m.

After March 30, participants will be able to register at the University of Massachusetts Medical School. Tickets for the Annual Banquet and Applications for Membership will be available at the Registration Desk.

CONDUCT OF SCIENTIFIC PROGRAM

The Scientific Program of the 1976 Meeting will open at 8:30 a.m. on March 31. There will be a Symposium, a State of the Art Lecture, and two Short Communication Sessions. On April 1, there will be one Symposium Lecture and two Short Communication Sessions. On April 2, there will be a Clinical Session and a Panel Discussion.

ANNUAL BUSINESS MEETING

The Annual Business Meeting of the American Society of Andrology will be convened immediately following the Short Communication Session on Thursday, April 1, in the same amphitheater. Committee reports, unfinished and new business will be presented. Attendance is limited to members of the Society; they are urged to attend.

COCKTAIL RECEPTION

All registrants, guests, and their spouses are welcomed to the Cocktail Reception (open cash bar) from 7:00 to 8:30 p.m., Wednesday, March 31, at the Sheraton-Lincoln Inn. This event affords an opportunity for speakers and registrants to mingle and get acquainted.

ANNUAL BANQUET

The Annual Banquet will take place on Thursday, April 1, at 7:30 p.m. at the Sheraton-Lincoln Inn. The Presidential Address will be given at the Annual Banquet. Tickets may be purchased at the Registration Desk.

GUEST SPEAKERS

Alfred Jost, M.D. - Professeur au Collège de France et de l'Université P. et M. Curie, Paris, France

Jean D. Wilson, M.D. - Professor of Internal Medicine, University of Texas Health Science Center at Dallas, Dallas, Texas

Mortimer B. Lipsett, M.D. - Director of the Cancer Center for Northeast Ohio and Professor, Case Western Reserve University, Cleveland, Ohio

C. Alvin Paulsen, M.D. - Professor of Medicine, University of Washington, Seattle, Washington

S. Jan Behrman, M.D., M.S., F.R.C.O.G. - Professor of Obstetrics and Gynecology and Director, Center Research Reproductive Biology, University of Michigan, Ann Arbor, Michigan

Emil Steinberger, M.D. - Professor and Chairman, Department of Reproductive Medicine and Biology, University of Texas Medical School at Houston, Houston, Texas

LOCAL COMMITTEE ON ARRANGEMENTS

Chairpersons : Dr. H. Maurice Goodman
Dr. Andrzej Bartke

Members :

Dr. Lewis E. Braverman	Dr. Sandy Marks
Ms. Susan Dalterio	Dr. John A. McCracken
Dr. Joel Feinblatt	Dr. James P. Preslock
Dr. Mary Harris	Dr. Michael Price
Dr. T. W. Honeyman	Dr. M. S. Smith
Dr. Larry Lipshultz	Dr. Anna Steinberger
Dr. Christopher Longcope	Dr. Robert K. Tcholakian
Dr. Christopher Lubicz-Nawrocki	Dr. Apostolos G. Vagenakis

LADIES COMMITTEE

Chairperson : Mrs. Rebecca Budnitz

Members :

Mrs. Martha Brem	Mrs. Sylvia Jaffee
Mrs. Josephine Calabro	Mrs. Minna Johnson
Mrs. Mildred Cavan	Mrs. Roma Josephs
Mrs. Phyllis Croce	Mrs. Esther Lieberman
Mrs. Bobbi Feinblatt	Mrs. Marilyn Merritt
Mrs. Bernadette Felton	Mrs. Dorothy Mikoloski
Mrs. Sandra Goodman	Mrs. Bobbi Seidman
Mrs. Evelyn Heller	Mrs. Ruth Stern
Mrs. Mary Jane Herrmann	Mrs. Simone Weinert
Mrs. Frances Hiatt	Mrs. Betty Wheeler

SCIENTIFIC PROGRAM

Wednesday, March 31
Morning

SESSION I

Amphitheater 1

8:30 a.m. **OPENING REMARKS**

Eugenia Rosenberg, M.D.
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Hormonal and Genetic Factors Affecting the
Development of the Male Genital System

Alfred Jost, M.D.
Professeur au Collège de France et de
l'Université P. et M. Curie, Paris, France

9:50 a.m. Coffee Break

Wednesday Morning

SESSION III: METABOLIC PATHWAYS - RECEPTORS -
ANTIFERTILITY AGENTS

Amphitheater 1

Chairpersons: Nancy J. Alexander, Ph.D.
C. Alvin Paulsen, M.D.

- 10:05 1. Steroid Metabolism in Isolated Epithelium of Guinea Pig Seminal Vesicle. Randolph C. Steer* and Carlo M. Veneziale, Mayo Medical School, Rochester, MN
- 10:20 2. Steroid Metabolites of the Marmoset Testis. James P. Preslock*, Univ. of Texas Med. Sch. at Houston, Houston, TX
- 10:35 3. Synthesis and Metabolism of Prostaglandin $F_{2\alpha}$ By The Human Prostate. Alice H. Cavanaugh*, SUNY at Buffalo and VA Hospital, Buffalo, NY
- 10:50 4. The Effects of Sympathectomy and Testosterone Propionate On Prostatic Cytosol Receptors. M. James Cosentino* and P. Jones-Witters, Ohio University, Athens, OH
- 11:05 5. Receptor Sites on Human Prostate Tissue for Prostaglandin $F_{2\alpha}$. Wells E. Farnsworth* and Alice H. Cavanaugh, SUNY at Buffalo and VA Hospital, Buffalo, NY
- 11:20 6. Properties of Specific Androgen Receptors in the Hypothalamus and Pituitary Gland of Adult Male Rats. W. W. Leavitt* and L. J. Sholiton, Univ. of Cincinnati Coll. of Med., Cincinnati, OH
- 11:35 7. The Antispermatic Effects of *o*-Nitro-benzenesulfonamide (ORF 11, 133) in Male Rats. Larry A. Kraft* and Allen F. Hirsch, Ortho Pharmaceutical Corp., Raritan, NJ
- 11:50 8. Partial Characterization of the Antispermatic Effects of 5-Aminoindazole. Thomas J. Lobl* and S. E. Porteus, The Upjohn Co., Kalamazoo, MI

* Presenting Author

Wednesday Morning

12:05 2. Studies on the Antitesticular Action of DL-6-(N-2-Pipecolino-
methyl)-5-Hydroxy-Indane In the Rat. Victor S. Fang* and
Winston A. Anderson, Univ. of Chicago, Chicago, IL

12:20 10. Mechanism of Suppression of Rat Ventral Prostate Weights
By Methandrostenolone. R. E. Steele*, F. D dato, and
B. G. Steinetz, CIBA-GEIGY Corp., Ardsley, NY

EXHIBIT 10a. The Molecular Conformation of Androgens and Anti-Androgens.
Jane F. Griffin and William L. Duax, Med. Fdn. of Buffalo,
Buffalo, NY

Wednesday Afternoon

SESSION IV: STATE OF THE ART LECTURE

Amphitheater 1 - 2:00 p.m.

Genetic Disorders and Sexual Development

Jean D. Wilson, M.D.
Professor of Internal Medicine
University of Texas Health Science
Center at Dallas, Dallas, Texas

3:00 Coffee Break

Wednesday Afternoon

SESSION V: PHYSIO-ANATOMIC ANDROLOGY - SPERM

Wed. PM - Amphitheater 1

Chairpersons: Donald Fawcett, M.D.
Stuart S. Howards, M.D.

- 3:15 11. Prepubertal Histochemical and Ultrastructural Changes in the Epididymis of the Rat. Frank E. Snyder*, C. S. Mott Center, Detroit, MI
- 3:30 12. Ultrastructural Changes in Human Fetal Leydig Cells at Mid-Gestation. Bernard Gondos* and Mitchell S. Golbus, Univ. of California, San Francisco, CA
- 3:45 13. Inhibition of the Motility and Metabolism of Human Spermatozoa by Cytochalasin B. Rudolph N. Peterson*, JoAnn Gram, and Matthew Freund, New York Med. Coll., Valhalla, NY
- 4:00 14. Micropuncture Studies of the Effect of Caffeine and Cyclic Nucleotides on the Motility of Rat Epididymal Sperm. Stuart S. Howards* and Robert Wyker, Univ. of Va. Sch. of Med., Charlottesville, VA
- 4:15 15. Effect of Glycerol and Orvus ES Paste on Sperm Cell Acrosin During Freezing and Storage at -196°C. Lawrence A. Johnson* and V. G. Pursel, Animal Physiol. and Genetics Inst., A.R.S., U.S.D.A., Beltsville, MD
- 4:30 16. Kinetic Studies on the Interaction and Specificity of Synthetic Proteinase Inhibitors Towards Human Acrosin. A. K. Bhattacharyya* and L. J. D. Zaneveld, Univ. of Ill. at the Med. Ctr., Chicago, IL
- 4:45 17. Importance of Seminal Plasma Components on the Structural Stability of Human Spermatozoa. Rune Eliasson* and U. Kvist, Karolinska Institutet, Stockholm, Sweden

RECEPTION

7:00 Sheraton-Lincoln Inn

Thursday, April 1
Morning

SESSION VI: SYMPOSIUM PAPER

Amphitheater 1 - 8:30 a.m.

Physiological Regulation of Male Reproductive Function

Mortimer B. Lipsett, M.D.
Director of the Cancer Center for Northeast Ohio
and Professor, Case Western Reserve University,
Cleveland, Ohio

9:30 Coffee Break

SESSION VII: CLINICAL ANDROLOGY

Thur. AM - Amphitheater 1

Chairpersons: Richard J. Sherins, M.D.
Joseph N. Corriere, M.D.

10:00 9:45

18. Endocrine Evaluation of Infertile Men. Gerald S. Bernstein*, Oscar A. Kletzky, Alfredo Ortiz, and Uwe T. Goebelsmann, Univ. So. Calif. Sch. of Med., Los Angeles, CA
- 10:00 19. Study of FSH, LH, and Prolactin Before and After LH-RH and TRH in Infertile Men. R. Roulier*, A. Mattei, and P. Franchimont, Ctr. des Problèmes de la Réprod. Humaine, Marseilles, France, and Radioimmunoassay Lab., Liège, Belgium
- 10:15 20. The GnRH Stimulation Test in the Evaluation of Unilateral Cryptorchidism: A Twenty-Year Retrospective Study. Larry I. Lipshultz* and Peter J. Snyder, Hosp. of the Univ. of Pennsylvania, Philadelphia, PA

Thursday Morning

- 10:30 21. Gonadal Function in Patients with Chronic Renal Failure Maintained with Haemodialysis. Relationship Between Length of Treatment and Patient's Age. G. Bucciante*, A. DaTos, R. DeToni, V. Frizzi, A. Bernardi, and G. Toscano, Univ. of Padua, Hosp. of Pistoia, Padua, Italy
- 10:45 22. The Seminiferous Tubule Wall in Human Hypogonadism. V. Santemma*, S. Francavilla, F. Francavilla, G. Poccia, G. DiCarlo, A. Celli, C. DeMartino, and A. Fabbrini, Istituto Univ. Med. e Chirurgia, L'Aquila, Italy.
- 11:00 23. Semen Analysis: Apparent Biological Breaks in Semen Quality When Related to Sperm Concentration. K. A. Dougherty*, A. T. K. Cockett, and R. L. Urry, Univ. of Rochester, Sch. of Med. and Dent., Rochester, NY
- 11:15 24. Treating the "Subfertile" Male: Improvement in Semen Characteristics After Low Dose Androgen Therapy. R. L. Urry* and A. T. K. Cockett, Univ. of Rochester, Sch. of Med. and Dent., Rochester, NY
- 11:30 25. Clomiphene Test and Clomiphene Therapy in the Hypofertile Male. J. C. Emperaire*, A. Ruffie, P. Roger, and J. Riviere, USN Haut-Leveque, Bordeaux-Pessac, France
- 11:45 26. Effect of Long-Term Estrogen Therapy on the Human Testes. L. Rodriguez*, R. K. Tcholakian, K. D. Smith, and E. Steinberger, Univ. of Texas Med. Sch. at Houston, Houston, TX
- 12:00 27. Seasonal Changes in Body Weight, Testicular Volume, and Semen Parameters of Rhesus Monkeys Following Sham, Unilateral and Bilateral Vasectomy. Richard M. Harrison*, G. Domingue, P. Heidger, J. Roberts, and J. U. Schlegel, Tulane Univ. Med. Sch., Covington, LA
- 12:15 28. The Absence of Sperm-Agglutinating Activity in Human Seminal Fluid After Vasectomy. Aarne I. Koskimies*, Univ. of Helsinki, Helsinki, Finland

*Janusovsk
Prostate Growth
in Biochemical Castration
Eicasson 2 slides*

Thursday Afternoon

SESSION VIII: HYPOTHALAMIC - PITUITARY - GONADAL AXIS

Thur. PM - Amphitheater 1

Chairpersons: Philip Troen, M.D.
Fletcher C. Derrick, M.D.

- 2:00 29. A New Procedure For the Clinical Determination of Urinary LH: Application to Testicular Disorders. Alexander Albert*, A. Nureddin, and R. E. Emslander, Mayo Clinic and Mayo Med. Sch., Rochester, MN
- 2:15 30. Existence of a Follicle-Stimulating Hormone-Inhibiting Factor in Ram Rete Testis Fluid. P. Franchimont*, S. Chari, M. T. Hagelstein, M. L. Debruche, S. Duraiswami, J. Walton, and G. M. H. Waites, Radioimmunoassay Lab., Liège, Belgium, and Univ. of Reading, Reading, England
- 2:30 31. Recovery of Pituitary-Testicular Axis After Acute or Chronic Suppression With Estradiol. R. K. Tcholakian*, M. Chowdhury, and E. Steinberger, Univ. of Texas Med. Sch. at Houston, Houston, TX
- 2:45 32. Mechanism of Luteinizing Hormone (LH) and Testosterone (T) Suppression By Fluoxymesterone (Halotestin). R.A. Vigersky* and D. L. Loriaux, N.I.H., NICHD, Bethesda, MD
- 3:00 33. Effect of Human Chorionic Gonadotropin (HCG) on Interstitial Cells and Androgen Production in the Immature Rat Testis. H. E. Chemes*, M. A. Rivarola, and C. Bergada, Buenos Aires Childrens Hospital, Buenos Aires, Argentina
- 3:15 34. Advanced Puberty in Males. FSH and LH Studies. Salvatore Raiti*, Noel K. Maclaren, and F. Akesson, Univ. of Md. Sch. of Med., Baltimore, MD
- 3:30 35. Hypothalamic, Pituitary, and Gonadal Hormones in Sexual Maturation of the Male Rat. Anita H. Payne*, R. P. Kelch, E. P. Muroc, and J. T. Kerlan, Univ. of Mich., Ann Arbor, MI
- 3:45 36. Differences in the Testosterone-Aggression Relationship Between Men and Women. Harold Persky*, C. P. O'Brien, K.D. Smith, G. K. Basu, and M. A. Khan, Univ. of Penn. and Philadelphia Gen. Hosp., Philadelphia, PA

Thursday Afternoon

4:00 Coffee Break

BUSINESS MEETING 4:15 - 5:30 p.m.

Amphitheater 1

7:30 **ANNUAL BANQUET** Sheraton-Lincoln Inn

Presidential Address:

Emil Steinberger, M.D.
President

Friday, April 2
Morning

SESSION IX: CLINICAL SESSION

Fri. AM - Amphitheater 1

8:30 C. Alvin Paulsen
Semen Analysis: Importance in the
Evaluation of Male Infertility

9:00 Discussion

9:10 S. Jan Behrman
Immunological Role of the Female
Reproductive Tract

9:40 Discussion

9:50 E. Steinberger
Medical Treatment of Male Infertility

10:20 Discussion

Friday Morning

10:30 Coffee Break

SESSION X: PANEL DISCUSSION

Fri. AM - Amphitheater 1

Chairperson: Eugenia Rosenberg, M.D.

10:45 Panelists: A. Albert C. A. Paulsen
N. Alexander L. E. Reichert, Jr.
S. J. Behrman G. T. Ross
R. Eliasson R. Sherins
E. S. E. Hafez A. Steinberger
A. Jost E. Steinberger
M. Lipsett P. Troen

12:00 CLOSING REMARKS

Eugenia Rosenberg, M.D.
Program Chairman

4th floor Dr Goodman's office
Physiology for luggage.

1

STEROID METABOLISM IN ISOLATED EPITHELIUM
OF GUINEA PIG SEMINAL VESICLE

Randolph C. Steer and Carlo M. Veneziale
Mayo Med. School, Rochester, MN 55901

The metabolism of nine radioactively labelled steroids in the epithelium of the seminal vesicle of the mature guinea pig has been studied. The rapid assimilation and metabolism of these steroids demonstrate the very active biochemical nature of this tissue. Based on the use of several thin-layer chromatography systems and comparison to the locations of known standards, the following was observed: testosterone was rapidly converted to dihydrotestosterone and androstandiol. The latter was the major metabolite of dihydrotestosterone and of androsterone. Androstenedione was readily converted to androstenedione, testosterone, and dihydrotestosterone, although it formed little androstandiol. Dehydroepiandrosterone was converted to small amounts of androstenediol and androstandiol. Pregnenolone was rapidly converted to an unidentified highly polar compound only. Progesterone was converted to 5α -pregnane- 3β -ol-20-one and its 3α -isomer. Dehydroepiandrosterone and progesterone were also significantly converted to unidentified highly polar compounds.

The major metabolites of 17-hydroxyprogesterone were co-chromatographed with standard androstandiol, testosterone, and an unidentified metabolite possessing intermediate chromatographic mobility. In addition, 17-hydroxyprogesterone was converted to small amounts of compounds possessing R_f values identical to standard androstenedione and dihydrotestosterone. The identification of the products of 17-hydroxyprogesterone metabolism and their physiologic significance must await critical evaluation.

Because of its homogeneity, isolated epithelium of guinea pig seminal vesicle shows promise as a tissue preparation for use in future studies that might elucidate the role(s) of individual androgens in secretory tissues of the male accessory sex organs. Our demonstration of extensive steroid interconversions in this tissue is a logical prerequisite to such studies.

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STEROID METABOLITES OF THE MARMOSET TESTIS

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Comparatively little information is available regarding the biosynthesis of steroids by the testis of non-human primates. Marmosets are New World primates of the family Callithricidae, and the following studies were to determine the major steroid metabolites formed from selected androgen precursors by the testis of this primate species. The left testis was removed from an adult marmoset and cut into 50 mg fragments. The fragments were teased, placed into flasks containing Krebs-Ringer bicarbonate buffer, pH 7.4, and incubated at 37°C. Fragments were incubated in duplicate for 3 hours with pregnenolone-7- 3 H(2 μ Ci) or progesterone-7- 3 H(2 μ Ci), or for 5 hours with acetate-1- 14 C(5 μ Ci). Reactions were terminated, incubation media extracted with cold diethyl ether:chloroform (4:1), and metabolites separated by paper chromatography in hexane:formamide (1:1), and hexane:benzene:formamide (1:1). Metabolites were identified by comparison of mobilities in selected thin-layer chromatography systems with that of authentic standards, formation of acetylated derivatives, and recrystallization to constant specific activities. 17 α -Hydroxyprogesterone was the predominant metabolite formed from incubation of marmoset testicular fragments with radiolabelled pregnenolone, with 42.7% of the pregnenolone con-

verted into this metabolite. Testosterone was the next predominant metabolite formed, with 20.5% of the pregnenolone converted into it, while androstenedione and progesterone contained 11.4% and 9.2% of the original radioactivity, respectively. Major metabolites of progesterone were 17 α -hydroxyprogesterone (49.0%), testosterone (21.2%), and androstenedione (10.7%). Radiolabelled acetate was converted into progesterone (14.8%), testosterone (17.3%), 17 α -hydroxyprogesterone (20.1%), pregnenolone (12.4%), and androstenedione (18.5%). These results demonstrate that the marmoset testis can convert selected precursors into androgens and androgen intermediates similar to that of other vertebrate species. The relatively high levels of 17 α -hydroxyprogesterone resulting from incubation of marmoset testicular fragments with pregnenolone and progesterone are similar to that reported for incubation of progesterone with human testicular biopsies from patients with Klinefelter's Syndrome.

3 SYNTHESIS AND METABOLISM OF PROSTAGLANDIN F₂ α BY THE HUMAN PROSTATE

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We have found that the human prostate possesses the ability to both synthesize and metabolize prostaglandin F₂ α . After incubating prostate tissue with arachidonic acid, we have been able to isolate and quantitate PGF₂ α by radioimmunoassay. Quantitation of the PGF metabolites, 15-keto-PGF₂ α and 13,14-dihydro-15-keto-PGF₂ α , by the Upjohn Company, also revealed significant metabolism of the prostaglandin. We were able to show prostaglandin synthesis and metabolism using both prostate minces and microsomal preparations; however, microsomes showed less activity, indicating the need for an intact membrane.

Since prostate is an androgen-dependent tissue, we incubated prostate tissue in the presence of 10⁻⁹ to 10⁻⁷M testosterone. Since lactogens are known to favor prostate reception to androgens, human placental lactogen (HPL) was also added to some incubations. Little effect on assayable prostaglandin F was observed; however, significant influences on metabolism were evident in the androgen- and lactogen-treated tissue. Metabolism was followed by incubating ³H-PGF₂ α with prostate minces in the presence and absence of testosterone and HPL. Radioactivity in the metabolites was significantly increased when testosterone and HPL were added together.

These results lead us to believe that the human prostate is an adequate site for prostaglandin synthesis. Furthermore, the metabolism of the prostaglandin seems to be enhanced by androgen. That we saw no apparent increase in assayable PGF₂ α may be a reflection of both accelerated synthesis and metabolism. The significance of this will be clarified when the biological activity of prostaglandin metabolites has been elucidated.

This work was performed at the VA Hospital, Buffalo, New York, in the laboratory of Dr. W. Farnsworth. Thanks is given to the Upjohn Company, Kalamazoo, Michigan, for their generous donation of prostaglandin antisera, prostaglandin standards, and helpful suggestions. Assays of prostaglandin metabolites were done through the courtesy of Dr. John Wilks of the Upjohn Company.

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THE EFFECTS OF SYMPATHECTOMY AND TESTOSTERONE PROPIONATE
ON PROSTATIC CYTOSOL RECEPTORS

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The effects of bilateral sympathectomy (SYM), testosterone propionate (TP) at 1 mg/day, or both (SYM-TP) on cytosol receptor binding of dihydrotestosterone (DHT) were studied in ventral prostate tissue obtained from adult Holtzman rats. Prostate tissue from rats of each group was perfused with isotonic saline, homogenized in tris-HCl buffer, and the 105,000x g supernatant obtained. Incubation with ^3H -DHT was done *in vitro* for 16 hours at 4°C. Cytosol receptor binding of DHT was quantified using the dextran-coated charcoal method. Specific binding of DHT was represented by the calculated difference between values obtained after incubation of ^3H -DHT alone (total binding) and those obtained after incubation with ^3H -DHT plus unlabelled DHT. Assessment of total binding indicated 7.4×10^{-15} moles of DHT bound/mg of cytosol protein for untreated control animals. Binding assays showed a marked decrease of total binding in SYM animals (4.0×10^{-15} moles/mg protein) and for SYM-TP animals (4.1×10^{-15} moles/mg protein) as compared to the untreated controls. The TP animals showed an increase in DHT-receptor interaction (9.8×10^{-15} moles/mg protein). The prostate weights (mg%) of the SYM animals showed no significant variation from the controls, while the SYM-TP group and the TP animals showed a marked increase in gland weight. This suggests that the sympathectomies did not alter the androgen secretion of the testis. Addition of unlabelled steroid showed no specificity for binding DHT in the sympathectomized group and greater specificity for binding in the group receiving TP alone. Even though the total binding in SYM-TP animals was markedly decreased, the specificity for DHT was maintained. The results indicate that both hormonal and neural influences are involved in regulation of steroid receptor specificity and receptor concentrations. The effects of a sympathetic blocking agent on prostatic cytosol receptors are currently being studied.

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RECEPTOR SITES ON HUMAN PROSTATE TISSUE
FOR PROSTAGLANDIN $\text{F}_{2\alpha}$

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We have found specific binding sites on prostatic tissue membranes for prostaglandin $\text{F}_{2\alpha}$.

Prostate tissue obtained from suprapubic prostatectomy was frozen until ready for use. Tissue was thawed, and membranes were isolated by the procedure of Medolesi. After suspending the membranes in .01 Tris-HCl buffer, aliquots were incubated 1 hour at room temperature with high specific activity (approximately 100 $\mu\text{C}/\text{nmole}$) $\text{PGF}_{2\alpha}$. Unbound $\text{PGF}_{2\alpha}$ was separated from bound by filtration on a Millipore filter followed by extensive washing of the filter with the Tris buffer. Filters were then cut in half and counted in a liquid scintillation counter. Significant amounts of activity were found bound to the membranes caught on the filter. Activity could be displaced by adding cold $\text{PGF}_{2\alpha}$ to the incubation mixture. The influence of lactogen on prostaglandin binding is now under investigation.

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PROPERTIES OF SPECIFIC ANDROGEN RECEPTORS
IN THE HYPOTHALAMUS AND PITUITARY GLAND OF ADULT MALE RATS
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Different brain regions and the anterior pituitary gland were examined for specific binding components (receptors) for 5 α -dihydrotestosterone (DHT). Cytosol fractions were prepared in 50 mM Tris buffer pH 7.5 containing 1 mM EDTA, 12 mM thioglycerol, and 10% glycerol (buffer A). The sedimentation properties of specific ^3H -DHT binding components in cytosol and serum samples were studied by density gradient centrifugation using 5-20% sucrose gradients prepared in buffer A. The binding affinity (K_A) and quantity of receptors were measured by Scatchard plot analysis of specific ^3H -DHT binding data. Binding specificity was evaluated by a competitive binding assay and by competition studies done using density gradient centrifugation procedures. Cytosol fractions from ventral prostate, anterior pituitary, and hypothalamus contained a high affinity, limited capacity ^3H -DHT binding component with an 8S sedimentation coefficient in low ionic strength medium. This component was not detected in serum nor in cytosol fractions prepared from cerebral cortex, hippocampus, and olfactory lobe. This substance possessed the properties expected of a hormone receptor, i.e., high binding affinity ($K_A \sim 10^{11} \text{M}^{-1}$) and hormonal binding specificity (DHT > testosterone > estradiol = progesterone > cortisol). In adult male rats castrated for 24 hours, the receptor concentration in ventral prostate was 18 pmole/gm fresh tissue (0.5 pmole/mg protein). Receptor concentration in anterior pituitary and hypothalamus was about one-half and one-tenth that of ventral prostate, respectively. After one week of castration, the prostate receptor titer dropped to low levels, whereas the receptor concentration in pituitary and hypothalamus remained at levels comparable to those present 24 hours after castration. These results demonstrate that hypothalamic and pituitary DHT receptors are maintained after castration which is in contrast to the rapid decline observed in prostate receptor levels. This observation suggests that hypothalamic and pituitary DHT receptor levels may be regulated in a different manner than are prostate receptor titers. Since the physicochemical properties of DHT receptors in hypothalamus, pituitary, and prostate were found to be similar, i.e., 8S sedimentation coefficient and a high binding specificity for DHT, our results support the hypothesis that similar DHT receptor molecules are present in these target tissues, but the control of DHT receptor levels in hypothalamus and pituitary is different from that operative in ventral prostate. (Supported by VA grant MRIS 7877.)

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THE ANTISPERMATOGENIC EFFECTS OF o-NITRO-
BENZENESULFONAMIDE (ORF 11,133) IN MALE RATS
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The inhibition of male fertility by o-nitro-benzenesulfonamide (ORF 11, 133) was investigated in adult Wistar rats following oral (i.g.) administration at 1, 5, and 10 mg/kg. Fertility of the males was determined at weekly intervals by cohabitation with proestrus females which were autopsied on day 14 of gestation for the examination of implantation sites. Twenty-eight days of treatment with ORF 11,133 at 1 mg/kg did not reduce fertility nor alter the histological morphology of the testes. At treatments of both 5 and 10 mg/kg, fertility was normal after 14 days, markedly decreased after 21 days, and showed complete inhibition by 28 days. Fertility returned 4-5

weeks after cessation of treatment, but did not reach normal rates for an additional 3-4 weeks. A dose-related inhibition of spermatogenesis was observed in histological preparations of the testes. When administered at 5 mg/kg for 14 days, ORF 11,133 induced partial germinal epithelial atrophy and loss of spermatozoa; however, testes weights were only slightly reduced, and some tubules were still undergoing spermatogenesis. In contrast, 14 days of treatment at 10 mg/kg caused approximately a 50% decrease in testes weights and nearly complete aspermatogenesis in most of the seminiferous tubules. The results after 28 days of treatment were similar at both 5 and 10 mg/kg; spermatozoa and spermatids were completely eliminated, and a partial disappearance of primary and secondary spermatocytes was observed. Spermatogonia were present in all tubules, but appeared to be reduced in quantity in some areas. Sertoli cells and Leydig cells appeared to be unaffected. Neither libido nor accessory sex organ weights were decreased in these ORF 11,133 treated male rats. The antispermatogenic activity of various nitro-heterocyclic compounds is well-known. These data indicate that a nitro-aromatic compound also has antifertility effects in male rats.

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PARTIAL CHARACTERIZATION OF THE ANTISPERMATOGENIC EFFECTS OF 5-AMINOINDAZOLE

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Interruption of the normal spermatogenic process in rats has been achieved with 5-aminoindazole, a compound not previously known to have this property. 5-Aminoindazole, or a molar equivalent of its water soluble hydrochloride salt, administered orally 4 days a week for 2 weeks at 200 mg/kg daily, was found to inhibit spermatogenesis and fertility without significantly changing seminal vesicle or ventral prostate weights. The compound causes the formation of giant and multinucleated cells and the exfoliation of immature germ cells of all developmental stages into the lumen of the seminiferous tubule. An effective dose causes the seminiferous epithelium in many tubules to be reduced to a basal layer of primary spermatogonia and Sertoli cells. The maximal effect appears about 10 days subsequent to the last dose. The epididymis empties of germ cells rapidly after an effective antispermatogenic treatment and is largely void of sperm by day 21 of the experiment. In an experiment where a group of rats were dosed as described above and serially mated starting on day 21 until day 132 of the experiment, sperm were seen in the caput epididymis of 3/3 rats by day 62, and fertility was demonstrated in 3/4 rats by day 132. Histological examination of the rat testes taken on day 132 found some inactive tubules where there was little recovery of the germinal epithelium. We conclude from these experiments that 5-aminoindazole is an orally active and rapidly effective antispermatogenic compound in the rat, and that short-term administration of the compound causes reversible infertility as judged by mating.

STUDIES ON THE ANTITESTICULAR ACTION OF
DL-6-(N-2-PIPECOLINOMETHYL)-5-HYDROXY-INDANE IN THE RAT
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The antitesticular action of DL-6-(N-2-pipecolinomethyl)-5-hydroxy-indane maleate (PMHI) was reported by Boris et al. The effects of PMHI on the male reproductive endocrine functions and the precise mechanism of action have not been investigated. We treated both prepubertal and adult rats with a single oral, submaximal dose of either 60 mg or 120 mg of PMHI per kg of body weight. Their testicular weight was drastically reduced. A follow-up, beginning on the 3rd day post-treatment and continuing for a period of 50 days, showed normal growth of PMHI-treated rats. The hormonal profile indicated that none of the serum levels of LH, FSH, estrogen, or testosterone were abnormal. Testicular histology revealed that the spermatogenic process in PMHI-treated rats recovered at a dose-related rate. Electron microscopic sections of testes of adult rats treated with PMHI similarly showed cytoplasmic vacuolation in the Sertoli cells 5 h post-treatment. The subsequent cascade of arrested spermiogenesis included abnormal acrosomal condensation of spermatids and sloughing of mono- and polynucleated spermatids. Some spermatocytes also seemed to be affected, but spermatogonia and Leydig cells remained intact. These hormonal and histological results suggest that PMHI acts primarily on Sertoli cells and causes arrest in the spermiogenetic stage of the spermatids. In rats treated with a higher and toxic dose of PMHI (180 mg/kg), however, spermatocytes and even spermatogonia were also affected, probably due to the extensive damage of the supporting Sertoli cells by the compound. This work was partially supported by NIH grant HD-07110.

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MECHANISM OF SUPPRESSION OF RAT VENTRAL
PROSTATE WEIGHTS BY METHANDROSTENOLONE
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Intact adult rats received seven daily s.c. injections of 1.25 mg methandrostenolone (M)/100 g/day in oil which reduced the organ/body wt (bwt) ratio of the testis to 87%, seminal vesicles to 62%, and ventral prostate (VP) to 67% of control values. Body and kidney wts were not affected, while the levator ani was increased to 133% of control values. To determine if the reduction in VP wt resulted from an anti-androgenic effect of M, the ability of M to inhibit DNA synthesis by VP tissue was assessed. Rats (350-400g) were castrated and 1 week later injected s.c. daily for 3 days with either 450 µg testosterone (T)/100 g, 900 µg M/100 g, the combination of M + T, or oil (vehicle). Twenty-four hrs after the last injection, the rats were killed, and the VPs excised, weighed, and minced. Aliquots (300 mg) were incubated for 20 min at 37°C in 5 ml of Eagle's Basal Medium containing 15 µCi of (Me-³H) thymidine/ml (50-55 Ci/mmole). The nuclear fractions were isolated, and total radioactivity and DNA determined (Burton, Biochim. J., 62: 315, 1956). VPs were 3 times heavier, and DNA synthesis was more than 30-fold greater in T-treated rats than in oil-treated controls (>3000 DPM/µg DNA/20 min vs. <100 DPM/µg DNA/20 min). When administered concomitantly with T, M failed to antagonize the effects of T on VP wt or DNA synthesis. Thus, M did not act as an anti-androgen. To assess the possible effects of M on endogenous secretion of T, intact rats (350-400 g) were fitted with catheters and injected daily s.c. with either 4 mg M, or oil (vehicle). At

16 and 24 hrs after each injection, a blood sample was obtained for radioimmunoassay of plasma T. T values for controls followed a diurnal variation with morning values (3346 ng/ml) being significantly ($p < 0.05$) higher than afternoon values (1585 ng/ml). Within 48 hrs after administration of M, plasma T was reduced to < 500 ng/ml. Similarly, M reduced the elevated plasma LH of castrated rats (240-560 ng/ml) to values subnormal for intact rats (4-11 ng/ml). These findings suggest that M reduces VP wts of intact rats by suppressing LH and thereby lowering plasma T.

10a
(Exhibit)

THE MOLECULAR CONFORMATIONS
OF ANDROGENS AND ANTI-ANDROGENS
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The crystal structure determinations of over 280 natural and synthetic steroid molecules reported from 1956 to 1976 constitute the most detailed block of structural data on any class of biologically active molecules in existence and provide a wealth of raw material concerning molecular conformation and intermolecular interactions ideally suited to the analysis of structure-function correlations. The utilization of these data for purposes of exploring biochemical reactions at the molecular level has been inhibited by lack of communication among structural chemists, biochemists, and clinicians. In order to facilitate such a utilization of structural data in the exploration of molecular mechanisms of steroid hormone action, all crystallographic data concerning estranes, androstanes, and pregnanes has been assembled in the Atlas of Steroid Structure, Volume I, William L. Duax and Dorita A. Norton, Editors, Plenum Press, New York, New York, 1975.

The Atlas of Steroid Structure contains twelve androgen, anti-androgen, or known inactive compounds. In addition, six other androgen or anti-androgens have already been analyzed for inclusion in Volume II of the Atlas. Of particular interest are the structures of the anti-androgens cyproterone acetate (PR54) and BOMT (AN09) which are known to selectively block the high affinity binding of 5 α -DHT without impairing 5 α -reductase activity; this means they do not compete with testosterone. By analyzing the structural data together with specific binding data, it is possible to gain some insight into the nature of the active sites of the androgen receptor and the 5 α -reductase.

Copies of the Atlas of Steroid Structure are available for inspection at this meeting, and charts and diagrams illustrating comparative conformational analysis of the androgen and anti-androgens have been prepared based upon the data presented in the Atlas.

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Spermatozoa are transported to the epididymis of the rat in about 45-50 days. These spermatozoa may mature and acquire fertilizing ability due to interactions with epididymal epithelial secretions. Epididymides of pre-pubertal rats of ages 7, 14, 21, 30, and 45 days were used in histochemical and/or TEM investigations to determine maturational changes in the epididymis prior to the entry of testicular spermatozoa. Metachromatic staining of nucleoprotein by azure B indicated the presence of ribonucleoprotein (RNP) in the proximal segments of the caput epididymides. RNP was present as large accumulations of rough endoplasmic reticulum, indicating that proteins may be elaborated long before epididymal spermatozoa are present. In the distal segments of the caput, the basal regions of the epididymal epithelium showed invaginations of the plasma membrane with enclosed mitochondria, indicating absorptive function and possible transfer of luminal materials to the blood supply underlying the basal lamina in these areas. This supposition is based on the striking subcellular structural similarities between this tissue and renal tissue of known absorptive function. Histochemical monitoring of changes taking place in sections of whole epididymides included acid mucopolysaccharide, alkaline phosphatase, and neutral mucopolysaccharide localization utilizing Spicer's alcian blue techniques, Takamatsu's cobalt nitrate technique, and McManus's periodic acid-Schiff technique, respectively. Acknowledgements: Thanks to Dr. Stu Swihart for his generosity and Mr. Phil Sherman for his expert technical assistance.

ULTRASTRUCTURAL CHANGES IN HUMAN FETAL
LEYDIG CELLS AT MID-GESTATIONBernard Gondos and Mitchell S. Golbus
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The extensive development of human fetal Leydig cells during the 3rd and 4th months of gestation is well-known, but some question exists as to the fate of these cells after the early developmental period. The present study was undertaken to evaluate the fine structure of Leydig cells in their period of active proliferation and in the regressive phase beginning at 18 weeks. Electron microscopic examination was performed on testicular specimens obtained from 22 fetuses following abortion by prostaglandin induction or hysterotomy. The crown-rump lengths ranged from 5.2 to 19.0 cm., corresponding to fetal ages of 10 to 20 weeks. During the 10- to 18-week period, Leydig cells occupied a major portion of the testicular parenchyma, and, in 0.5 to 1 μ m, sections of plastic-embedded tissue were seen to be arranged in dense groups of large, round to oval cells with abundant cytoplasm containing large numbers of mitochondria and other organelles. By electron microscopy, the cells were filled with smooth endoplasmic reticulum and large pleomorphic mitochondria, some of which contained osmiophilic lipid-like inclusions. The cell membranes of adjacent cells were closely aligned, with many gap junctions evident. In contrast, after 18 weeks, the cells were less closely aggregated, often occurring as single cells. Some retained the morphologic appearance of fully differentiated Leydig cells, while others had a more oval to elongated shape, with fewer mitochondria, more lipid, and lesser amounts of smooth endoplasmic reticulum than the fully differentiated

cells, and mitochondria generally lacked lipid-like inclusions. The nuclei and general architecture of these cells remained intact, and no degenerating forms were seen. This last observation indicates that the regressive changes are not associated with cell death, but rather represent a reversion to a less well-differentiated state. The findings suggest that the cells which undergo regressive changes at mid-gestation remain to redifferentiate at a later time, possibly contributing to the stock of adult Leydig cells which appear at the time of puberty. Supported by grants from the U.S. Public Health Service (HD 08202) and the National Foundation-March of Dimes (CRBS-321).

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INHIBITION OF THE MOTILITY AND METABOLISM
OF HUMAN SPERMATOZOA BY CYTOCHALASIN B
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Cytochalasin B, an agent which interacts with filamentous proteins in cells, inhibits the motility and metabolism of washed human spermatozoa at low concentrations (20-200uM). Glycolysis is inhibited by 50% at a cytochalasin B concentration of 100uM and by more than 70% at 200uM. The motility of spermatozoa declines slowly upon addition of 100uM cytochalasin B to 20-40% of control values after 45 minutes, but is not abolished even after prolonged treatment (2 hours). The addition of caffeine to washed sperm suspensions increases the percentage of motile cells 10-20%, increases the rate of flagellar contraction, and markedly stimulates the rate of glycolysis. However, if cytochalasin B is given simultaneously with caffeine, there is no change in the inhibition of motility nor in the inhibition of metabolism caused by the presence of cytochalasin B. In view of recent evidence suggesting a relation between cyclic AMP and the function of filamentous proteins (Olsen, R.W., *J. Ther. Biol.*, 49:263, 1975), it is proposed that cytochalasin B may interfere with the interaction of cyclic AMP and microfilaments in human spermatozoa. Supported by Grant HD-0934-01, NICHD, USPHS.

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MICROPUNCTURE STUDIES OF THE EFFECT OF CAFFEINE AND CYCLIC
NUCLEOTIDES ON THE MOTILITY OF RAT EPIDIDYMAL SPERM
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These studies were conducted to determine the effects of dilution, dextrose, caffeine, 3'5' cyclic AMP (cAMP), and dibutyryl cAMP (diCAMP) on the motility of sperm obtained *in vivo* by micropuncture from the rete testis, caput epididymides, and cauda epididymides of the rat. The testicles and epididymis of mature, anesthetized rats were exposed for micropuncture. Samples were aspirated in micropipettes from the rete testis, caput, and cauda. The samples were divided into the following six groups: I, no dilution; II, dilution with a physiologic buffer; III, as Group II plus 10mM dextrose; IV, as Group II plus 10uM caffeine; V, as Group III plus 5uM cAMP; VI, as Group III plus 5uM diCAMP. The specimens were placed on a slide warmer, viewed with a microscope, and the motility was evaluated. Samples from the rete testis did not demonstrate significant motility under any experimental

conditions, and epididymal samples were not motile in their native fluid. Addition of a physiologic buffer induced motility in caput and caudal sperm. The addition of dextrose further increased motility of sperm from the proximal and distal epididymis ($p < .02$ and $p < .003$). Caffeine, CAMP, and diCAMP significantly increased the motility of caput sperm ($p < .004, < .003, < .003$), but did not induce progressive motility in these sperm. DiCAMP was very slightly more effective than CAMP ($p = .04$). Caffeine slightly but significantly increased the motility of caudal sperm ($p = .01$). CAMP and diCAMP did not affect the motility of caudal sperm. This work confirms in epididymal sperm obtained *in vivo* by micropuncture the previously observed effects of dilution and dextrose on motility. We have also confirmed Hoskins's observation of stimulation of caput sperm by caffeine and cyclic nucleotides. The absence of response of caudal sperm to CAMP and diCAMP may be explained by the high base line motility (58.8±4.4 per cent) in these sperm under our experimental conditions.

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EFFECT OF GLYCEROL AND ORVUS ES PASTE ON SPERM CELL ACROSIN DURING FREEZING AND STORAGE AT -196°C

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A study was conducted to determine the effect of 0, 0.5, or 1% Orvus ES Paste (OEP) with or without 1% glycerol (G), as components of the Beltsville freezing extender (BF-5), on the acrosin (EC 3.4.21.10) content of porcine spermatozoa. The extender and the freezing and thawing procedures used to process the semen have been described (Pursel, V.G. and Johnson, L.A., *J. Anim. Sci.*, 40:99-102, 1975). Semen collected as the sperm-rich fraction from three boars was pooled and split into aliquots containing 3×10^9 sperm. Six billion sperm were frozen and stored at -196°C for each of the six combinations. Three billion sperm were thawed and extracted for acrosin, 2 to 4 days after freezing (T1); the remaining 3×10^9 sperm were thawed and extracted 2 months later (T2). Morphological evaluation of the sperm acrosomes and sperm motility estimates were made after thawing. Extracts were assayed for enzyme activity using Benzoyl-arginine ethyl ester (BAEE) and fractionated using acrylamide gel electrophoresis (pH 4.3). Gels were stained for acrosin activity by the hydrolysis of Benzoyl-arginine-p-naphthylamide (BANA) coupled to a Fast Black K salt (FBK). Specific enzyme activity was not altered by any treatment at either T1 or T2 ($P > .05$); average values (units/mg protein; $n = 6$) were 5.58 and 5.29 for T1 and T2, respectively. Four molecular fractions of acrosin activity were visualized by BANA-FBK. The amount of protein extracted from the sperm cells did not differ ($P > .05$) among the treatments; mean protein was $3.27 \mu\text{g}/10^6$ sperm at T1 and 4.21 at T2. A higher percentage of sperm acrosomes was morphologically damaged in 0% OEP - 0% G and 0% OEP - 1% G than for the other treatments ($P < .05$). Sperm motility was higher for 0.5% OEP - 1% G and 1% OEP - 1% G than for the other treatments ($P < .05$). At the levels tested, OEP and G had no effect on boar sperm cell acrosin concentration whether stored at -196°C for 4 days or 2 months.

The sperm acrosome contains a neutral proteinase (acrosin, EC 3.4.21.10) which aids the spermatozoon in penetrating zona pellucida of the ovum during fertilization. The addition of natural and synthetic inhibitors of acrosin to capacitated spermatozoa prevents fertilization. Synthetic inhibitors also prevent conception when placed vaginally before coitus. Such inhibitors have the potential to be practical contraceptive agents, and a search was therefore performed to find the most active synthetic acrosin inhibitor(s) that shows the greatest specificity for acrosin. Sixty-four synthetic proteinase inhibitors were obtained from commercial sources and tested for their inhibitory activity towards human acrosin and, if active, towards human pancreatic trypsin. The Michaelis constant for human sperm acrosin, using BAEE concentrations ranging from 0.0125 mM to 0.4 mM, was $4.25 \times 10^{-5}M$. The most active inhibitor ($K_i = 1.5 \times 10^{-8}M$) was p-nitrophenyl p'-guanidino benzoate (NPGB) which inhibited acrosin instantaneously, even at a concentration of $1 \times 10^{-7}M$. The compounds M and B 4596, p-amino benzamidine, p-[m-(m-fluorosulphonyl phenylureido) phenoxy ethoxy]benzamidine, n- α -p-tosyl-L-lysine chloromethyl ketone, 2-2' dibromopropamidine isethionate, pentamidine isethionate, and propamidine isethionate were also effective inhibitors of human acrosin (K_i values ranged from $10^{-3}M$ to $10^{-6}M$), but were at least 200-3000 times less active than NPGB. All other inhibitors were less active. The K_i values of the active inhibitors towards pancreatic trypsin were approximately the same as those towards acrosin, although occasionally 5-fold differences were observed. Dixon plots showed that all active inhibitors, with the exception of NPGB, possessed a competitive type of inhibition towards acrosin. NPGB showed a mixed or non-competitive type of inhibition. Recent studies showed that NPGB is also the most active antifertility agent of all the inhibitors tested to date when evaluated *in vitro* using mouse gametes or *in vivo* as a vaginal depository using the primate (Maccaca arctoides) as the experimental animal.

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IMPORTANCE OF SEMINAL PLASMA COMPONENTS ON
THE STRUCTURAL STABILITY OF HUMAN SPERMATOZOAR. Eliasson and U. Kvist
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Spermatozoa undergo maturation in the epididymis resulting in the establishment of structural stability. Ejaculated spermatozoa from sub-human mammalian species have a homogenous degree of stability when exposed to sodium dodecyl sulphate (SDS), with or without dithiothreitol (DTT). In contrast, the nuclei of ejaculated human spermatozoa reveal considerable variation in the degree of lysis when exposed to these agents. Bedford (J.Repr. Fert. 1973, 33, 19-29) noted that SDS alone caused moderate to gross swelling in 16% of the nuclei in ejaculates from normal volunteers, but up to 60% in semen from some infertile men. With the same technique, we noted that spermatozoa have a lower resistance to SDS a few minutes after ejaculation than later. In semen with biochemical evidence of normal secretory function of the prostate and seminal vesicles, full stability was reached within 15

minutes, but significantly slower development was seen in semen with low concentrations of zinc and magnesium and low acid phosphatase activity. Spermatozoa removed from the first part of split-ejaculates (i.e., "prostatic" fluid) were much more resistant to SDS than spermatozoa recovered from the "vesicular" fluid. Spermatozoa from semen with indication of decreased prostatic function were therefore transferred to prostatic fluid from "normal" men. With this approach, a significant acceleration in the development of structural stability was noted. Stability could also be obtained by adding zinc to the seminal plasma; however, magnesium and calcium had no effect. Our observations confirm that human spermatozoa display heterogeneity in structural stability. Factors in the seminal plasma -- particularly in the prostatic fluid -- influence the development of this stability. Therefore, the secretory function of the human male accessory genital glands is necessary for the functional properties of the spermatozoa.

SHERINS

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ENDOCRINE EVALUATION OF INFERTILE MEN

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FSH, LH, testosterone (T), and DHT were measured by radioimmunoassay in the sera of 91 men attending the U. S. C. infertility clinic. A group of men with normal semen analyses attending the vasectomy clinic served as controls. The control group had normal hormone levels with a log-normal distribution. Patients with normal sperm counts whose infertility was caused by an immunological factor or infection also had normal hormone levels. All of the infertility patients had normal thyroid and adrenal function.

There were two subgroups of 18 men with azoospermia, and 37 men with oligospermia for whom there were sufficient data to arrive at a diagnosis. Six of the patients with azoospermia had a 47XXY karyotype and elevated gonadotrophins, although four had normal levels of T. Four patients had Sertoli-cell only syndrome. Two of them had elevated gonadotrophins, but two had normal gonadotrophins, contrary to what was expected for this condition. Patients with obstructive azoospermia secondary to vasectomy or an anatomical abnormality had normal hormone levels.

Patients with oligospermia were divided into three groups depending on whether their gonadotrophin levels were elevated (4 men), normal (31 men), or low (1 man), and these groups were further divided on the basis of a normal or low T. (DHT levels were closely related to T values.) Patients with a varicocele had normal gonadotrophins and T levels, but fourteen of the other patients with normal gonadotrophins had reduced levels of T. There was no correlation between testicular histology and T levels in those cases where the patient had a testicular biopsy.

The division of oligospermic patients into subgroups on the basis of gonadotrophin and T levels may be of value in selecting a method of therapy. Some of the patients included in this evaluation and new patients entering the clinic are being treated with some of the otherwise non-specific therapeutic agents in order to test this hypothesis.

Prol and 2 Brom Ergocryptine

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STUDY OF FSH, LH, AND PROLACTIN BEFORE AND
AFTER LH-RH AND TRH IN INFERTILE MEN

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LH-RH (100µg) and TRH (200µg) tests were performed on 150 infertile male subjects.

FSH, LH, and prolactin were assayed by radioimmunological methods, and from this study we can conclude the following:

1. In primary testicular disorders (Klinefelter's syndrome, post-orchitis, etc.), the FSH basal levels are elevated, and the LH-RH response is proportional to basal levels. When the LH basal levels are normal or elevated, the LH-RH response is augmented.
2. A good correlation between FSH and LH response is found. Basal levels of prolactin are normal, but, in 20% of the subjects, the response to TRH injection is elevated.
3. In idiopathic azoospermia and oligospermia
 - a. The basal levels and the response to stimulation tests are variable;
 - b. In 40% of the subjects, the response is comparable to those described in primary testicular disorders;
 - c. 40% of the subjects elicited a normal response;
 - d. In 10% of the subjects, a diminution of basal levels of FSH or LH and decreased response to the LH-RH test is seen;
 - e. In 10% of the subjects, excluding hypophysial tumors and iatrogenic causes, an increase of prolactin basal levels is noted;
 - f. TRH response in these subjects is normal or elevated.

On the basis of this study, treatment with 2 bromo- α -ergocryptine is being undertaken for those subjects with increased prolactin levels. Gonadotropins are being administered to subjects with diminished basal levels or diminished LH-RH response. Supported by INSERM, and, at the moment, R. Roulier is spending a year with Professor P. Franchimont.

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THE GnRH STIMULATION TEST IN THE EVALUATION OF
UNILATERAL CRYPTORCHIDISM: A TWENTY-YEAR RETROSPECTIVE STUDY

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The ultimate fertility following orchidopexy at any age is often questioned. This study examines clinically and endocrinologically a group of 29 patients with unilateral cryptorchidism at least twenty years after orchidopexy.

111 Patients born between 1935-54 were randomly selected from a review of hospital charts coded for cryptorchidism. 63 patients could be located; nine were then rejected when found to be bilaterally cryptorchid. Of the remaining 54, 23 would submit to histories only. 31 patients had, in addition to a complete history, a physical examination including testicular measurements and two semen analyses. Assessment of their hypothalamic-pituitary-gonadal axis was performed using baseline gonadotrophins (LH,FSH), and plasma testosterone, as well as the LH and FSH response to a GnRH stimulation test. Two patients, found to have gross endocrinopathies, were excluded. An age-matched control group was obtained from healthy volunteers (N = 30).

There was no significant difference in age, marital status, or infertility rate in the study (N = 29) or "histories-only" (N = 23) groups. In the study group, 85% of patients had a smaller operated than non-operated testis,

and their sperm density was significantly lower ($p < .001$) than the controls.

The cryptorchid patients demonstrated definite differences in their endocrine evaluation. Basal LH and FSH were significantly greater ($p < .01$) than the controls; basal testosterone was not. After 250 μg m of intravenous GnRH, the LH response area was not significantly different than controls, whereas the FSH response was significantly greater ($p < .001$).

The cryptorchid patients in this study, irrespective of age at surgery, demonstrated a higher incidence of poor semen quality and gross testicular damage than previously reported. In addition, both gonadotrophins were elevated, and the FSH response to GnRH was hyperreactive. Whether this response indicated a basic abnormality in the gonadal axis or a sudden physiologic release of gonadotrophins due to prolonged ineffective feedback from a poorly functioning end-organ remains to be evaluated.

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GONADAL FUNCTION IN PATIENTS WITH CHRONIC RENAL FAILURE
MAINTAINED WITH HAEMODIALYSIS. RELATIONSHIP BETWEEN
LENGTH OF TREATMENT AND PATIENT'S AGE

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Twenty patients with chronic renal failure maintained with haemodialysis (HD) for periods ranging from six (6) months to ten (10) years received 200 mg of testosterone given once weekly. Circulating levels of plasma testosterone, FSH, and LH were determined by radioimmunoassay before the initiation of HD and after discontinuation of treatment. Pituitary stimulation and suppression tests with GnRH and testosterone, respectively, were carried out during the treatment period. Examination of the seminal fluid was performed at regular intervals. A testicular biopsy was obtained from one of the patients so treated.

In patients under 40 years of age, FSH and LH levels increased after three (3) years of treatment. Above age 40, the increase in FSH and LH levels occurred at a much shorter interval. The suppression and stimulation tests were normal in young patients during the first year of treatment. Oligospermia and reduction in sperm motility were observed during the first years of treatment. With prolonged periods of treatment, abnormal forms and azoospermia were seen. A testicular biopsy, obtained from a 40-year old patient who had received treatment for four (4) years, demonstrated germinal cell damage, peri-tubular fibrosis, and a diminished number of Leydig cells.

These data indicate that, as a consequence of chronic renal failure, derangement of the function of the hypothalamic-pituitary-testicular axis occurs.

THE SEMINIFEROUS TUBULE WALL IN HUMAN HYPOGONADISM
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The structure and function of the seminiferous tubule wall in the mammalian testis has been the subject of several recent studies. In the human, gonadal disorders often present alterations of the tubular wall. Few detailed descriptions of these alterations and their possible pathophysiologic importance have been reported; therefore, we conducted a study on 202 testicular biopsy specimens taken from patients with primary hypogonadism, hypogonadotropic hypogonadism, cryptorchidism, and spermatidic arrest of the germinal epithelium. These specimens were studied by light and electron microscopy.

The most frequent alteration was hyalin thickening of the tubular wall, of which three types could be distinguished. In the first type, frequently found in cryptorchidism, PAS-positive material accumulated on the basement membrane. The second type was due to accumulation of hyalin PAS-negative, and sometimes RO-positive material, and to an increased number of irregularly oriented collagen fibrils in the internal acellular layer between the basement membrane and the myoid cell layer. This was the most frequent form of thickening and could be observed in all testicular disorders. In the third type, similar material accumulated in the external acellular layer, and was usually associated with thickening of the internal acellular layer.

The frequent finding of alterations of the tubular wall's internal cellular layers in both primary and secondary hypogonadism suggests that a similar response is elicited by different pathogenetic factors. It can be speculated that the myoid cells, like other cells of mesenchymal origin, react to stress by increasing their fibrillogenetic activity at the expense of their contractile activity, and that the fibroblasts also increase their fibrillogenetic activity only under more severe conditions.

SEMEN ANALYSIS: APPARENT BIOLOGICAL BREAKS IN
 SEMEN QUALITY WHEN RELATED TO SPERM CONCENTRATION
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Multiple semen analyses were performed on 225 men attending an andrology clinic. The percentage of oval, viable, and active sperm cells, as well as the motility scores, were lower in samples with sperm counts of less than 10×10^6 /ml, increased in counts of $10-40 \times 10^6$ /ml, and again increased in counts more than 40×10^6 /ml. The percentage of semen samples with abnormalities in the measured parameters dramatically increased as the sperm count decreased. The percentage of samples with significant numbers of white blood cells and problems with agglutination was higher in the samples with sperm counts less than 10×10^6 /ml and in the azoospermic patients. The results indicate that two biological breaks seem to occur in semen quality which relate to sperm cell concentration. The first break seems to be in those samples with counts of less than 10×10^6 /ml when compared to those with counts above 10×10^6 /ml. The parameters then seem to remain constant in samples with counts up to 40×10^6 /ml and again change in those with counts more than 40×10^6 /ml. It is important to note that samples with counts of $10-40 \times 10^6$ spermatozoa/ml do not seem to be significantly different in the several parameters of semen quality examined. The data does not give support to the current practice of considering samples with less than 20×10^5 spermatozoa/ml

Abstract

as those with problems. Perhaps samples with counts of less than 40×10^6 spermatozoa/ml but greater than 10×10^6 /ml should be grouped together, while those samples with counts of less than 10×10^6 spermatozoa/ml should be placed in another group.

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Single Sample Control Data!

TREATING THE "SUBFERTILE" MALE: IMPROVEMENT IN SEMEN CHARACTERISTICS AFTER LOW DOSE ANDROGEN THERAPY

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Semen samples from patients undergoing fertility evaluations were analyzed 15 minutes to one hour after collection for volume, sperm concentration, percentage of active spermatozoa, sperm motility, percentage of live spermatozoa, and sperm morphology. Patients with consistent sperm counts close to or above normal (greater than 20×10^6 sperm per ml), but with asthenospermia or low volume, were treated with 2 mg of halotestin (fluoxymesterone) daily. At 4- to 6-week intervals thereafter, each patient returned, and another semen sample was evaluated. Preliminary results suggest that, of the patients so treated to date, 85% have improved in at least four or more of the six categories of semen quality. At least 60% of the patients had an increase in semen volume, sperm count, motility score (quantitative expression of motility), percentage of live spermatozoa, or percentage of oval spermatozoa. The therapeutic regimen may, therefore, be most beneficial for individuals with reduced sperm motility, poor sperm morphology, and/or low semen volume. Additional studies are underway to evaluate other dosages to determine the usefulness of halotestin for the treatment of semen problems in the male with fertility difficulties.

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CLOMIPHENE TEST AND CLOMIPHENE THERAPY IN THE HYPOFERTILE MALE

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A clomiphene test was performed in 100 cases of oligoasthenospermia and secretory azoospermia, and in 10 normal fertile men. Clomiphene citrate was given at 50 mg per day for 15 days (day 1 to day 15). Plasma testosterone, FSH, and LH were evaluated by radioimmunoassay on days 0 and 15.

As a group, the hypofertile males showed an apparently normal function of the hypothalamo-hypophyseal-testicular axis in comparison with the fertile group: clomiphene induced a significant elevation of the plasma levels of the three hormones. However, individual responses could be divided into three types: complete (elevation of all 3 hormones); dissociated (lack of elevation of 1 or 2 hormones); and no response at all. These distinctions were made with reference to a group of 10 hypofertile patients assayed under the same conditions, twice at 15-day intervals, but without clomiphene administration.

Forty hypofertile patients were treated with clomiphene citrate, 50 mg per day for 100 days, with spermograms taken before and at the end of treatment. Monthly control assays showed that the hormonal response, when present, was maintained throughout the therapy. Our results indicate that the spermatogenic response, as evaluated by the spermogram, occurs much less frequently

than the hormonal response.

From our studies, we conclude that there is no correlation between the results of the clomiphene test and of clomiphene therapy: a positive clomiphene test cannot predict a therapeutic result; on the other hand, there will be no improvement of the spermogram in the absence of a hormonal response.

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EFFECT OF LONG-TERM ESTROGEN THERAPY ON THE HUMAN TESTES

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It has been suggested in the past that certain pathologic conditions of the human testes associated with abnormal steroidogenesis are also associated with an increase in 20 α -hydroxylase activity. The purpose of the present study was to determine the effect of long-term estrogen therapy in young adult males on *in vitro* steroid biogenesis in the testes with particular emphasis on formation of 20 α -hydroxyprogesterone. Four male transsexuals were treated with estrogen for at least one year prior to sex reversal. At surgery, testicular tissue was obtained for morphologic and metabolic studies. In one patient, testicular biopsies were obtained prior to commencement of estrogen treatment. The tissue was incubated under appropriate conditions with [7(n)-³H]progesterone. Throughout treatment all four patients exhibited complete suppression of circulating testosterone and FSH and LH levels, while plasma estradiol levels were consistently high. The *in vitro* studies demonstrated marked suppression of testicular steroidogenesis as evidenced by highly significant decrease in total substrate conversion when compared to pre-treatment steroid metabolism. The specific effects were associated with a significant decrease in 17 α -hydroxyprogesterone and testosterone formation. This was associated with a significant increase in 20 α -hydroxylase activity. More than 50% of the total substrate conversion resulted in formation of 20 α -hydroxyprogesterone. These results suggest that the effect of estradiol on androgen production in the testis is related either to an increase in 20 α -hydroxylase activity, or to suppression of 17 α -hydroxylase activity. It remains to be determined whether this is the result of decreased gonadotropic stimulation secondary to estrogen effect on the hypothalamic pituitary axis, or to a direct effect of estrogen on testicular steroidogenesis.

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SEASONAL CHANGES IN BODY WEIGHT, TESTICULAR VOLUME,
AND SEMEN PARAMETERS OF RHESUS MONKEYS
FOLLOWING SHAM, UNILATERAL, AND BILATERAL VASECTOMY

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Forty-seven mature male rhesus monkeys (*Macaca mulatta*) were subjected to sham, unilateral, or bilateral vasectomy. These animals were studied for periods up to 72 weeks in order to ascertain the morphologic and immunologic effects of the procedures. Records were kept of body weights, testicular volumes, and semen evaluations. Analysis of these data were made to determine if there were seasonal effects on these parameters, and if these effects were modified by the surgical procedures.

Control monkeys had an average sperm concentration of 415×10^6 sperm/ml

with 58% of the sperm showing progressive motility. Motility varied less than concentration over a long interval of time. Concentration was lowest from June through November. The unilaterally occluded monkeys showed less variation, but the same lower concentrations during summer and fall. Sperm concentrations in the bilaterally vasectomized monkeys were zero in all cases by 10 weeks post-vasectomy.

Body weight changes in all groups reflected seasonal variability. Decreases in weights were noted in the winter and early spring followed by increases until mid-summer and then fairly constant weights throughout the fall and early winter months.

Testicular volumes were estimated using the formula and measurements for a prolate spheroid. Volumes ranged from highs around 35 cm^3 in January to lows around 15 cm^3 in July and August. The seasonal changes in testicular volumes generally paralleled the body weight changes, but were not directly correlative.

No changes in body weights or testicular volumes could be contributed to the vasectomy or sampling procedures. Changes in these parameters did indicate that the monkeys remained responsive to environmental stimuli throughout the study period. This work was sponsored by NIH Contract NO1-HD-3-2758.

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THE ABSENCE OF SPERM-AGGLUTINATING ACTIVITY
IN HUMAN SEMINAL FLUID AFTER VASECTOMY

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Sperm-agglutinating antibodies were studied in the serum and seminal fluid of thirteen (13) men 4 and 8 weeks after vasectomy. Determination of sperm agglutinin titer was performed by a gelatine-agglutination test (Kirbrick et al., 1952) and by a microagglutination technique (Friberg, 1974). The type of agglutination could be revealed by the latter test (head-to-head or head-to-tail sperm-agglutination activity). Sperm-agglutinating antibodies were present in 8 sera 4 weeks after vasectomy. The serum sperm antibody titers ranged from 1:8 to 1:4096. One of these men had a sperm agglutination titer of 1:8 prior to the operation. Agglutinating antibodies could not be found in the seminal fluid samples, although five (5) men had high serum titers of sperm-agglutinating activity ($\geq 1:32$). The incidence of sperm antibodies 8 weeks after the operation was the same as 4 weeks post-vasectomy, and no significant rise in the antibody titers could be demonstrated. By the microagglutination test, it was found that the sperm-agglutinating activity was of head-to-tail type. Head-to-tail agglutination in the male sera is known to be caused by IgG antibodies against human spermatozoa and may also occasionally be caused by IgA or IgM antibodies (Friberg, 1974). In man, IgG and IgA are found in seminal fluid, but not IgM. The failure of the agglutinins to enter the seminal fluid deserves further characterization of the sperm-agglutinin antibody in sera from vasectomized men.

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A NEW PROCEDURE FOR THE CLINICAL DETERMINATION
OF URINARY LH: APPLICATION TO TESTICULAR DISORDERS

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Clinical assay of urinary LH involves extraction of urine and estimation by 5 day ventral prostate weight (VPW) bioassay as estimator system or 5 day radioimmuno estimator system. We report a new procedure combining a new extraction method (2-hours) with a 3-hour radioligand receptor estimator system, thus performing the clinical assay in one day. A new extraction method is needed because neat urine cannot be used with RIA or RRA; nor can the standard extraction procedure (Albert-Kaolin Acetone Method) be employed. The new method involves two (2) successive iso-electric precipitations at pH 5.0 and 9.2, after which the urine is processed by the standard procedure. The soluble extract obtained contains one-third of one-sixth the solids, but all of the biologic potency of the standard method. The extract was assayed simultaneously by three estimator systems: standard VPW or rat uterine weight, standard double antibody RIA with NIH reagents, and RRA using rat ovarian homogenate -- 1^{125}I hCG reagents. Standard (2nd IRP) was included in every assay run, thus achieving homologous unknown -- standard conditions. The extinction points which can be experimentally varied were 3, 1.2, and 0.2 IU LH per 24-hours for bioassay, RRA and RIA. Normal men excreted 3-10 IU per day, all three systems in agreement. Klinefelter's Syndrome had elevated values (20-60) by all three methods (RRA being twice bioassay and RIA). The urine of a fertile eunuch contained no LH by all three methods; urinary FSH was present. Use of RRA estimator with a rapid suitable chemical extraction has certain advantages not shared by bioassay, RIA, or by using blood serum: reduction of labor, high precision, low cost, reduced time, nondependence on NIH reagents restricted to research purposes.

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EXISTENCE OF A FOLLICLE-STIMULATING HORMONE-INHIBITING
FACTOR IN RAM RETE TESTIS FLUID

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Ram rete testis fluid (RTF), centrifuged at 4°C to remove spermatozoa and protein from the supernatant, was precipitated by addition of alcohol to a concentration of 86%. The precipitate was recovered by centrifugation, washed twice with acetone at -20°C , dissolved in distilled water, and lyophilized.

Batches of 250 mg were subjected to gel chromatography on Sephadex G20C in columns with a packed dimension of 15/90 cm using 0.06 M ammonium acetate buffer pH 7.0 for equilibration as well as elution.

This yielded 4 peaks: RTF₁, RTF₁₁, RTF₁₁₁, and RTF_{1V}. RTF₁, RTF₁₁, RTF_{1V} caused no significant decrease in serum FSH and LH of the castrated adult male rat and normal immature female rats, whereas 50-400 μg of RTF₁₁₁, whether administered intravenously or intraperitoneally, caused a consistent and significant decrease in serum FSH without affecting LH in either bioassay.

No steroid-binding capacity for testosterone, dihydrotestosterone, and 17β -oestradiol could be detected for RTF₁₁₁. Moreover, the possibility that

the biological effects of the active material were due to contamination with steroids or their conjugates was excluded after appropriate organic solvent extraction, by radioimmunoassay of testosterone, progesterone, and 17 β -oestradiol. Furthermore, the observed action of RTF₁₁₁ is not related to the presence of gonadotropins, their fragments, or metabolites.

To ascertain the polypeptide nature of the RTF₁₁₁ fraction isolated by gel filtration, it was subjected to pepsine and trypsin digestion. These enzymatic digestions destroyed the FSH-inhibiting activity of RTF₁₁₁. RTF₁₁₁ contains more than one component which are currently separated by ion exchange chromatography. Supported by Grant No. 74039 from WHO and No. 20305 from the Belgian F. R. S. M.

? Rats

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RECOVERY OF PITUITARY-TESTICULAR AXIS
AFTER ACUTE OR CHRONIC SUPPRESSION WITH ESTRADIOL
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Changes in testicular (TT) and plasma (PT) levels of testosterone, pituitary (PLH), and serum (SLH) levels of LH were examined at intervals after cessation of estrogen treatment. One hour after a single injection of 50 μ g EB, TT decreased to 25% and PT to 48% of the pretreatment levels, and, after 8 h, to 7% and 19%, respectively. Subsequently, a progressive increase in the testosterone levels was noted. By 4 d, TT returned to 66% and PT to 100% of pretreatment levels and then remained unchanged for 11 d. PLH and SLH remained unchanged during the first 4 d after injection. During the subsequent 11 d, PLH decreased slightly while SLH rose significantly. TT and PT levels were markedly depressed (7% and 29%, respectively) after 14 daily injections of 50 μ g EB, returned to 50% of pretreatment levels by 4 d after the last injection where they remained until termination of the experiment (7 weeks). SLH decreased slightly after 14 d EB treatment, but increased significantly between 30-60 d after cessation of treatment. PLH significantly diminished after 14 d of treatment, returned to normal 20 d later, but significantly decreased by the 7th week. Apparently a single EB injection rapidly blocks testosterone synthesis without concomitant changes in SLH or PLH, but the gonado-pituitary axis must be disturbed in these animals because of the marked decrease in PLH 15 d after EB injection. After chronic (14 d) EB treatment, testosterone synthesis recovers rapidly although SLH remains slightly and PLH significantly depressed for approximately 20 d. The data demonstrate a direct effect of EB on testosterone synthesis and an alteration of LH production patterns during the post-treatment recovery period.

T Clearance is 1hr. 50 μ g EB. pharmacologic
is ester cleared?
E₂ plasma levels?
whlt clearance is 40'
-7312 140'

Testis T after chronic EB
remains low and LH \uparrow demonstrates
Direct effect of E \rightarrow T synthesis

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MECHANISM OF LUTEINIZING HORMONE (LH) AND
TESTOSTERONE (T) SUPPRESSION BY FLUOXYMESTERONE (HALOTESTIN)R. A. Vigersky and D. L. Loriaux
NIH, NICHD, Bethesda, MD 20015

Chronic fluoxymesterone (Halotestin) administration results in a suppression of plasma T, presumably through pituitary LH suppression. However, recently it has been shown that Halotestin suppresses plasma T without suppressing LH. The ability of Halotestin to bind to Testosterone-Estradiol Binding Globulin (TeBG) and to modify the pulsatile release of LH was investigated to elucidate the mechanism of its complex effects. Equilibrium dialysis was performed at 22° and 37°C. Halotestin binds to TeBG with an apparent $K = 1.0 \times 10^9$ and 1.9×10^9 at 22°, and $K = 5.2 \times 10^9$ and 8.0×10^9 at 37°, in female and male plasma, respectively. In polyacrylamide gel electrophoresis, 1000-fold molar excess of fluoxymesterone decreased the peak of TeBG-bound T by 45.

Blood was obtained from four (4) normal men, ages 18-21, every 30 minutes for 48 hours. Halotestin 10 mg every 6 hours was given during the second 24 hours. Halotestin decreased the mean number of LH spikes and integrated 24-hour LH level by 47% and 27%, respectively. Mean T level was decreased by 62% after 24 hours of Halotestin treatment. Despite the overall LH suppression, isolated LH spikes occurred with a subsequent rise in T within 30 minutes. In an orchietomized and adrenalectomized man, and, in a genotypic and phenotypic man with congenital anorchia, there was no LH suppression after 72 hours of Halotestin administration.

We conclude that Halotestin displaces T from TeBG and causes a fall in both T and LH. Since there was no LH suppression in a patient without endogenous T, the mechanism of the Halotestin induced fall of LH and T in normals appears to be via displacement of T from TeBG leading to greater free T available to cross the blood-brain barrier and to be metabolized.

Alternative No LH sup in Castro!

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EFFECT OF HUMAN CHORIONIC GONADOTROPIN (HCG)
ON INTERSTITIAL CELLS AND ANDROGEN PRODUCTION
IN THE IMMATURE RAT TESTISH. E. Chemes, M. A. Rivarola, and C. Bergada
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The administration of HCG induces an increased testosterone secretion by the adult human testis that can also be elicited in prepubertal boys to various degrees according to age, with the greatest response at puberty. The effects of administration of HCG on the testicular interstitial cells of immature rats were determined by studying the sequence of histological events and their correlation with testosterone levels. Immature rats were injected with HCG for different periods of time. The number of Leydig cells, their mitosis and precursor fibroblasts, as well as plasma testosterone levels, were determined and statistically analysed.

A progressive stimulation of Leydig cell mitosis was observed after 3 days of HCG treatment, but stabilization occurred after 5 days. Leydig cell numbers were significantly greater at 5 and 10 days. The number of precursor fibroblasts had increased at 5 days and was still increasing at 10 days. Plasma testosterone showed a progressive and continuous increase in all treated groups with a parallel increase in the weight of the seminal vesicles and prostate.

The Leydig cell hyperplasia is considered to be due to a combination of stimulation of Leydig cell mitosis and differentiation of precursor fibro-

blasts. Leydig cell mitosis seems to precede fibroblastic differentiation, but the latter continued when the mitotic rate had stabilized. The elevation of plasma testosterone concentrations is probably due firstly to the stimulation of the existing Leydig cells, and then to the increase in the number of hormone-secreting cells. The parallelism between the cellular and humoral changes induced by HCG administration indicates that the interstitium of the immature rat testis is able to respond to gonadotropic stimulation in a way similar to the adult testis. It also shows a close correlation between the morphological and functional parameters of Leydig cell maturation in the immature rat.

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ADVANCED PUBERTY IN MALES. FSH AND LH STUDIES
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 Univ. of Maryland Sch. of Med., Baltimore, MD 21201

We measured FSH and LH excretions (1) (by radioimmunoassay) and production rates (P.R.) (2,3) in boys with idiopathic precocious puberty (P.P.) and with untreated congenital adrenal hyperplasia (C.A.H.).

Patient	Chron. Age (years)	Puberty Stage	LH(IU/24 hours)		FSH(IU/24 hours)	
			Excretion	PR	Excretion	PR
Adult Males	21 - 50		22.3-45.1	250-465	8.5±3.6	22-48
P.P.						
J.A.	4 0/12	2	5.0	122	2.2	17.9
	4 6/12	3	9.2	398	-	-
C.D.	3 0/12	3	5.6	459	3.2	21.8
	4 6/12	5	11.8	197	2.2	21.8
C.A.H.						
J.W.	3 weeks	1	0.35	-	0.31	-
T.W.	4 weeks	1	1.1	-	0.21	-
P.M.	1 0/12	2	5.9	166	6.2	41.5
M.B.	6 6/12	3	11.8	141	6.7	40.2
J.M.	81	Adult	16.4	-	13.6	-

We conclude that in P.P., the increases in FSH and LH excretion and production follow the pattern expected for normal puberty. In untreated C.A.H., after the neonatal period, there is marked increase in FSH excretion and production. The possible mechanisms for these observations will be discussed.

- References: 1. Raiti, S. and Blizzard, R. M., J. Clin. Endocrinol., 28, 1719, 1968.
 2. Raiti, S., Foley, T., Penny, R., and Blizzard, R. M., Metabolism, 24, 937, 1975.
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HYPOTHALAMIC, PITUITARY, AND GONADAL HORMONES
IN SEXUAL MATURATION OF THE MALE RAT

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Observations were made on groups of rats at 5-day (d) intervals from birth to d 64, and at d 74 and d 89. Hypothalamic content of gonadotropin-releasing hormone (GnRH) was determined by radioimmunoassay with Niswender antisera R-42. LH, FSH, and testosterone were measured by double-antibody radioimmunoassays. 3β -hydroxysteroid dehydrogenase (3β HSD) and 17β -hydroxysteroid reductase (17β HSD) activities were assayed in the 10,000xg supernatant fractions of testicular homogenates. Total activity of 3β HSD was quantitated by conversion of [3 H]pregnenolone to progesterone and of 17β HSD by conversion of [3 H]androstenedione to testosterone. The *in vitro* capacity of the testis to synthesize testosterone was measured in the presence of a saturating dose of rat LH. Hypothalamic GnRH, serum LH, and FSH concentrations and enzyme activities were low at birth. Hypothalamic content of GnRH increased linearly with age up to d 47 and then plateaued. LH concentrations were highly variable and often exceeded adult values between d 10 and d 32. Between d 32 and d 47, there was a steady rise followed by a decline to stable adult values after d 52. Serum FSH increased from 220ng/ml at d 10 to a peak value of 1000ng/ml at d 32. Subsequently, there was a steady decline in FSH until d 89 when it was again 220ng/ml. 3β HSD exhibited a rapid increase between d 19 and d 37. 17β HSD increased in a similar fashion approximately 15 days later. The increase in capacity to synthesize testosterone occurred at the same time as the increase in 17β HSD activity and followed a comparable time course. This study demonstrates that, during sexual maturation in the male rat, changes in serum LH and FSH do not reflect changes in hypothalamic GnRH. The appearance of Leydig cells as monitored by 3β HSD activity precedes by 15 or more days the increase in *in vitro* testicular capacity to synthesize testosterone. The latter coincides with the increase in 17β HSD activity. This suggests that 17β HSD is a limiting factor in the ability of the testis to respond to LH stimulation. Supported by NIH Grants HD-08358, HD-04064, and HD-08333.

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DIFFERENCES IN THE TESTOSTERONE-AGGRESSION
RELATIONSHIP BETWEEN MEN AND WOMEN

H. Persky, C. P. O'Brien, K. D. Smith, G. K. Basu, and M. A. Khan
Univ. of Penna. and Philadelphia Gen. Hosp., Philadelphia, PA 19104

Plasma testosterone level (T) and 2 measures of hostility/aggression [Zuckerman & Lubin's Multiple Affect Adjective Check List Hostility Scale (MAACL-H), and Buss & Durkee's Hostility Inventory (B-D- Σ H)] were determined for a group of 18 young men and 21 young women. The young women were assessed during the early follicular phase, ovulatory peak, and late luteal stage of their menstrual cycle. Since no significant differences were obtained among the hostility/aggression test scores across the menstrual cycle between the multiple correlation coefficients between T and the two hostility/aggression scores nor between the regression coefficients obtained on each of the 3 female testing occasions, the first occasion of testing was used for comparison with the values obtained for males. Means and standard errors for the 3 variables, multiple correlation coefficients (R), and regression coefficients (β) for the men and women were:

SEX	T (ng%)	MAACL-H	B-D- Σ H	R	β MAACL-H	β B-D- Σ H
Men	686 \pm 46	3.2 \pm 0.6	22.3 \pm 2.0	0.58*	25.28	10.21*
Women	23 \pm 3	7.8 \pm 0.5	22.2 \pm 1.4	0.46*	- 2.53*	- 0.34

T, MAACL, and B-D-ΣH all fell within normal limits. T was significantly greater for the men than for the women while MAACL-H was greater for the female subjects.

The relationship, $T = \beta_1 \text{MAACL-H} + \beta_2 \text{B-D-}\Sigma\text{H} + a$, was subjected to multivariate regression analysis, separately for men and women. Multiple correlation coefficients (R) of 0.58 and 0.46 were obtained, both significant at the 5% level. The regression coefficient for MAACL-H for women and for B-D-ΣH for men were both significant at the 5% level also; i.e., the predominant proportion of the variance in T was due to MAACL-H for the women and to B-D-ΣH for the men. While the hostility/aggression indicators loaded positively on T for the men, they were negatively related to T for the women.

Comparison of the two regression equations indicated that the variances about the two lines were highly heterogeneous ($F = 66.48, p < .001$). B-D-ΣH is a trait measure of hostility detecting the more consistent aspects of the mood while MAACL-H responds to momentary changes. The combination of positive loading of this trait measure on T in the males and negative loading of the state measure in the females suggests that different regulatory pathways occur between men and women with respect to T and central nervous system expression of aggression.

READ BY TITLE

37

IMPORTANCE OF ANAMNESIS IN THE EVALUATION OF INFERTILE PATIENTS

Rudolf Kaden

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It is known that various factors such as infection, injuries, and exposure to radiation can cause disturbances of testicular function leading to infertility. Therefore, it was thought advisable to study 1,187 males exhibiting this condition. The patients were divided into fertile and sub- or infertile groups according to their sperm count and characteristics of the seminal fluid. These data were correlated with 11 anamnestic factors which could have been the cause of infertility as shown in Table 1.

TABLE 1
Order of 11 Anamnestic Group Factors According to Their Significance
For Sub-Fertility in an Andrological Case Aggregate of 1,187 Patients.

ANAMNESTIC FACTORS	INCIDENCE RATE n = 1187		NORMO- FERTILITY n=442/37.2%	SUB- FERTILITY n=745/62.8%	SIGNI- FICANCE
	(#)	(%)			
Constitutional Defects	95	8.00	19.6%	80.4%	0.001
Occupational Injuries	79	6.7	30.0%	70.0%	0.01
Iatrogenic Injuries	322	27.1	42.4%	57.6%	0.01
Infectious Diseases	349	29.4	43.0%	57.0%	0.01
Accidents	93	7.8	38.3%	61.8%	0.05
Urogenital Infections	162	13.7	40.8%	59.2%	0.05
Physical Thermal Defects	53	4.5	35.4%	64.6%	
Focal Infections	245	20.6	45.6%	56.4%	
Miscellaneous	104	9.2	45.0%	55.0%	
Psychic Traumata	123	10.4	49.3%	50.7%	
Inconspicuous Case History	262	22.07	68.6%	31.37%	0.001

Both the frequency order of the 11 group factors in the total case aggregate and their order of significance were evaluated statistically. The study demonstrates that infectious diseases predominate in the frequency order, whereas constitutional defects are prominent in the order of significance.

Therefore, it can be stated that careful anamnesis will greatly facilitate the work-up of patients attending an infertility clinic.

Behrman - Immunology of Female Reprod.
7 cases of IFE = post coital
Symptoms.

Reviews Phyllis

1) Cytol
2) Bx
3) R

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(1976)

THE AMERICAN FERTILITY SOCIETY

MGM Grand Hotel
Las Vegas, Nevada..... April 5 - 8

THE ENDOCRINE SOCIETY

San Francisco Hilton Hotel
San Francisco, California..... June 23 - 25

FIRST INTERNATIONAL CONGRESS OF ANDROLOGY

Barcelona
Spain July 12 - 15

FIFTH INTERNATIONAL CONGRESS OF ENDOCRINOLOGY

Hamburg
Federal Republic of Germany..... July 18 - 24

SOCIETY FOR THE STUDY OF REPRODUCTION

University of Pennsylvania
Philadelphia, Pennsylvania August 11 - 14

PACIFIC COAST FERTILITY SOCIETY

Mountain Shadows Hotel
Scottsdale, Arizona..... October 6 - 10

Early History of the American Society of Andrology

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Early History of the ASA

The Archives and History Committee

History of the American Society of Andrology is found written in four different documents, beginning with a thorough presentation by Eugenia Rosemberg, who was a Charter Member of the ASA and Program Chair of the First Annual Meeting in 1976. Dr. Rosemberg was also instrumental in the formation of the *Journal of Andrology* and a recipient of the Distinguished Andrologist Award. The past Co-Editor-in-Chiefs, David Hamilton and Jon Pryor, published the second document in 2000. It consisted of letters to the Editors from past ASA Presidents, beginning with Dr. Emil Steinberger, the first President who served two consecutive terms. The next document is that of the first Editor of the journal, Andrzej Bartke, who also became the 8th President of the Society. Dr. Bartke provided a brief history of the *Journal of Andrology*. The final document is a review of our history presented by the Archives Committee in 2005, in celebration of our 30th Annual Meeting in Seattle. We are unclear of where the 2005 version was published, but Chris DeJonge's name is attached to the digital file.

It should be pointed out that many of the original documents and files associated with the early years of the ASA were donated to the Iowa State University Library Special Collections. The Archives and History Committee requested that much of this collection be digitized and today these documents are available online at:

<http://cdm16001.contentdm.oclc.org/cdm/search/collection/p16001coll1/order/title/ad/desc>

The original list of Charter Members of the newly formed ASA, which was signed by the founding Secretary, Rudi Ansbacher in 1980, is

also included, as well as numerous original correspondences. This treasure of original letters provides a unique insight into the relationships that were built during the early days of our Society's founding.

Finally, under the title of "Evolution of the ASA Logo", we show the changes in our Logo from 1976 to the most current illustration adopted in 2012. The archives found four letters dated 1976, which contained illustrations for consideration as the Logo for the newly formed society. The letters were mailed to the Founding Secretary, Dr. E.S.E. Hafez. Signatures included those of Duane Garner, Terry Turner and Jerald Bain. The artist behind the fourth letter is unknown, but the drawings were rather complex.



Minutes of the first ASA Council Meeting, held in Worcester, Massachusetts, show the following motion regarding the ASA Logo: "A motion duly made and seconded was passed that the Secretary organize a contest among members to select a design for a logo for the Society. The winning "designer" is to receive a one year free subscription to *Andrologia*." A quick examination of the first issues of *J. of Andrology* will reveal that Dr. Duane Garner was the Logo winner.

AMERICAN SOCIETY OF ANDROLOGY ITS BEGINNINGS

*Eugenia Rosemberg, M.D.
Medical Research Institute of Worcester, Inc.
August 1985*



The term ANDROLOGY was introduced in 1951 by Harold Siebke, a Professor of Gynecology in Bonn, Germany. However, many years passed before the term gained acceptance. It was not until 1969 when, due to the efforts of Dr. Carl Schirren of Hamburg, that the first scientific journal dedicated to the subject titled ANDROLOGIE initiated its publication in West Germany (Schirren, 1985). Now, ANDROLOGY is recognized as an area of science and medicine, which fosters a multidisciplinary and multifaceted approach to the study of male reproduction. ANDROLOGY encompasses both basic and clinical sciences. It includes research in biochemistry, genetics, histology, immunology, molecular biology, pathology, pharmacology, physiology and endocrinology. It also includes urology, microsurgery, gynecology, internal medicine, pediatrics, psychology and animal husbandry.

The American Society of Andrology came into being, not as an isolated development but as a consequence of events promoted by individuals deeply committed to the study of male reproduction. The first of these events, took place in the U.S.A., when Drs. W. O. Nelson and CH. LeBlond, suggested that a Club of scientists interested in the study of male reproduction be organized. At that time, Dr. E. Steinberger became actively involved in the organization of the Club, which held its first meeting in 1968. The Club became known as the Warren O. Nelson Club and held -meetings for the following four years. Although it was proposed that the Club become a society, the idea did not materialize.

The second event, which occurred abroad in 1970, was the establishment of the Comitè Internacional de Andrologia, better known as CIDA, whose tireless founders were Drs. A. Puigvert, of Barcelona, Spain, and Dr. R. E. Mancini, of Buenos Aires, Argentina. Due to the continuous efforts of various individuals among them, Drs. R. E. Mancini, J. M. Pomerol of Barcelona, and E. Eliasson of Stockholm, Sweden, CIDA was reorganized in 1972, and its governing regulations approved in 1973. It is worth noting that the work carried out by CIDA, fundamentally, to encourage and promote the study of male reproduction, was possible due to the generous support of the Fundacion Puigvert, and of the Population Council, with headquarters in Barcelona and New York, respectively (Eliasson, 1974). CIDA adopted ANDROLOGIE as its publication arm, changing its title to ANDROLOGIA. In 1978, a new journal, the INTERNATIONAL JOURNAL OF ANDROLOGY, became the official publication of CIDA. However, both, ANDROLOGIA and the INTERNATIONAL JOURNAL OF ANDROLOGY are now being published without their official affiliation with CIDA or the INTERNATIONAL SOCIETY OF ANDROLOGY (ISA).

Since its inception, CIDA enjoyed the active participation of American scientists, among others, Drs. N. Alexander, W. Bardin, D. Fawcett, C. A. Paulsen, E. Rosemberg, R.J. Sherins, E. Steinberger, and P. Troen, who helped foster the growth of the organization. CIDA stimulated the development of ANDROLOGY as a field of science throughout the world, which led to the formation of several national andrology societies, promoted educational activities, and organized International Congresses. It should be noted that in 1981, when the

INTERNATIONAL SOCIETY OF ANDROLOGY (ISA), emerged from the COMITE INTERNATIONAL DE ANDROLOGIA (Nieschlag, 1985), CIDA ceased to exist.

The third important event relevant to the development of ANDROLOGY occurred in the U.S.A., in 1972, when, at the time of the International Congress of Endocrinology held in Washington, D.C., the first Testis Workshop Meeting took place as a Satellite Symposium to the International Congress. This meeting was initiated by M.B. Lipsett, who was then Chief of the and Reproductive Research Branch of the National Institute for Child Health and Human Development (NICHD), National Institutes of Health (NIH), Bethesda, Maryland. The Testis Workshop Meetings continue to be held every year under the sponsorship of NICHD, NIH.

As American scientists maintained a long standing interest both, at the national and international level, in the formal organization of groups dedicated to the study of male reproduction, the idea of the establishment of an American Society of Andrology (ASA), gradually gained the needed exposure and support from the American scientific community.

This idea was relentlessly pursued by Dr. E. Steinberger who discussed the project with interested scientists at the International Congress of Endocrinology held in 1972 in Washington, D.C., at the International Congress on Hormonal Steroids held in 1974 in Mexico City, and also in 1974, at the VIII World Congress of Fertility and Sterility, which was held in Buenos Aires, Argentina. It was then that the idea was seriously considered.

On November 7, 1974, a meeting concerning the formation of the ASA took place in Buenos Aires, attended by Drs. E.S.E. Hafez, E. Rosemberg, E. Steinberger, and D. de Kretser and R. Eliasson, as representatives of CIDA. The conclusions arrived at this meeting were that Dr. E. Steinberger continue to explore the interest of the American scientific community in the establishment of the ASA, receiving the necessary support from Drs. E. Rosemberg and E.S.E. Hafez, as well as from members of CIDA. If it was found that sufficient interest was present, the American Society of Andrology could be organized during a Symposium, which was to take place in Detroit, Michigan, in April 1975.

Dr. Steinberger received many enthusiastic replies from investigators and clinicians. Therefore, the stage was set to schedule the organizational meeting of the American Society of Andrology, which was hosted by Drs. T. Evans and E.S.E. Hafez, April 25, 1975, during the Symposium on " The Human Semen and Fertility Regulation ", organized by the C.S. Mott Center for Human Growth and Development, in Detroit, Michigan.

The initiation of any endeavor requires the gathering of individuals who are willing to provide expertise and devote the necessary time to complete a task. The ASA was fortunate to find such a group, who worked continuously from early February till April 1975 to study and suggest a possible organizational chart for the Society to be established at the Meeting of the Incorporators, to- take place April 25, 1975. The individuals most actively involved during this preliminary phase were: N. Alexander, S.J. Behrman, E.S.E. Hafez, E. Rosemberg, and E. Steinberger.

On April 24, 1975, as part of the activities of the Detroit Meeting, the participants elected a Committee composed of four individuals, charged with the election of a fifth member, of the election among themselves of the Officers of the future American Society of Andrology, and the election of the members of the Executive Council. The elected members of this Committee were: N. Alexander, S.J. Behrman, E.S.E. Hafez, and E. Steinberger. The Committee met and elected as the fifth member E. Rosenberg.

The Meeting of the INCORPORATORS of the AMERICAN SOCIETY OF ANDROLOGY was held April 25, 1975, with all the Incorporators, N. Alexander, E.S.E. Hafez, S.J. Behrman, E. Rosenberg, and E. Steinberger in attendance. E. Steinberger was elected to preside over the meeting, and E.S.E. Hafez was named temporary secretary. The Incorporators elected the following individuals as Officers of the Society: PRESIDENT: E. Steinberger, VICE PRESIDENT: S.J. Behrman, SECRETARY: E.S.E. Hafez, TREASURER: N. Alexander, PROGRAM CHAIRMAN: E. Rosenberg. The Officers elected the following individuals as Members of the EXECUTIVE COUNCIL: A. Bartke, J. Corriere, F.C. Derrick, Jr., T. Evans, D. Fawcett, C.A. Paulsen, R. Sherins, A. Steinberger, and L. Zaneveld.

The following COMMITTEES were established: BY LAWS- Chairman: S. J. Behrman, Members: N. Alexander, E.S.E. Hafez, E. Steinberger, and J. Corriere; NOMINATING- Chairman: D. Fawcett, Member: C.A. Paulsen; PROGRAM- Chairman: E. Rosenberg, Members: R. Sherins and A. Steinberger; MEMBERSHIP- Chairman: L. Zaneveld, Member: LC. Derrick, Jr.; FISCAL- Chairman: S.J. Behrman, Members: N. Alexander and T. Evans; LIAISON- Chairman: S.J. Behrman; PUBLICATION- E. Rosenberg. Each Committee Chairman was urged to select the appropriate number of committee members and to send their nominations to all Officers of the Society.

Under the leadership of the President, E. Steinberger, a frenzy of activity took place during the months following the Meeting of the Incorporators. Each Committee Chairman appointed their respective members, and each committee worked at a rapid pace.

By June 1975, due to the efforts of S.J. Behrman, the Articles of Incorporation were signed in the State of Michigan; therefore, the ASA was a legal entity and could function in compliance with Section 501 (c)(3) of the Internal Revenue Code. Consequently, the Society began its activities, soliciting individuals to join the ASA by means of Membership Application Forms, and the Treasurer, N. Alexander, opened a Bank account in order to initiate deposit of membership dues. By July 1975, the Secretary, E.S.E. Hafez, recorded 196 members from the U.S.A., and 47 from Europe. Other aspects of the organizational work proceeded very rapidly. S.J. Behrman and E. Rosenberg dedicated time to prepare a draft of the ASA Constitution and By Laws, and E. Rosenberg initiated the preparation of the First Annual Scientific Meeting of the ASA, scheduled for March 1976 in Worcester, Massachusetts.

It was recognized that full discussion of important issues needed to be carried out. Therefore, the President, E. Steinberger, scheduled the FIRST MEETING of the Officers, Members of the Council and Committee Chairman. The Meeting was held at the University Motor Inn, Fort Collins, Colorado, July 24, 1975.

At this FIRST MEETING of the Officers and Members of the ASA Council, the following was discussed: a draft of the By Laws presented by S.J. Behrman, ASA affiliation with CIDA and utilization of ANDROLOGIA as the publication arm of the ASA, format of the Membership Application Forms and of the Society's stationary and logo, authorization to sign checks in behalf of the Society, format of the forthcoming First Annual

Scientific Meeting, and tenure of office of the President, Vice President and Program Chairman.

The highlights of the important decisions made at this Meeting are as follows: that three (3) Officers be authorized to sign checks, with only one (1) signature, that of the required to withdraw funds; that the ASA affiliate with CIDA and use ANDROLOGIA as its publication arm; that the President serve through 1976-1977; that the Vice President serve through 1976-1977, and become President for 1977-1978; that the Nominating Committee present a slate for nomination and election at the Second Annual Meeting of the ASA for Vice President for 1977-1978, and Program Chairman for 1976-1977; that the Official Business Meeting of the Society be held at the time of the First Scientific Meeting in March, 1976; that A. Bartke assume the post vacated by L. Zaneveld.

The Program Chairman, E. Rosenberg, presented the outline of the program of the First Scientific Meeting to take place at the University of Massachusetts, Medical School, in Worcester, Massachusetts, March 31- April 2, 1976. E. Rosenberg indicated that she had initiated negotiations to obtain financial support for the Meeting, as well as negotiations with CIDA in order to publish as a Supplement to ANDROLOGIA the Proceedings of the First Scientific Meeting. The report of the Program Chairman was approved.

The real launching of the Society occurred March 31- April 2, 1976, when the First Scientific Meeting of the ASA took place at the University of Massachusetts, Medical School, in Worcester, Massachusetts. All Committee Members had worked assiduously, and the Society was well under way, with 235-recorded members.

The Scientific meeting enjoyed the attendance of 97 members of the ASA, of representatives of other Scientific Societies, of the Center for Population Research, NICHD, NIH, of Members of the Faculty of the University of Massachusetts, Medical School, and of local Worcester physicians (Steinberger, 1976). The SECOND MEETING of the Officers, Members of Council, and Committee Chairman, was held March '30, 1976, at the Sheraton-Lincoln Inn, Worcester, Massachusetts. At this time, all the initial problems had been resolved, the Constitution and By Laws of the Society were adopted, and dates for future Scientific Meetings and respective Program Chairpersons were established through 1979. It was decided that future Scientific Meetings should include Postgraduate Courses as part of the official Program. The duties of the Secretary and Treasurer's offices were defined, C.A. Paulsen was appointed to chair the By Laws Committee, R. Ansbacher agreed to serve as Temporary Chairman of the Nominating Committee, due to the resignation of S.J. Behrman, D. Fawcett was elected President for 1977-1978, and C.A. Paulsen was elected Vice President for 1977-1978.

The Council congratulated and thanked E. Rosenberg for having accomplished the task of conducting the First Scientific Meeting in its entirety, for having obtained the financial support for as the Society could not provide financial, organizational and administrative backing, and for having secured the publication of the Proceedings of the Meeting, which subsequently appeared as Supplement 1, Volume 8, 1976, of *Andrologia* (Ed.) E. Rosenberg.

As discussions were held at the March 1976 and 1977 Meetings of the Officers and Members of the Council concerning the possibility of initiating the publication of an Official Journal for the Society, the President, D. Fawcett, together with the Chairman of the Publication Committee, E. Rosenberg, and with the approval of the Members of the ASA Council and of the membership at large, made the decision to abandon ANDROLOGIA as the publication arm of the ASA, and proceeded to explore the possibility of obtaining an American publisher for a future ASA Journal.

It was in 1979, under the Presidency of N. Alexander, that the contract was signed with J.B. Lipincott to publish the official ASA journal, which was named the Journal of Andrology (JA). The Council elected A. Bartke to be its first Chief Editor, and the first issue of the JA appeared in January-February, 1980, as Volume 1, No 1 (Alexander, 1980). The JA has grown ever since, due to the relentless efforts and great ability of A. Bartke, its first Chief Editor, and of M-C. Orgebin-Crist, who followed A. Bartke on this post.

Thanks to the competence of the individuals who initiated the Society, and that of others that followed in its governance, the ASA has reached a membership of 642 members, has bestowed since 1976, the Distinguished Andrologist Award to eleven (11) scientists, the Young Andrologist Award to five (5) young investigators since 1982 and, since 1983, has presented the Student Award to three (3) deserving individuals. Moreover, the ASA has contributed to the teaching of ANDROLOGY through the Postgraduate Courses held since 1977 in conjunction with the Scientific Meetings.

With its rapid growth and increased prestige, it was only fitting that, on its 10th Anniversary, our Society would host the III International Congress of Andrology. The Congress took place in Boston, Massachusetts, April 27 - May 2, 1985, with our Society, in collaboration with Tufts University School of Medicine, serving as host of the International Society of Andrology (ISA) (Ansbacher, 1985). It was attended by 366 members of the ASA or ISA, 182 non-members of either Society, and 120 students. The combined scientific meetings of the two Societies proved to be a great forum for interaction and for renewal of friendships among scientists, who, although distant, share a common interest, and the desire to advance the understanding of our discipline.

We should feel proud of the collective endeavor 'called the American Society of Andrology. Personally, I feel privileged to have had the opportunity to work with such a group of dedicated persons whom I call my friends.

Eugenia Rosemberg, M.D.
Medical Research Institute of Worcester, Inc.
August 1985.

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Evolution of the ASA Logo

2013

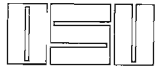


1991



1980





Oklahoma State University

DEPARTMENT OF PHYSIOLOGICAL SCIENCES
Anatomy, Physiology, Pharmacology, Toxicology

STILLWATER, OKLAHOMA 74074
(405) 624-6748

September 23, 1976

Dr. E.S.E. Hafez, Secretary
American Society of Andrology
C.S. Mott Center for Human Growth & Development
275 E. Hancock Avenue
Detroit, Michigan 48201

Dear Saud:

I hereby submit the attached logol for consideration in the A.S.A. logol contest.

The research in my laboratory on the spermatozoal PZ-pentapeptidase is progressing rapidly. Best regards.

Sincerely,

Duane L. Garner, Ph.D.
Associate Professor

DLG:t11
Enclosure

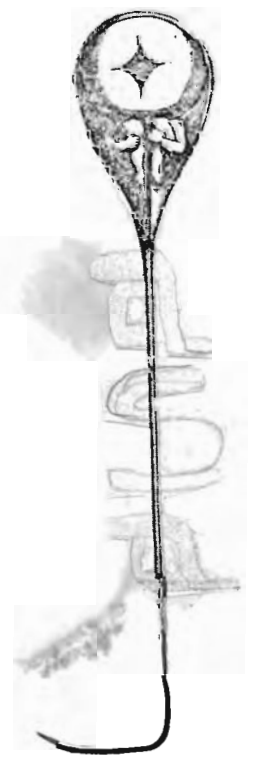


American Society of Andrology

E.S.E. Hafez
Reproductive Physiology
C.S. Mott Center for Human
Growth & Development
275 E. Hancock Ave.
Detroit, Michigan 48201 U.S.A.



← OR



UNIVERSITY OF VIRGINIA SCHOOL OF MEDICINE
DEPARTMENT OF UROLOGY
CHARLOTTESVILLE, VIRGINIA 22901

Telephone: 804/924-2224

2 August 1976

E.S.E. Hafez, Ph.D.
Reproductive Physiology
C.S. Mott Center for Human
Growth and Development
275 E. Hancock Ave.
Detroit, Michigan 48201

Dear Dr. Hafez;

The enclosed page has sketched and colored on it a suggested logo for the American Society of Andrology. Lest my poor artistic ability confuse you, I will tell you that the symbol involves a 'mammalian' sperm cell entwined with the symbol of the male sex. Thank you for your consideration.

Sincerely,


Terry T. Turner, Ph.D.



JERALD BAIN

B.Sc.PHM., M.D., M.Sc., F.R.C.P. (C)
ENDOCRINOLOGY - FERTILITY AND REPRODUCTION
CLINICAL INVESTIGATION UNIT
MOUNT SINAI HOSPITAL
600 UNIVERSITY AVENUE, SUITES 639 . 640
TORONTO, ONTARIO
M5G 1X5

August 23, 1976

Dr. E. S. E. Hafez,
Secretary,
American Society of Andrology,
C. S. Mott Center for Human Growth and Development,
275 Hancock Avenue,
Detroit, Michigan. 48201.

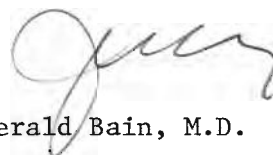
Dear Saad:

While reading through the recent ASA Newsletter I noted that a logo was being sought. I immediately began to doodle and present the following for your consideration.

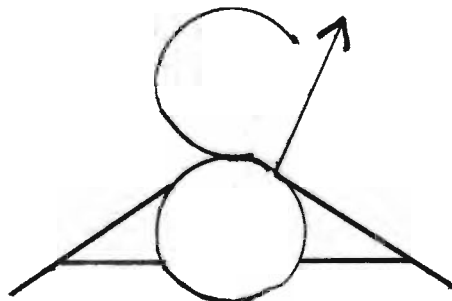
I am not known for my artistic creativity but I have taken this opportunity to make my first public presentation. I trust the logo is self-explanatory.

Best personal regards,

Sincerely,



Jerald Bain, M.D.



Business Meeting Minutes of the First Council Meeting 1975

AMERICAN SOCIETY OF ANDROLOGY

MINUTES OF THE MEETING OF THE OFFICERS AND MEMBERS OF THE COUNCIL

University Motor Inn, Fort Collins, CO

July 24, 1975

Presiding: Emil Steinberger, President

Secretary: E. S. E. Hafez

Present: E. Steinberger, President; S. J. Behrman, Vice-President; E. S. E. Hafez, Secretary; E. Rosemberg, Program Chairman; A. Bartke, Council; A. Paulsen, Council; R. Sherins, Council; A. Steinberger, Council

President's Report

Negotiations were conducted with CIDA concerning affiliation and utilization of Andrologia as the publishing arm of ASA. Affiliation will require one fee of \$50. Ten percent of the CIDA earnings from ASA membership subscriptions will be returned to ASA. Affiliation is a voluntary one. (There is controversy on the affiliation fee to CIDA. This will be resolved in our next business meeting.) Dr. Behrman was complimented for completing the formalities associated with incorporation of ASA. As of now, ASA has been incorporated in the State of Michigan. Dr. Eugenia Rosemberg was complimented for her superb work on organizing the first annual meeting. Because of the time limits Dr. Steinberger made up, with the help of Drs. Alexander and Hafez, a membership application form for immediate use, with the understanding it would be modified as necessary during the coming year. Dr. Hafez was to arrange for the Society stationery. Dr. T. N. Evans declined chairmanship of the Finance Committee. Dr. Zaneveld resigned as chairman of the Membership Committee because of pressure of new duties and lack of adequate administrative support in his new position at the University of Illinois at the Medical Center.

Discussion of the Report: It was moved and seconded that ASA affiliate with CIDA and use Andrologia as its publishing arm. Also, one affiliation fee of \$50 was approved. Dr. Behrman felt the by-laws would require further work and promised that the committee would work on the final copy of the by-laws to have it ready for reading by the officers and Council within the next couple of months. It was moved and accepted to use temporarily the current membership application forms. The officers noted with regret that Dr. Evans cannot serve as chairperson of the Finance Committee and voted Dr. Behrman to this position. The officers accepted with regret the resignation of Dr. Zaneveld. The administrative support necessary for the Membership Chairperson, particularly during the Society's first year, is a major one and an individual with such assistance would have to be nominated for the chairpersonship. Following a

discussion, Dr. A. Bartke was nominated and he accepted chairpersonship of the Membership Committee.

Report of the Program Chairperson (Dr. Rosemberg)

Dr. E. Rosemberg outlined the program of the first ASA scientific meeting to be held in Worcester, MA, on March 31-April 2, 1976. A copy of the tentative program has been circulated among officers of the Society. She stated that the annual meeting will attract new membership. She suggested that the official business meeting of ASA shall be held at the time of the annual meeting. She discussed registration fee, advance registration, and possible invited speakers.

Discussion of the Report: It has been noted that the meeting dates will not interfere with the meeting of the American Fertility Society and it was moved and accepted that the registration fees be: members--no fee; nonmembers--\$20; fellows, residents, and students--\$10, and guests--\$5. Dr. Rosemberg also mentioned to the officers that during the annual meeting of the Endocrine Society concern was voiced concerning the fragmentation of individuals interested in endocrinology and reproduction. The Endocrine Society has set up a committee composed of various societies related to endocrine and reproduction to look into this need. The first meeting was held in New York at the time of the Endocrine Society meeting. Drs. Eugenia Rosemberg and Anna Steinberger attended this meeting.

Report of the Publication Committee (Dr. Rosemberg)

Dr. Rosemberg reported of negotiations with Andrologia concerning publication of the abstracts and major papers of the first annual meeting. She announced the components of her committee:

Accepted:	Griff T. Ross	NIH
	Alexander Albert	Mayo Clinic
	R. Emslander	Mayo Clinic
	Larry Ewing	John Hopkins School of Public Health
	W. Odell	Harbor General Hospital, University of California
	Albert Parlow	Harbor General Hospital, University of California
	Philip Troen	University of Pennsylvania
	William L. Williams	University of Georgia

Not Yet

Accepted:	M.-C. Orgebini-Crist	Vanderbilt University
	C. Wayne Bardin	Penn State
	S. Howards	University of Virginia
	L. Persky	Case Western Reserve
	R. Bunge	University of Iowa
	Charles Rife	Mayo Clinic

Discussion of the Report: The role of the Publication Committee vis-a-vis Andrologia was discussed. It is hoped that ASA officers and Council would define the role of the Publication Committee.

Report of the By-Laws Committee (Dr. Behrman)

Dr. Behrman read the draft of the by-laws. However, due to the time limit, reading could not be completed and he promised to rework the by-laws and present them to the officers in the near future.

Report of the Treasurer

The Treasurer, Dr. Nancy Alexander, was unable to attend the meeting, but she communicated via telephone with the President, Dr. Steinberger. Dr. Alexander was primarily concerned with setting up an account with a bank.

Discussion of the Report: This issue was discussed, and it was moved and accepted that the following officers will have the authorization to sign checks: President, Vice President, and Treasurer. The Treasurer's signature will be sufficient for all ASA checks. The Treasurer was requested to inquire about laws pertaining to this issue in the State of Oregon. She was also urged to inquire about a special savings account which would permit withdrawal of funds without penalty.

Report of the Finance Committee

No report.

Report of the Liaison Committee

Lack of activity of the Liaison Committee was noted. However, it was noted that Dr. Behrman, Chairman of the Liaison Committee, had his hands full with the By-Laws Committee and incorporation of the Society. It was suggested that the President of the Society temporarily take over this function.

Financial Issue

It was moved that as soon as sufficient funds from membership dues are accumulated that the legal fees and other expenses incurred by Dr. Behrman in the process of incorporating ASA are refunded to him, as well as expenses incurred by Dr. Hafez in providing conference facilities at Fort Collins, stationery, and other expenses are reimbursed.

Other Societies

Dr. A. Paulsen expressed concern of certain societies and hazard of unnecessary fragmentation of societies. President Steinberger promised to communicate with AFS and SSR to augment their activities with that of ASA.

Tenure of Office

President Steinberger suggested to extend the tenure of the officers by one year. This suggestion was not settled and will be resolved during our next business meeting.

The meeting convened at 9:20 a.m. and adjourned at 1:30 p.m.

E. S. E. Hafez, Secretary

AMERICAN SOCIETY OF ANDROLOGY

FIRST BUSINESS MEETING

July 24, 1975

The first business meeting was held at University Motor Inn, East Collins, CO, on July 24, 1975.

Attending the meeting were: A. Bartke, S. J. Behrman, E. S. E. Hafez, E. Rosemberg, R. Sherins, A. Poulsen, A. Steinberger, and E. Steinberger.

Presiding was E. Steinberger, President.

Welcome by the President.

Presidential Report

The President contacted CIDA, and it was agreed that *Andrologia* will be the official journal of ASA. Affiliation will require a fee of \$50. Ten percent of the CIDA earnings from ASA membership subscriptions will be returned to ASA. Affiliation is a voluntary one.

The Membership Committee will revise the bylaws of membership and send comments to the President. President Steinberger read a letter for Dr. Zaneveld asking to be relieved from membership chairmanship. Drs. Bartke and R. Sherin accepted to serve on the Membership Committee.

ASA Stationary: Objections were raised by Dr. Nancy Alexander (by letter) and by Dr. Eugene Rosemberg on the ASA stationary. The addresses of officers and name of Council could be included in a new stationary with a new emblem. The old stationary could be used by the Secretary.

Finance Committee--S. J. Behrman (chairman), T. N. Evans, and E. Brueschke. The Finance Committee will deal with audit. The Council will take care of fund raising under the chairmanship of President E. Steinberger.

Treasurer. Authorized signatures of checks are of the President, Vice President, and Treasurer. Dr. Alexander will be the primary officer to sign ASA checks under normal circumstances. She is requested to find out about laws of the state of Oregon for details on nonprofit organization accounts for possible special savings accounts.

Report of the Program Chairman

Dr. Eugenia Rosemberg outlined her program of the first ASA scientific meeting to be held March 29-April 2, 1976, in Worcester, MA.

She aimed to attract new membership and to hold a business meeting during that occasion. She discussed registration fees, advance registration, and possible new invited speakers.

Liaison Committee

The Federated Society meeting was held in New York in June 1975. President Steinberger requested to reformulate additional members for the Liaison Committee to represent the following societies: American Urologic Society, American Fertility Society, Society of the Study of Reproduction, Endocrine Society, American Society of Anatomists, and the Neuroendocrinology Society.

Publication Committee (Eugenia Rosemberg, MD, Chairman)

Members: Griff T. Ross, NIH; Alexander Alberl, Mayo Clinic; R. Emslander, Mayo Clinic; Albert Parlow, Harbor General Hospital, CA; Philip Troen, University of Pennsylvania; William L. Williams, University of Georgia.

Not Yet Accepted: M.-C. Orgebin-Crist, Vanderbilt University; Larry Ewing (accepted), John Hopkins School of Public Health; C. Wayne Bardin, Penn State; W. Odell (accepted), Harbor General Hospital, CA; S. Howards, University of Virginia; L. Persky, Case Western Reserve; R. Bunge, University of Iowa; Charles Rife, Mayo Clinic.

It is hoped that the ASA officers and Council would define the role of the Publication Committee.

Financial Matters

As soon as membership dues are accumulated, Vice President Behrman will be refunded legal fees of incorporating ASA and Secretary Hafez will be refunded the price of the stationary and rent of a conference room in Ft. Collins.

Other Societies

Dr. Paulsen expressed concern of certain societies of the hazard of unnecessary fragmentation of societies. President Steinberger promised to communicate with AFS and SSR to augment their activities with that of ASA.

Bylaws

Vice President Behrman read a draft of the bylaws. Dr. Behrman was requested to rewrite the bylaws for circulation among officers for any possible revisions.

Tenure of Office

President Steinberger suggested to extend the tenure of officers by one year as follows:

President April 1976-77
Vice President April 1976-77
President-Elect April 1977-78
Program Chairman will be selected in April 1976
Nomination Committee for the new President-Elect to take place in April 1976.

The meeting convened at 9:20 a.m. and adjourned at 1:30 p.m.

E. S. E. Hafez
Secretary of ASA

The New Millennium ASA Past President's Letters to the Editor 2000

Co-Editors: David W. Hamilton and Jon L. Pryor
Journal of Andrology 21 (1); Jan/Feb

Letters to the Editors

As part of our transition into the new millennium, we thought that David Handelsman's suggestion of having the past presidents write a short Letter to the Editor on what they predicted, hoped, or imagined would happen to the American Society of Andrology during the millennium was not only appropriate, but also might also spark some debate and other letters from the members of the Society.

We sent invitations to each of the living past presidents, and the responses we have received up to now are reproduced below. As others come in, they will be printed.

We hope that you enjoy them.

David W. Hamilton
Jon L. Pryor
Co-Editors-in-Chief

To the Editors:

In 1967, at the annual meeting of the American Association of Anatomists, Warren O. Nelson, then the medical director of the Population Council at the Rockefeller Institute in New York, and Charles LeBlond, the chairman of the Department of Anatomy at McGill University, established the Male Reproductive Biology Club. It met annually, and after Warren O. Nelson's death, it was renamed the Warren O. Nelson Club. At about the same time the *Comite Internacional de Andrologia (CIDA)* was established under the leadership of Drs Puigvert and Pomerol of Barcelona and Mancini of Buenos Aires. It was in response to their prodding that I have launched a campaign for the establishment of an American Society of Andrology. At about that time Drs Saad Hafes and Tommy Evans invited me to present a paper at a symposium on "The Human Semen and Fertility Regulation in the Male" in Detroit, Mich. I asked them—and they agreed—to have an organizational meeting of the American Society of Andrology held during this symposium and the Society was founded on April 25, 1975, in Detroit. A number of individuals were instrumental in establishing the Society, including Drs Eugenia Rosenberg, Mort Lipsett, Al Paulson, Saad Hafes, Nancy Alexander, Jan Behrman, Larry Zanaveld, and others. During the first year, the Society attracted 200 members.

The Society was formed by "coalescing several existing areas of science and medicine to promote a multidisciplinary interest in the male reproductive system." It was to "encompass a problem-oriented and a system-directed segments of science and medicine rather than [to form] a discipline or technique-oriented, tradition-bound area defined by political or other expediencies"; and to "promote a multidisciplinary approach [and] guard jealously the precept of a close integration between the basic and clinical sciences" (Steinberger, 1976).

With the introduction of in vitro fertilization and particularly intracytoplasmic sperm injection (ICSI), the interest in andrology has heightened. Unfortunately, there are only a few departments or laboratories involved in the training of andrologists. The best are usually trained in basic or animal science departments. There is a decline in departments devoted to research and training in the area of male reproduction. Research is frequently conducted by small groups in a variety of basic science units. Despite these changes, considerable advances are being made

in our understanding of the molecular and genetic aspects of the male reproductive system. However, our appreciation of mechanisms responsible for oligospermia has evolved only a little in the past couple decades and our ability to treat spermatogenic arrest (thus oligospermia), even less. The demonstration that ICSI will result in apparently normal pregnancies diminished the need for research into spermatogenesis as a necessary prerequisite for the development of treatments of spermatogenic defects and infertility. The national and worldwide interest in developing a male contraceptive has also diminished. This resulted in a general decrease of financial support for male reproductive system research.

However, I like to be an optimist. Notwithstanding some of these "lukewarm" comments concerning predictions made in 1981 for a glowing future of andrology (Steinberger, 1982), many indeed did come through. Despite the declining financial support, a great deal of research in the past decade was brilliant. The development of ICSI, which apparently has undermined the financial support for research in some areas of testicular function, was in its own right not only brilliant and daring, but it has also resolved a number of problems for infertile couples.

In view of these developments, what is the future of our Society? In the past, the Society has performed its job admirably. It fostered the scientific knowledge and the clinical practice dealing with the male reproductive system. It brought the clinical disciplines close to the basic scientist and vice versa; thus, it accomplished probably the most important task, one I emphasized for the Society in the first presidential address: "to coalesce several existing areas of science and medicine in order to promote multidisciplinary interest in the male reproductive system" (Steinberger, 1976). In my opinion, the future of the Society rests on keeping this task in the forefront of the Society goals.

Emil Steinberger, MD
ASA President, 1976–1977
Texas Institute for Reproductive Medicine
and Endocrinology
Houston, Tex

References

- Steinberger E. Presidential address. *Andrologia*. 1976;8(suppl):11–15.
Steinberger E. The past, the present, and the future of andrology. *Int J Androl*. 1982;5(suppl):210–216.

To the Editors:

The American Society of Andrology was founded in the years that followed the development of methods for biological applications of the electron microscope. The impact of that instrument can only be compared with the opening of a new continent for geographical exploration, and it was attended by the same excitement and anticipation of discovery. It extended the reach of morphologists down to the level of macromolecules, largely eliminating the *terra incognita* that had previously separated microscopic anatomy from biochemistry. In the years that followed, the coalescence of these disciplines created the new field called cell bi-

ology, and the concurrent discovery of the structure of DNA, and of its commanding role in all the vital processes of living organisms, gave rise to another new area of research, molecular biology. Studies with the electron microscope alone now yield results of diminishing novelty and significance. Research in biochemistry, cell biology, and molecular biology have become a continuum with no clear boundaries between them. Andrologists must not resist this coalescence of the basic sciences. The significant advances in the future will be made by combining the knowledge and the methods of more than one discipline.

The progress in our understanding of male reproductive biology in the past 50 years has been remarkable, but many challenging problems remain, viz, localization of the proteins encoded by genes that affect fertility; identification of paracrine secretory products of myoid cells that influence Sertoli cell function; identification of the signaling development of methods for isolation and in vitro cultivation of spermatogonial stem cells; further studies on cryopreservation of male germ cells and their intra- and interspecific transplantation, and exploration of the potential of these techniques for preservation of germ-lines of exceptional value in animal breeding; . . . exploration of the feasibility of genetic modification of transplanted spermatogonia to prevent transmission of a heritable disease to offspring; . . . development of a male contraceptive vaccine that would block sperm receptors on the zona pellucida or the plasma membrane of the ovum; . . . studies of postcoital modifications in behavior of the spermatozoa in the female tract that may provide information relevant to assisted reproduction in the human.

These and many other initiatives will require a multidisciplinary approach. Electron microscopists among our membership must combine their expertise in microscopy with methods from biochemistry, from cell and molecular biology or from immunology to obtain results of greater physiological significance. Morphological descriptions of spermatogenesis and sperm ultrastructure in yet another mammal, bird, or insect species no longer command the respect of the broader scientific community. Too many of such publications in our journal may contribute to a prevailing image of andrology as an antiquated, purely descriptive branch of biological science.

Don W. Fawcett, MD
ASA President, 1977–1978
Hersey Professor of Anatomy, Emeritus
Harvard Medical School
Cambridge, Mass

To the Editors:

The world population has now topped 6 billion. Few doubt that overpopulation is the biggest problem faced by our planet. With about 3 million unplanned or unwanted pregnancies per year in the United States alone, it is obvious that currently available contraceptives are not being used effectively by a significant part of the population. More convenient, more accessible contraceptives could make possible more planned pregnancies and wanted babies. Many men are willing to share the burden of contraception, but the methods at their disposal are limited to abstinence, withdrawal, condoms, and vasectomy. These options have not changed for decades.

Effective hormonal male contraception is feasible. Administration of pharmacologic doses of androgens reduces the production of both luteinizing hormone and follicle-stimulating hormone sufficiently to dramatically decrease sperm production. A recent international multicenter trial evaluated testosterone administration for contraception. Most men developed azoospermia or severe oligozoospermia with a high degree of contraceptive efficacy.

However, the biweekly injections used in the study would not seem to be the most acceptable approach. Long-term oral androgen administration, on the other hand, generally has been problematic because of con-

cerns with hepatotoxicity. Molecular modifications potentially could solve this problem. A depot injection would markedly improve acceptability. The World Health Organization, working with the National Institutes of Health, has developed a 3-month injectable ester of testosterone that has potential. Speeding the onset of contraceptive action, which is in the neighborhood of several months, could be accomplished through the use of an antagonist to gonadotropin-releasing hormone. At least one is on the US market now.

Progestins can enhance the action of androgens resulting in a greater impact on spermatogenesis. Combinations of progestins and androgens, some of which are currently being evaluated in men, may be as effective as testosterone alone—plus they have advantages in not drastically changing lipid levels. A study in Indonesia employing a combination of deposedoxyprogesterone acetate and testosterone enanthate resulted in 100% azoospermia. Antiandrogens in combination with an androgen also have contraceptive potential. Such approaches will result in lower doses of androgens with a higher contraceptive efficacy.

Testosterone and its metabolite, dehydrotestosterone (DHT), exert various effects on tissues expressing androgen receptors and consequently can mediate disparate biological actions. Testosterone mediates functions that are desirable in male contraception, including modulating gonadotropin regulation and maintaining libido and potency. DHT may exert adverse androgenic effects such as prostate hypertrophy, balding, and acne. Various analogs have been developed and are being tested. For example, 7- α -methyl-19 nortestosterone has been designed to provide the functions of testosterone while resisting metabolism to DHT.

The more distant future for contraception may rest on our increased understanding of spermatogenesis or sperm maturation and efforts to disrupt these processes—for example, development of mechanisms to reversibly suppress the transformation of type A spermatogonia into the differentiating B spermatogonia, thus causing temporary contraception. Another possibility is to design specific inhibitors of meiosis. Certainly the many unique germ cell peptides and enzymes, including Mos, LDH-C4, phosphoglycerate kinase 2, and meiotic-specific heat shock protein, are promising research avenues. Since synthesis of numerous proteins and enzymes are required for spermiogenesis, a specific inhibitor might function as a reversible contraceptive approach. The Sertoli cell will most likely be pivotal in male contraceptive efforts since it rests on the basement membrane and allows compounds up to 10000 MW to enter it. These substances could either stimulate the Sertoli cell itself or be passed directly to the germ cells. Changing the epididymal milieu to alter sperm maturation is another possibility.

Recent research with knockout or transgenic mice can provide critical information to enhance relevant studies. If a targeted gene causes infertility without other obvious phenotypic effects, an important piece of information has been gained.

New, undreamed-of approaches will quickly develop. However, the first new systemic male contraceptive will undoubtedly be a hormonal one. After all, treatment of hypogonadism has long been successful with testosterone. It seems likely that new concepts will allow even greater specific targeting of reproductive ligands. Creative investigators and innovative science will speed advances in male contraception.

Nancy J. Alexander, PhD
ASA President, 1979–1980
Associate Director, Medical Services
Organon Inc
West Orange, NJ

To the Editors:

When I started the study of the testis under Al Albert 5 decades ago, the term *andrology* was not known to me (and many others), although, as I subsequently learned, it had appeared a half-century earlier (Troen,

1998). In the past 3 decades, the remarkable maturation of andrology as a discipline has been reflected and enhanced by the number of andrology journals and publications, of societies and congresses worldwide, and of workshops and symposia. Andrology now has a solid infrastructure for the next century.

What are the areas of opportunity and concern for andrology as we look ahead? Like many other areas of science and medicine, the exciting and important advances in the field reflect the strong multidisciplinary nature of our work. The involvement of clinicians and scientists of diverse skills and backgrounds has been integral to the growth of andrology, and every effort should be made to enhance this state. This can be done not only by collaborative studies but also by promoting a broad-based recognition of those who may contribute. This is not an exhortation to remedy our present approach but rather a reminder of the importance of consciously and vigorously strengthening this approach, especially in our recruitment of colleagues.

The above consideration leads to the recurring discussion of how andrology should be organized. In a number of countries, andrology has specialty certification or departmental status, and proposals have been made to extend this approach. One can visualize several alternative approaches, but each has implications both political and structural, and if improperly pursued, they could diminish our interdisciplinary focus. However, we must not lose sight of the fundamental need to continue our true interdisciplinary nature.

The specific advances in andrology in the past few years foretell continued further advances along many fronts both at the cellular or molecular levels and for clinical application. The accelerating rate of change has produced a shorter horizon for prediction of new developments. But even an extrapolation of present activities over the next few years supports the expectation of an exciting time.

To a large extent, however, future developments will be influenced by societal needs and concerns. This is already apparent by the importance to society of conception, fertility and infertility, contraception, and aging. In addition, the understanding of the relation of male hormones to neoplasia, athletics, and general well-being, for example, will accelerate. Intertwined with all these activities is the need to maintain and develop comprehensive ethical guidelines.

I believe that with the broadened scope and activities of andrology in the past few years, we should now define andrology as being dedicated to the overall health and well-being of the male. By building further on our strong multidisciplinary base and our important contributions in so many vital areas, we should be able to provide challenge and opportunity to our colleagues and render an important service to society.

Philip Troen, MD
ASA President, 1980–1981
University of Pittsburgh School of Medicine

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To the Editors:

Someone once said the best way to predict the future is to study the past. The future for andrology must look bright because we have come so far. In the early days, there were even questions as to who was an andrologist. I remember the conflict among some of the European representatives at the international meeting in Tel Aviv. The urologists insisted that they were andrologists and the dermatologists insisted that they were, since they had been treating syphilis in men for decades. It was

finally resolved that both were andrologists without either losing any status.

It was not too long ago that semen analyses were conducted by measuring the semen volume with a pipet, examining a slide with a drop of the semen on it and estimating the motility, diluting a portion of the semen with a diluting fluid in a blood cell pipet, counting sperm on a hemacytometer to calculate concentration, and sometimes doing a fructose assay. This latter assay provided an additional bit of information on a report form but was really of marginal value. I never saw a semen sample with a volume over 0.7 mL that had a below normal fructose value. It did, however, help one time to diagnose ejaculatory duct blockage in an individual who had decreasing volumes and decreasing fructose levels. Then along came computer-assisted semen analysis, CASA for short. Now the laboratory technician could tell the doctor that the motility was 67% instead of the 65% that would have been estimated by an experienced technician and the concentration determinations were faster and probably more accurate. Even better, the research scientist can use the CASA to determine what percentage of the sperm fell into different categories of motility. The fertility lab was moving towards the 21st century.

In the 1980s, a new procedure was introduced using the hamster nude oocyte to determine if human sperm could penetrate into the oocyte. The assay was fairly expensive, and some electron microscopy studies had indicated that when the sperm came in contact with the vitelline membrane, the oocyte engulfed the sperm and not that the sperm bore its way into the oocyte, but this assay was an important component in many fertility clinics. I am not sure if a negative assay ever ruled out trying at least one cycle of superovulation and in vitro fertilization or not.

In the last decade, there have been a number of efforts to try and determine what effects different endogenous and environmental factors may have on semen parameters, and this is where the future of andrology may lie. The effects of environmental phytoestrogens have not been intensively studied relative to male reproduction. Perhaps in the next decade we can learn more about the feedback mechanisms involving inhibin and activin. Then maybe we can find a way to increase the mitotic replication of spermatogonia and the initiation of meiosis leading to increase sperm production. No semen samples that I have ever examined had 100% motile sperm. Why? Are the nonmotile sperm too old or too immature? Are there environmental factors that reduce motility in the less mature sperm? These are areas in which the andrologist of tomorrow can make a valuable contribution.

Last, the leaders in andrology must take an active role in helping the lay and legal community catch up with the science. There are as many challenges for andrology tomorrow as there were yesterday. The future looks bright for andrology.

Richard M. Harrison, PhD
ASA President, 1981–1982
Tulane Regional Primate Research Center
Department of Veterinary Sciences
Covington, La

To the Editors:

Though some among us claim to be true visionaries, forecasting the future in any line of business is precarious. It is no less so in trying to predict the future of andrology in the next millennium. Consider, for the moment, the monumental changes that have occurred in the evolution of the human condition during the last 1000 years, since the primitive days of the middle ages, and then try to imagine life on this planet several centuries from now. This is quite a daunting task.

Given the current state of the globe, it seems reasonable to forecast that we will witness a seamless global economy, convenient systems for instantaneous worldwide communications, access to electronic catalogues of the entire existing history of earthly events and artifacts, harnessing

of nonpolluting energy sources, mining of the vast resources of the ocean, interplanetary if not interstellar travel, and unprecedented advances in our understanding of the genetics, biology, and health of the human condition. Given the history of mankind to date, however, I remain skeptical that we will be able to fully control interpersonal aggression, the destructive prejudices of many tribal, religious, and national entities, or the famine, poverty, and misery of the underprivileged. I am certain, though, that there will be no lessening of the passion that couples display to have children on a planned basis who can attain equal opportunity to achieve a long, healthy, happy, and prosperous life, living in a world at peace.

From my perspective in the field these past 33 years, great advances will be made in male reproductive health from a better understanding of the genetic regulation of the testis and male reproductive tract. We will come to understand not only the molecular factors that control the quantitative production of sperm, but also the factors that regulate the functional cellular components of those sperm. This would include those factors that effect sperm entry into the egg as well as the contribution of sperm to fertilization and subsequent early embryo development. This will require that andrologists develop considerably greater knowledge of egg and embryo biology. The epididymis should also be the target of considerably greater attention, as it would appear to hold many keys to the functional properties of sperm and in this regard serve as an important site for contraceptive regulation. I sense the increasing use of long-term banking of gametes and embryos during one's youth and the development of truly effective methods of growing testicular germinal epithelium *in vitro*.

Although cloning in animal husbandry is likely to achieve remarkable success, the use of this technique in the human will have very restricted, though important, use. Likely we will see considerable bioengineering developments to enable strategic tissue and organ banks. Andrologists will also come to better understand the hormonal actions of androgens and estrogens on nonreproductive organs such as brain, bone, and heart so as to facilitate our understanding of male aggression and promote treatments for mental disease (especially depression and schizophrenia) and the age related disorders of prostate, osteoporosis, and coronary artery disease. Finally, I forecast that sperm will become a vital instrument for future gene therapy by providing a convenient biological vehicle for transfection of normal genes into at-risk embryos.

The American Society of Andrology is well suited to catalyze these developments. Its multidisciplinary membership facilitates the early presentation of basic science developments to clinically oriented physicians and its demand for high quality science promotes the ultimate clinical usefulness of new findings. What I feel is most lacking, however, is an effective influence of our Society on medical school training of basic science and clinical professionals to carry the field forward in the next millennium. This must become a high priority for our Society.

Richard J. Sherins, MD
ASA President, 1982–1983
Genetics and IVF Institute, Division of Andrology
Fairfax, Va

To the Editors:

On the occasion of the 25th "birthday" of the American Society of Andrology, it was decided to publish a series of letters on the future of andrology. In the midst of never-ending list of deadlines and tasks calling for immediate attention, it is a rare opportunity to pause and try to think of broader issues and the more distant future. New developments in biomedical science are happening so quickly that it is not easy to look beyond the next grant application or the next academic year. My thoughts (or should I say "guesses") summarized below are an attempt to extrapolate from the developments of the last 25 years and to relate developments in other fields to the field of andrology.

Genetic Mechanisms—There is no doubt that studies of spermatogenesis, fertility, androgen production, and reproductive health will focus increasingly on the effects of expression of individual genes. The basic research-oriented andrologist of the future will almost certainly have a profound understanding of molecular genetics, will use animals in which expression of a specific gene is enhanced, reduced, or extinguished in selected cell types or at selected stages of development, and will rely on mice, cell lines, and cell or organ cultures in the laboratory. He will be increasingly aware of biological diversity, including species differences, strain differences, and effects of genetic background. The clinical andrologist will often analyze genotypes of his patients and consider frequency of different alleles in epidemiological studies.

Assisted Reproduction Technologies—Progress in this area has been impressive, the number of clinical andrology laboratories increased greatly, and results from Dr Yanagimachi's group and from other investigators suggest that, for assisted reproductive technology, the sky is the limit. There is every reason to expect that more and more men hitherto considered infertile will be able to become fathers and that long-term storage of male germ cells (I am purposely not saying "spermatozoa") will be used routinely in various clinical situations as well as for preservation of unique mutants and strains.

Antiaging Medicine—As we live longer and become increasingly concerned with avoiding the limitations of old age, the newly emerging field of antiaging medicine is certain to overlap broadly with the field of andrology. Androgen supplementation and other therapies designed to combat age-related changes in body composition, appearance, energy level, psychological outlook, and sexual functioning will be developed, aggressively promoted, and probably widely used. Prevention and treatment of benign prostatic hyperplasia, prostatic cancer, osteoporosis, impotence, and frailty will assume importance as immediate concerns of an increasing proportion of patients and as public health issues.

Although much has happened in andrology during the last 25 years, I strongly suspect that the progress and changes during the next 25 years will surpass our expectations and differ in significant ways from the predictions I made in this letter.

Andrzej Bartke, PhD
ASA President, 1983–1984
Southern Illinois University
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Physiology Department
Carbondale, Ill

To the Editors:

It is a pleasure and an honor for me to be able to consider what may transpire in the field of andrology in the early part of the next century, and my comments will be limited to a few hormonal considerations.

With the finding of the second estrogen receptor, new avenues for pharmaceutical investigation have been opened. Estrogeniclike compounds will be identified which can elicit their agonistic or antagonistic action on specific end-organ tissues, sparing other organs for which these might have deleterious effects (Ansbacher, 1998).

In similar fashion, I expect that the androgen receptor (or receptors) will receive greater attention from investigators in order to determine if selective androgen receptor modulators exist.

The aging male has not received the attention given to his female counterpart in trying to determine what should be utilized to obviate the changes with aging, which include a decrease in lean body mass with an increase in fatty body mass; decreased bone density with subsequent osteopenia and osteoporosis; deleterious cardiovascular system changes; decreased cognition; increase in colon cancer; thinning of the dermis with skin changes; decreased libido with increased erectile dysfunction; in-

creased macular degeneration of the eye; decrease in testosterone production from a decrease in Leydig cells; and increased tooth loss.

Tissue-selective testosterone agonists and antagonists should become available that would have beneficial effects on various organ systems while sparing other tissues from adverse sequelae. Such agents should enable us to obtain additional information concerning the aging process and its effect on targeted tissues, hopefully decreasing some of the devastating effects of aging, thereby enhancing the quality of life in one's golden years.

My thanks to the *Journal of Andrology* and its editors for allowing me to express the above thoughts with our Journal's readership.

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ASA President, 1984–1985
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University of Michigan Medical Center
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To the Editors:

The “famous philosopher” Yogi Berra once stated: “Predictions are very difficult to make, particularly about the future.” Thus, making predictions about the future of ASA can only be a speculation. Nevertheless, I would like to offer a few such speculations with the hope that some of them may become reality. Based on ASA's accomplishments the past 25 years, one can be quite optimistic that the Society will continue to prosper in an energetic and mature way. After all, the age of 25 years is supposed to be most vigorous and productive!

From its beginning, ASA had every indication of becoming a great society, and great does not necessarily mean large. In fact, ASA's relatively small size was among its very attractive features. It was easy to get to know and interact with colleagues. When I had the privilege to serve as ASA's president (1985–86), the Society was entering its adolescence stage and exhibiting many of the typical growing-up pains and uncertainties: Will ASA become financially more secure? Will our fledgling *Journal of Andrology* survive and be considered favorably among other journals in the area of andrology? Who should handle publication of the Journal? Should the Society engage a professional company to handle some of its office affairs, or continue to depend totally on the volunteerism of its members? Due to the dedication and vision of its members, many of the earlier concerns and uncertainties have been overcome. ASA's annual meetings have been progressively more sophisticated and versatile. This trend will undoubtedly continue into the future. We must also strive to increase the number of commercial exhibitors at the annual meetings by early solicitation of their participation. Many companies commit their funds at least 1 year in advance. Because andrology is a highly specialized field, ASA's membership probably will not increase significantly; however, for the Society to remain vibrant, every effort must be made to continue attracting new members with fresh ideas and enthusiasm. It is also crucial for the Society to achieve a sound financial basis. Members of the Society, as well as commercial companies, foundations, and other sources, will need to be actively solicited for contributions to the endowment fund in order to attain a situation when the interest alone from wisely invested funds could provide substantial support for ASA's activities.

The *Journal of Andrology* will most likely remain the most widely cited, top journal in its field, providing ASA members and others will submit their best manuscript to this journal. Also, the *Handbook of An-*

drology, which proved to be very popular among students and workers in the field, should be periodically updated and widely distributed (with a reasonable charge to cover publication expenses) to researchers and practitioners of andrology in the United States as well as in other countries.

It is my hope that ASA will remain a multidisciplinary society that will continue to attract both basic and clinical scientists, as well as those devoted primarily to patient care. It is this mix of interests and expertise that has made ASA an unique society. ASA will undoubtedly remain a leader in promoting the goals of andrology around the globe through the International Society of Andrology.

I take much pride in ASA's many past achievements and have much faith in its future. It has all the potential of becoming an even greater society. I wish ASA and its leaders much success in the next 25 years and beyond.

Anna Steinberger, PhD
ASA President, 1985–1986
University of Texas, Houston
Medical School
Assistant Dean of Faculty Affairs
Houston, Tex

To the Editors:

The future of andrology is bright. However, the picture is clouded by societal changes, burgeoning knowledge, inadequate funding of both biological and especially directed research, and limited entry of early and midcareer broadly trained and laterally thinking individuals to the area. These concerns impact both human and animal andrology. They increase need for a forum that crosses species to identify core biological features and share challenges in diverse applications. The ASA has an opportunity to assume the leadership role in cross pollination of andrologists and foster successful application of andrology with all species.

Clinical human andrology will not become extinct, as some suggest. We are just beginning to understand how to diagnose molecular defects in gamete or testicular function. Application of this knowledge will enable reasoned triage of subfertile couples to the most appropriate therapy, defined as that which provides the maximum probability of birth of one normal child with the least emotional impact on the prospective parents and within the budget of all couples seeking treatment. It will become increasingly obvious that intracytoplasmic sperm injection–ET is not a general solution. Linkage between prenatal or prepubertal exposure to agents impacting on function of Sertoli cells and germ cells 18 to 50 years later will emerge via efforts of broadly trained andrologists.

Changing societal perceptions will bring scrutiny to human andrology, but especially to animal andrology. Increasingly, the question will not be, “What can be done?” but rather, “Is the procedure acceptable and will the resultant progeny be widely accepted?” Trade barriers limiting agricultural markets are implemented for political or sociological reasons, not reasons based on biology. Growth stimulants for livestock, genetically engineered grains, and fabric woven from genetically engineered cotton illustrate what might happen. How will this affect use of advanced reproductive technologies with livestock or companion animals?

Consumers are demanding specialized animal products of high quality and low cost in a global economy. “Gene companies” (former bull studs or animal breeders) will use marker genes to identify unique alleles, but high costs can be recovered only by rapid and low cost dissemination of genetic merit—via the male and artificial insemination. Producers will recognize that reproduction is a major factor limiting genetic change whose negative impact is hidden by ill-advised management practices. Andrologists will develop tests to allow neonatal elimination of males and females destined to be subfertile 6 to 18 months later. Have we really improved sperm preservation in the past 40 years? Better understanding

of biology and new procedures diagnostic of sperm function will facilitate development of improved procedures for sperm preservation. Such tests will have a high percentage of correct prognoses of outcome. Application of methods to harvest most sperm produced by a unique gene factory (ie, a given male) is long overdue and will be linked with new technology to improve on nature via additives increasing fertilizing potential of sperm, timed insemination once during estrus, and insemination of a reduced number of sperm. Current practice of inseminating 0.5×10^9 sperm per pig egg ovulated is illogical. For animals of economic importance, the goal should be maximum number of progeny, of the desired sex, from a unique young male transmitting valuable alleles, not maximum pregnancy rate for females inseminated.

These rosy predictions will not happen without substantially greater investment by society in human clinical andrology and by agricultural industries in animal andrology, in both cases including related advanced reproductive technologies. Income at human clinics is unknown, but farm gate value of animal agriculture in the United States is \$96 billion. Total United States investment in reproductive research on animals is $<0.1\%$ of this value. No wonder progress is hard to detect and it is difficult to entice the best minds to the area.

It will be fun to be a broad thinking andrologist over the next 25 years. Good luck.

Rupert P. Amann
ASA President, 1989–1990
Fort Collins, Colo

To the Editors:

Past presidents of the American Association of Andrology have been asked to submit a letter outlining an opinion of the future of andrology. I am pleased to do this. For the first 9 years of my career, I was involved with youngsters with maturation problems and with infertile couples with emphasis on the infertile male. For the last 22 years, I have been involved with aging males and hormone changes with aging and clinical andrology. I will address my comments to my major activities of the past 22 years and leave the remainder to others who are more familiar with the rest.

It took a long time, but I believe that everyone involved in andrology now agrees that bioavailable and free testosterone decline with aging. There is central failure and testicular failure. The question still remains should we use values found in young men or age matched normal values (T or Z scores in osteoporosis) to assess for low levels? We need to be able to assess the actions of testosterone, bad and good. Using levels alone may not be adequate as there may be individual variation in sensitivity. Ways to evaluate effects of testosterone in an individual would be useful. It would be wonderful if selective androgen receptor modulators (SARMS) could be found that would have the benefits without the potential harmful actions. We need to continue to explore delivery of replacement androgens. Longer lasting intramuscular testosterone preparations that produce flat levels of hormone, or smaller and longer lasting patches, or topical gels, or new oral medications would be useful.

Benign prostatic hyperplasia (BPH) remains a major problem, and in some patients it is not so benign. In theory, finasteride (Proscar) was a great idea. It is useful in some patients, but once BPH has occurred, treatment is only somewhat successful. Ongoing long-term clinical trials should give the answer about prevention of BPH and prostate cancer. A more selective and effective inhibitor of prostatic 5-alpha reductase or a SARM that down-regulates BPH would be useful.

Sexual dysfunction, or in particular erectile dysfunction, has been getting deserved attention. Sildenafil (Viagra) has done much for this common disorder and brought many men out of the closet. We need to stress the appropriate evaluation and management to maximize the potential for success with this drug and with all drugs, especially in the complicated patients. Other medications are undergoing clinical trials and we need to

use the best drug to address the likely problems afflicting a given patient. In men who are partially benefited by one drug, it would be useful to assess treatments utilizing 2 or more drugs that have different mechanisms of action.

Prostate cancer has become a common disease, with a tremendous morbidity and mortality. The prostate-specific antigen (PSA) determination has probably been responsible for increased detection. Other aids have been prostate ultrasound and transrectal prostate biopsies. The problem now is, what should be done when occult cancer is detected? We can get some help from the Gleason sum score, which grades prostate cancers into more and less malignant forms. But some propose that occult cancer should be left alone. They are comparing radical surgery or external beam radiation therapy to no treatment. For some men, who have other terminal diseases, this may be a reasonable approach. But is it a reasonable approach for men who are otherwise healthy? I do not know of any other cancer that is left alone and not treated. More realistically, insurance carriers and others are asking if the costs, both financial and other costs, are worth doing? What this suggests is that better ways to prevent or to treat early prostate cancer are needed. Using implanted radioactive seeds in the prostate appears to have less morbidity and seems to be quite successful. Are other effective, acceptable forms of therapy available?

Howard R. Nankin, MD
ASA President, 1990–1991
Department of Internal Medicine
University of South Carolina School of Medicine
Dorn VA Medical Center
Columbia, SC

To the Editors:

When David Handelsman suggested that a fitting beginning to the millennium would be to publish comments by past presidents about the future of andrology, I readily agreed. What didn't occur to me at the time was that I am a past president and that I also would have to predict the future. This is more difficult than I first imagined. But here goes.

When I was an undergraduate, knowledge about gene structure was very limited, except in the minds of some forward-thinking individuals, and gene function was in essence limited to classic genetics. With publication of the Watson/Crick hypothesis about the structure of DNA, knowledge in this area expanded by leaps and bounds, and the attendant advances in understanding genes and their transcription and translation products have been mind-boggling. These have had immense impact on clinical practice—even in andrology.

Will there be similar quantum leaps in the future? I believe so, and I believe they will occur in the same way advances occurred in the past. The big leaps were in large part not brought about by classically trained biologists but by physical scientists who turned to biology as their newest challenge. The same things are happening today in the area of cryobiology of gametes—the physical scientists are teaming with reproductive biologists to bring new insights and approaches to a difficult biological problem. This will continue in ways we cannot even imagine as subatomic resolution becomes an everyday approach.

I am concerned that andrologists have become isolated from the mainstream of modern biology. This not true in all instances, but there are indications that the exciting advances in molecular immunology, molecular immunology, and other areas are not finding their way into the skill sets of andrologists. For andrology to thrive in the new millennium, this must change. The advent of on-line publishing and access to huge informational databases will aid the broader perspective that is needed to peak the interests of andrologists, but there must be the willingness to “think out of the box” and to broaden horizons in order for the profession to prosper.

In spite of what I have said, I am very optimistic that andrologists will meet the challenge and that the field *will* grow and prosper.

David W. Hamilton, PhD
 ASA President, 1991–1992
 Department of Genetics, Cell Biology, and Development
 University of Minnesota
 Minneapolis, Minn

To the Editors:

Predicting the future provides an opportunity to combine an awareness of current shortcomings and future possibilities into predictions for the future, realizing that few predictions are accurate. I am going to confine my comments to the areas of andrology that I know best and assume that other colleagues will do similarly.

Presently, androgen deficiency is grossly undertreated. Boys with delayed puberty and aging men represent the largest groups of untreated or inadequately treated males. There also is great interest in treating androgen deficiency in women, but I will not address this issue. We must be more aggressive in identifying the 14- to 20-year-old males with androgen deficiency to improve their psychosocial adjustment and to ensure they develop a normal bone mass. This will help to prevent future osteoporosis. Androgen replacement of aging males currently is problematic. The population of aging androgen-deficient men is large and increasing rapidly. Although prevention is desirable, we have few insights. It is becoming clear that androgen replacement in men over age 60 will increase lean body mass, muscle mass (probably muscle strength), and bone mineral density. We don't know if it will prevent osteoporotic fractures that can be devastating to older men or prevent loss of cognitive function. We also don't know if it will increase risk of developing clinical prostate cancers (CaP), require more invasive therapy for benign prostatic hyperplasia (BPH) or exacerbate cardiovascular disease. We need a large clinical trial to address these issues and determine the risk:benefit ratio for treating androgen-deficient aging men. We will develop selective androgen receptor agonists (SARMs). It is likely that some of these agents will be less stimulatory to the prostate than testosterone, thereby reducing the risk:benefit ratio. There also will be improvement in the delivery of androgen agonists.

CaP is the second leading cause of cancer deaths in men in the United States. Currently, curative therapy is restricted to disease that is confined to the prostate. Our most effective strategy is early detection. We will gain greater understanding of the molecular mechanisms that cause androgen resistance in men with metastatic CaP, and this will lead to new strategies for treating metastatic CaP. Targeted delivery of genes that restore sensitivity to androgen ablation or genes that induce apoptosis will provide effective treatment for most CaPs. CaP genes will be identified, making it possible to screen family members of probands, if not the entire population of aging men. Identification and modification of environmental risk factors and widespread use of agents that reduce clinical CaP will be very important. We will know within 5 years if chronic preventive therapy with finasteride, a 5 α -reductase inhibitor, will reduce clinical CaP (Prostate Cancer Prevention Trial [PCPT]). It will take 10 to 15 years to learn whether chronic ingestion of selenium or vitamin E alone or in combination will prevent CaP (SELECT).

Prostate enlargement secondary to macronodular BPH is an important contributor to lower urinary tract symptoms (LUTS). Although BPH accounts for <0.5 of 100 000 deaths per year, more than \$4 billion dollars a year are spent treating BPH and LUTS, and BPH greatly affects the quality of life of most aging men. The past 15 years have witnessed medical treatments for mild to moderate disease and less traumatic invasive therapies for moderate to severe disease. The latter therapies will undergo refinement and greater acceptance. The future will see develop-

ment of effective preventive therapies. The PCPT will tell us whether finasteride can provide effective preventive therapy.

In summary, I think that the next 25 years will provide many opportunities for basic and clinical andrological research. These advances will be translated rapidly into clinical practice and will greatly impact the quality and length of life of men.

Glenn R. Cunningham, MD
 ASA President, 1994–1995
 Baylor College of Medicine
 Houston, Tex

To the Editors:

While writing this letter to the editor in the year 2022, it is difficult to imagine the archaic state of andrology at the time of the second millennium. At that time, the treatment of men with nonobstructive azoospermia (NOA) was just beginning. The development of intracytoplasmic sperm injection (ICSI) in the 1990s for use with in vitro fertilization (IVF), which had been developed in the 1970s and continued to be used until about 10 years ago, stimulated the use of invasive procedures to obtain small numbers of spermatozoa, or in some cases spermatids, to perform IVF/ICSI. Not only were our male patients subjected to invasive procedures, but their partners were subjected to various complications that resulted from the regimens of ovarian stimulation that were required for IVF. Twins, triplets, and higher-order births were not uncommon in that bygone era.

The first major advance came in 2003 with the development of vital stains to identify various stages of spermatogonia, spermatocytes, and spermatids in the semen of men suffering from NOA (Spotem, 2003). Soon thereafter, Growem (2005), in a landmark article, reported the development of a culture medium capable of maturing spermatozoal precursors into mature spermatozoa in vitro. This was followed by a report (Male Reproductive Genoma Study Group, 2009) of the use of the older technology of polymerase chain reaction (PCR) to identify specific genes not only on the Y chromosome, but also on certain autosomal chromosomes, that caused an arrest of spermatogenesis at each specific stage. The subsequent development of an attenuated viral vector capable of inserting specific spermatogenic genes into the genome of men with NOA (Growem, 2012) was a feat that would have been unimaginable in the IVF/ICSI era.

Even 10 years ago, the development of the Human Reproductive Therapy Network, which has been one of many compartmentalized networks developed from the old Internet system, could not have been imagined. Who could believe that someday in the future a physician could place a drop of blood obtained by a finger stick of the patient into a computerized office gene analyzer not only for diagnostic purposes, but also with the intent of ordering a therapeutic supply of specific spermatogenic genes to be administered by the now available oral administration of the genes contained in a viral vector?

The last 3 decades certainly have brought about quantum leaps in our ability to treat men with NOA. However, those of us who were andrologists around the time of the second millennium still have a nostalgia for the excitement of first being able to help men with NOA achieve pregnancies in what now must be considered as the dark ages of our specialty.

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To the Editors:

Thanks for your letter inviting a comment about the future of andrology. First, I do believe that male reproductive medicine and the basic sciences that underpin advances in reproductive medicine will remain an important, identifiable unit of our scientific culture. Unfortunately, there is a threat that andrology will remain an underappreciated area of biomedicine. As is often noted, people do not die from reproductive dysfunction, and this makes it hard for the field to have an aura of importance like that attaching to the study or treatment of life-threatening disease. Public perceptions are important to both research funding and clinical engagement, so a good future for andrology demands we become better evangelists for our science and for its medical and social benefits.

Having said all that, it would be easier to visualize Andrology Future if we had a better definition of Andrology Present. The American Society of Andrology was organized in 1975, and other national andrology societies developed subsequently. Although all andrology societies have an aim of giving definition to the area of male reproductive science and medicine, what this definition is seems to vary around the world. The ASA has always taken the position that an andrologist is anyone, whether scientist or clinician, who works professionally in male reproductive bi-

ology or medicine. This has meant that the Society has taken seriously the goal of retaining a mix of both basic scientists and clinicians; likewise, the Society has insured that both types of andrologists participate in the Society at all levels. Still, the term *andrology* is not commonly used by scientists or clinicians in North America in describing what they do. When used, the term is mostly commonly associated with a clinical laboratory. Thus, what is andrology? Sperm watching? Surely it is more than that, but if andrologists in the broad sense of the word do not include themselves in the definition, a restricted definition will become the standard.

From the viewpoint of one encouraging diversity, the issue of identity is even more problematic in Europe. There, and in many other areas of the world, andrology seems to be conceived of as almost completely clinical in nature. One has the impression that outside North America clinicians largely constitute the discipline. Basic scientists, where they are present, play a minor role. This difference in practice illustrates a separation between andrology in North America and andrology in Europe. The difference has meant, for example, that European andrologists have made the effort to establish formal training programs for clinicians and to formulate rules and standards for clinical laboratories. The ASA, with its large component of basic scientists, has largely foregone opportunities to have a significant impact in these areas. It is debated whether this has been a good or bad idea. In any case, to the degree that differences exist between the “andrologies” of the different continents, it diffuses the vision of andrology’s future.

I am one of those who hope that andrology of the future will remain a mix of clinicians and scientists engaging in a true partnership, and I believe both reproductive biology and reproductive medicine will receive the benefit.

Terry T. Turner, PhD
ASA President, 1997–1998
Professor of Urology and Cell Biology
University of Virginia School of Medicine

Early Years of the *Journal of Andrology*

First Editor's Memoir

From the time that the American Society of Andrology (ASA) first came into existence, there were debates about creation of a specialty journal. Some members of the council and the Society felt that a US andrological journal would be important for the development of the field of Andrology in North America. Others, including myself, felt that the field of andrology was too small to support yet another journal in this field. It was argued that rather than creating a new journal, ASA should become cosponsor of the *International Journal of Andrology*, which was published in Europe. However, in 1978 when the ASA Council decided to launch a new journal and offered me a chance to be its first editor, I accepted this challenge. The Publication Committee, chaired by Dr Eugenia Rosenberg, negotiated a contract with Lippincott Co, and the *Journal of Andrology* was born.

The first editorial board consisted of Drs Nancy J. Alexander, Rupert P. Amann, Richard D. Amelar, Rudi Ansabacher, Martin Dym, Stuart S. Howards, Fernand Labrie, Thomas J. Lobl, Marie-Claire Orgebin-Crist, C. Alvin Paulsen, Kenneth L. Polkoski, Eugenia Rosenberg, Richard J. Sherins, Emil Steinberger, and Philip Troen. I selected this group, hoping these prominent figures in the field of Andrology would be reassuring to prospective authors.

Most members of the Council appeared confident that the journal would be successful. However, there was also a tangible feeling of concern and suspense. Would we receive enough manuscripts to allow timely publication of scheduled issues? Would the manuscripts be of high quality? I knew Dr Frank Comhaire, editor of the *International Journal of Andrology*, through a common interest in distribution of testosterone in different compartments of the testes. We both felt strongly that neither of us would consider doing anything to undermine the activities of the other journal; thus, our "competition" was friendly from the very beginning.

The first issue appeared in January 1980. It consisted of papers provided by members of the Council and the Editorial Board or submitted in response to our solicitations. Support provided by Society officers and Editorial Board members continued to be very important during the first years of the existence of the journal, but naturally, our success hinged on submission of manuscripts from outside this small group. I sent many letters to members of ASA and others soliciting manuscripts for the *Journal*. These included many individuals for whom I was able to "sign in" as members a few years earlier when ASA was created and I took on chair-

manship of the Membership Committee. Although manuscripts initially trickled in at a fairly low rate, it was clear to all of us that the *Journal* would not succeed if we did not maintain high standards of peer review and acceptance. I vividly remember the task of composing rejection letters that I hoped would not offend the authors or discourage them from submitting other manuscripts to the *Journal*.

We quickly developed a list of reliable reviewers. Those who were tardy and unresponsive to reminders will never know that they might have received a "black testis award" initiated by Lynn Rudloff, Editorial Assistant, duly marked on their index card in our address file.

I had a great deal to learn, including some technical aspects of journal production. We enjoyed an excellent working relationship with Lippincott. On several occasions, when the number of accepted manuscripts was particularly low, I had to find out from Lippincott what the "real" (ie, the absolute rather than our standard) deadline was for assuring that the new issue of the journal would appear on time.

Looking back at this exciting period, it is difficult not to be amazed by how much everything has changed since the early days of the *Journal*. Did the editorial office really function without e-mail and Fax? Many younger members of ASA might find it hard to believe when our journal was started, microsurgery of the male reproductive system was an exciting novelty, research on inhibin was considered controversial, automatic systems from analysis of sperm motility were yet to be developed, and if anyone had the foresight to contemplate the use of intracytoplasmic sperm injection, it certainly would have been labeled science fiction.

Gradually, the *Journal of Andrology* found its niche and a group of loyal supporters. We were certainly helped by the decision of the Institute for Scientific Information to include us in "Current Contents" almost from the start. Happily, our citation index quickly placed us at the top of the list of andrology journals.

In 1983, I resigned from the editorship because of election to vice-presidency of the ASA. In the hands of my successor, Dr Marie-Claire Orgebin-Crist, the *Journal of Andrology* grew in size, quality, and prestige, a trend that continues to this day.

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ASA – Our History
30th Annual Meeting, Seattle, Washington
by the Archives Committee
2005

Those who cannot remember the past are condemned to repeat it.
George Santayana, The Life of Reason, Volume 1, 1905

The American Society of Andrology (ASA) is thirty years old. This is an important milestone in the growth and development of a young thriving organization. Our organization has arrived at the age of reason. It began as an infant, it developed and nurtured through adolescence, and now it is a leader in the field of male reproductive medicine. It is a good time to reflect on the many professional changes that have occurred during the first thirty years of ASA and note the many leaders that led us successfully down this pathway.

What is this thing called Andrology? At every meeting a stranger on the elevator asks ‘what is andrology?’ This Society fosters a multi-disciplinary approach to the study of male reproduction, exists to promote scientific interchange and knowledge of the male reproductive system. Our central topics include, but are not limited to erectile dysfunction, infertility, hypogonadism, male contraception, male senescence, and prostate disease. We are the branch of science and medicine dealing with normal and abnormal male reproductive function. ASA is a unique partnership of scientists and clinicians. Today there are over 800 members from all over the world whose specialty fields include anatomy, animal science, biochemistry, endocrinology, gynecology, psychiatry, toxicology and urology.

The ASA would not be were it today without the brains and cooperation of many luminaries – some of whom are not here with us today. The society was built on the shoulders of clinicians and scientists who recognized the need for a community of andrologists – those with like interests. ASA is especially indebted to the doggedness of Dr. Emil Steinberger. I am told that when you met him before, and probably after

1975, he looked at you and said ‘you are an andrologist’. Although your first answer might well be, ‘what is an andrologist,’ you were hooked. We know that Dr. Steinberger began his efforts in 1974 to organize ASA during the VIIIth World Congress on Fertility and Sterility in Buenos Aires in 1974.

The idea of a scientific society concerned with the area of male reproduction was not a new one. It was discussed on a number of occasions in the past. The question, however, always came up: ‘Why a new society?’ Do we not already have a sufficient number of established societies which could provide a forum for those interested in the basic and clinical aspects of the male reproductive system?’ There were predecessors that set the stage. One important ‘club’ was the Warren O. Nelson club started by Drs Nelson and LeBlond. Warren O. Nelson was the Medical Director of the Population Council and Charles P. LeBlond was chair of the Department of Anatomy at McGill University. Together they formed this Club in 1968, meeting at least through 1972. The goals were to promote and discuss the scientific study of the male reproductive system. This group may have been the most influential in the formation of ASA.

Another important group was the Comité International de Andrologia (CIDA). The aim of CIDA was to encourage and promote the study of male reproduction. The publication of CIDA was the 1978 International Journal of Andrology. American scientists involved with CIDA included Drs N. Alexander, C.W. Bardin, D. Fawcett, C.A. Paulsen, E. Rosemberg, R.J. Sherins, E. Steinberger and P. Troen. These are the same names that were so influential in the formation of ASA.

The key players in the formation of ASA were N. Alexander, S.J. Behrman, E.S.E. Hafez, E. Rosenberg, R. Sherins and E. Steinberger. The first meeting was in **Detroit on April 25, 1975** and resulted in the formation of ASA. The membership drive was launched and in a few short months the Society had over 200 members. Our leaders were indeed a remarkable group of men

and women. The following is the first slate of officers for ASA:

1975-76 Officers ASA

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Vice-President
Secretary
Treasurer
Program Chairman
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E.S.E. Hafez, PhD
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Donald Fawcett, M.D.
C Alvin Paulsen, M.D.
Richard J Sherins, M.D.
Anna Steinberger, M=Ph.D.
Lourens J.D.Zaneveld, PhD
By laws – Behrman
Membership Bartke
Liason – Behrman
Nominating Fawcett
Publication Roseberg
Finance - Behrman

Committee Chairmen

The world of reproductive medicine and andrology has changed greatly in the last 30 years. New terms, science, and techniques have entered our field. Terms such as AIH, AID (artificial insemination-husband or doner), AZF (azoospermia factor), HIV (human immunovirus), sperm banking, ICSI (intracytoplasmic sperm insertion), PGD (preimplantation genetic diagnosis) entered our vocabulary during this period. New science has included growth factors, Y chromosome microdeletions, and CAG repeats. We have discussed new methods of diagnosis, treatment and prevention. These included conventional semen analysis, CASA in many iterations, sperm function tests from hemizona to DNA fragmentation and microarray tests. We have added quality assurance to andrology laboratories.

We have developed new techniques for treatment. This has included microsurgical repairs of the vas and epididymis, IVF, ICSI and ROSI. There have been changes in the availability of drugs including new delivery systems (testosterone), formulations (gonadotrophin agonists) and analytes (antiandrogens, alpha blockers, and 5 alpha reductase inhibitors). Erectile dysfunction and premature or rapid ejaculation became part of our vocabulary. ED was no longer psychogenic but a complex problem with a myriad of surgical and medical therapies. We have gone from intracavernous injections (ICI), intraurethral pellets to oral compounds for the treatment of ED.

Even statisticians have had a hand in the field of andrology. First, they tried to tell us that vasectomies caused prostate cancer (they were wrong) to, most recently, that more frequent ejaculation could prevent prostate cancer. We hope they are correct. Finally, our occupation and environmental members have not let us forget the importance of prevention. Pollution, the work-place, and even the bicycle all may play a role in a man's reproductive health.

Perhaps the most important change in this last 30 years (rather the last decade) relates to our communication skills. E-mail and URL are a way of ASA business. Our directory is online and we depend on Dr. Niederberger's androlog. Internet connection is essential for committee meetings, voting, registration, scientific information and our Journal.

Most importantly, we have lost some of our outstanding leaders – Tom Chang, Min Chueh Chang, Larry Ewing, Pat Patenelli, Eugenia Rosemberg, Lonnie Russell, and Brian Vickery - to name only a few. These were important leaders in our field.

Tom Chang was a scientist at Hopkins. We now remember him with a Travel Award for students. Min Chueh Chang was regarded one of the giants of his time. His contributions primary interest from start to finish was in the free-living egg and sperm of mammals their fateful union in a process called fertilization: (Greep, 1992). Larry Ewing was Professor Division of Reproductive biology, The Johns Hopkins University School of Hygiene and Public Health. One of his important contributions was with Dr. Eik-Nes – that testosterone could be synthesized from steroid precursors by the perfused rabbit testes, and that its production was responsive to gonadotropins (Zirkin, 1992).

Dolores "Pat" Patinelli was a graduate student with Dr. Warren O. Nelson and joined the Center for Population Research, Contraceptive Development NICHD in 1972 until her retirement in 1992. She was an invaluable helper for both the Testis Workshops and ASA.

Eugenia Rosemberg was an important member of the founding meetings. She was a scientist at the Medical Research Institute of Worcester in Massachusetts and was program chair of the first annual meeting of the ASA (March 31-April 2, 1976) and the first historian of ASA (before there was history). She passed away April 16, 2004 in Worcester MA. Lonnie D. Russell was an early member of the American Society of Andrology and always attended the annual meeting. The first mention of his name in the ASA minutes from Executive Council meetings was in 1984 when he was recognized as a member of the Executive Council. In the same year he received the Young Andrologist Award. Over the years he served on two committees: Membership and Publications. It was as Chair of the latter committee that Lonnie did his best work. He loved the publishing business and understood the intricacies involved, which made him the perfect Chair of this committee. Brian Vickery was a senior scientist at Syntex and was an important help in the support of our fledgling organization.

Finally, we are the only organization that honors its young andrologist with an oversized 'condom' hat. The wearing and placing of this hat has become an important and honored tradition in the Society. So important that special planning must identify the party room to which both young and old will flock. As an organization we work and play hard.

The history and archives of this organization are important. If you have material or facts to share with the archives committee please share it with us.

Congratulations ASA for a successful 30 years,

Your Archives Committee

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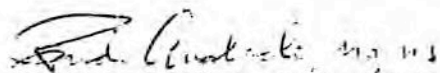
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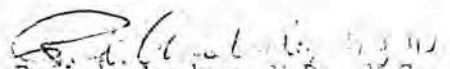
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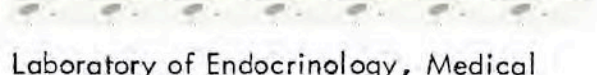






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1975

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for the organization of the
American Society of Andrology



Emil Steinberger, MD
Eugenia Rosemberg, MD
E.S.E. Hafez, MD

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THE UNIVERSITY OF TEXAS
HEALTH SCIENCE CENTER AT HOUSTON

MEDICAL SCHOOL

John H. Freeman Building
Texas Medical Center

February 14, 1975

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713/792-2121

Eugenia Rosemberg, M.D.
Research Director
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26 Queen Street
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Dear Eugenia:

I believe our letters crossed in the mail. I just received your letter of February 10th and you have probably received mine of the same date.

I am glad to see that you agreed with some of the points I raised concerning the "Rules for the Editorial Board" and I am sure that Rune Eliasson won't have any objections. Incidentally, concerning the UNESCO coupons, I have already received a letter from Eliasson stating they will take appropriate measures not to utilize UNESCO coupons for purchase of ANDROLOGIA.

Concerning the informative drive for ANDROLOGIA at the meeting in Detroit, I agree with you and will drop Hafez a note.

I think we should get going very actively in setting up the structure of ASA. I would like to suggest a structure which is similar to that of The Endocrine Society and obviously would like to get a response from you and Al Paulsen.

We should have a President, Vice President, Secretary, Treasurer and Council. At the meeting we may consider seeing about getting an office of president elected and this individual would serve the following year. For the present year the simplest and most effective way would be for us to decide who is going to be who because that is the only way to really get something like this off the ground. I would like to suggest for President either one of the three of us (Al Paulsen, you or myself), similarly for Vice President. For Secretart, I'm not certain, maybe Hafez would be just right for the job. For Treasurer I would like to suggest Dr. Keith D. Smith from our department. For the Council for this year we should deal primarily with individuals that are very interested in the Society and consequently I think we should have at least the following and I am looking for further suggestions from you -- Troen, Sherins, Bartke and Anna. *Hafez*

We should have a Publication Committee, Nominating Committee, Membership Committee, and a Program Committee. The members of these committees could be selected at the time of the meeting.

Eugenia Rosenberg, M.D.
Worcester, Massachusetts

February 14, 1975
Page 2

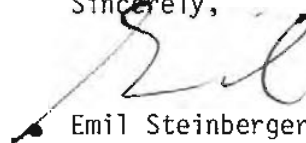
Once we agree on the structure and on the individuals we probably should compose a white paper explaining the whole situation and the names of the individuals and have a sufficient number of copies to be distributed among the individuals who will arrive at the meeting.

I also think we should have an agenda for the ASA meeting. The meeting is being scheduled for a given period of time and somebody will have to be responsible for running it in order to leep to the agenda.

Please let me know how you feel about these things. I am sending a copy of this letter to Al. Al, I'm looking forward to receiving some scribbles from you. I have a tough time trying to stay in contact with you.

Let's hear from both of you at your earliest and with best regards from all of us.

Sincerely,



Emil Steinberger, M.D.
Professor and Chairman
Dept. of Reproductive Biology
& Endocrinology

Associate Editor and
Coordinator for North American
ANDROLOGIA

ES:rh

P.S. Al, I'm enclosing some of the forms for your perusal.

February 14, 1975

Dr. Emil Steinberger
Professor and Director Program
in Reproductive Biology and Endocrinology
The University of Texas
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6400 West Cullen Street
Houston, Texas 77025

Dear Emil:

Hope you will receive the correspondence with Current Contents soon so, we could resolve the problem.

I received your letter of February 10, and the enclosures you probably have, by now, my version of the forms to be used by the Editor(s) of Andrology. I did not send you the Instructions to Reviewers. I do approve your version. The two versions, yours and mine, of the forms are very similar. We can adopt yours. However, I do think that these, and the letterhead stationary should be printed by Grosse-Verlag and sent to us for our use. What do you think?

With respect to the letters you sent to people interested in Andrologia, and in the ASA, I think these are good. We should have extras at the meeting in Detroit together with copies of all available issues of Andrologia.

With best regards,

Sincerely,

Eugenia Rosenberg, M.D.
Research Director

Research Professor
University of Massachusetts
Medical School

ER/ss

cc: C. Alvin Paulsen

February 24, 1975

Dr. Emil Steinberger
Professor and Chairman
Dept. of Reproductive Biology
and Endocrinology
The University of Texas
Medical School
6400 West Cullen Street
Houston, Texas 77025

Dear Emil,

Thank you for your letter of February 14. I did have a long talk with Al prior to his departure for Geneva. We discussed a possible structure for the ASA along the lines you described, that is, something similar to the Endocrine Society structure. Al asked me to finalize things with you in this respect.

First - we think, like you do, that to start, the ASA we should have: a President, A Vice-President, a Secretary, a Treasurer and a Council.

As we have to be prepared, Al and I propose for President Dr. Emil Steinberger, for Vice-President, whoever you like. We could discuss this over the phone. For Secretary, Dr. Anna Steinberger, and for Treasurer, Dr. Keith D. Smith. For Council: Hafez, Troen, Sherins, Bartke, Nancy Alexander, Orgebin-Christ, Fawcett. I do not like the idea of Hafez in the Secretary's job. He will be all right as member of the Council.

Unlike the Endocrine Society, I would think that the Vice-President should become President the following year. As far as all other Committees, we should emphasize that the Publications Committee will have to work with the Chief-Editor and Associate Editors of *Andrologia* which will be the official Journal of the ASA. We should work towards a Charter Membership at the time of the Meeting. We should decide the amount for Membership fees.

We should have a copy of proposed By-Laws - I guess you could get a copy of the Endocrine Society By-Laws prior to the Meeting. Please ask for two copies and send me one. Officers should serve for one year period - Council for 2 or 3 year period.

We should have an Agenda ready. What do you think of the following Agenda:

1. Background information relative to the formation of the ASA
2. Proposed Structure and Location of Office
3. Proposed By-Laws
4. Charter Membership - Fees
5. Election of Officers
6. Election of Committee Members
7. Relationship with Andrologia
8. Future Meetings. *St. Vincent*

Let's discuss everything over the phone.

Best regards,

Sincerely,

Eugenia Rosenberg, M.D.
Research Director

Research Professor
University of Massachusetts
Medical School

ER/ss



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March 12, 1975

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Dr. Eugenia Rosenberg
Medical Research Institute of Worcester
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26 Queen Street
Worcester, Massachusetts 01610

Dear Eugenia:

Thank you for your letter of February 25th. I essentially agree with all you say in your letter concerning the organization of ASA. I am in the process of obtaining The Endocrine Society bylaws and also will try to get a copy from SSR.

I gladly will assume the post of President for one year and obviously either you or Al should assume the Vice-Presidency with the idea that the Vice-President becomes President the following year. This is a good arrangement because it gives the President the necessary one year experience prior to assuming the office. I suppose you will have to work it out with Al as to which one of you wishes to take the office. While I feel that either one is obviously qualified for either of the offices, President or Vice-President, I think that Al, being as busy as he is now, may not wish to be saddled at the moment with this job, particularly during the formative year or two of the Society. We may want to keep him on ice as possibly the 3rd year president. With this in mind, I would favor you as the Vice-President.

I think that Keith Smith would make a good Treasurer but I do not think that Ann is ready to be Secretary of the Society, at least not this year. Her work load is horrendous and I doubt that she will be able to devote a sufficient amount of time. Maybe we could get Sherins or Orgebin-Crist for this job. Let me know what you think. As far as the Council is concerned I think it looks good, maybe we could enlarge it by putting a urologist in and I have in mind specifically several urologists, either Joe Davis from New York or Joe Corriere from our school (he is Chairman of Urology here).

The agenda you proposed is a good one. I would like to add a point concerning our relationship with C.I.D.A. and on the point you make about future meetings a discussion of the type of meetings. As you know, I favor the workshop type meetings so we would not replicate the annual meetings of the other societies with 10 minute papers.

On your point #6 concerning Election of Committee Members, I think we should rough in the different committees, not as far as the composition but the type of committees. I think we will need the following committees:

- 1) Membership Committee
- 2) Nomination Committee

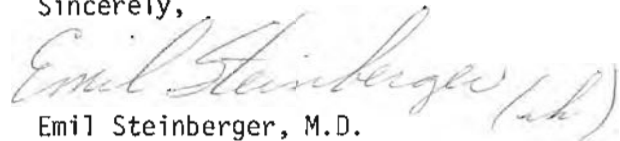
Dr. Eugenia Rosenberg
Worcester, Massachusetts

March 12, 1975
Page 2

- 3) Fiscal Committee
- 4) Publication Committee
- 5) Program Committee
- 6) Bylaw Committee

Let me hear from you re your thoughts on the items in this communication and with best regards.

Sincerely,

A handwritten signature in cursive script that reads "Emil Steinberger" followed by a small mark in parentheses.

Emil Steinberger, M.D.
Professor and Chairman
Department of Reproductive Biology
& Endocrinology

ES:rh
cc: Dr. Al Paulsen

March 17, 1975

Dr. Emil Steinberger
Professor and Chairman
Dept. Reproductive Biology & Endocrinology
Texas Medical Center
6400 West Cullen Street
Houston, Texas 77025

Dear Emil:

Thank you for your letter of March 12. All your points are well taken. After talking to Al we can decide who will be the Vice President--in either case, the one who will not be proposed for Vice President should be added to the Council. As far as the Secretary is concerned, I do think that we should go for Orgebin-Crist, and add Joe Corriere to the Council membership.

Concerning the agenda, we should have the following:

- 1- Background information relative to the formation of ASA
- 2- Proposed structure and location of office
- 3- Proposed By-laws
- 4- Charter Membership - Fees
- 5- Election of officers
- 6- Selection of Committees and Members
- 7- Relationship with CIDA and ANDROLOGIA
- 8- Structure of future meetings

Does it look all right now?

Best regards,

Eugenia Rosenberg, M.D.
Research Director

Research Professor
University of Massachusetts
Medical School.

cc: G. Alvin Paulsen

P.S. There is a strong possibility that the Serono Research Foundation, USA, is interested in sponsoring the first meeting of the ASA. I will let you know the details later.

April 9, 1975

Emil Steinberger, M.D.
Program in Reproductive Biology
University of Texas Medical Center
6400 West Cullen Street
Houston, Texas 77025

Dear Dr. Steinberger:

Enclosed you will find my contribution to the Agenda of the ASA meeting, in response to your letter of 4 April 1975. I'm sending everything along to you for printing, just in case you want to look it over first. Please give me a ring if you have any questions.

By the way, I thought the "Charter Membership" form could be distributed and collected at the meeting.

Looking forward to seeing you soon,

Best regards,

Eugenia Rosenberg, M.D.
Director of Research

Research Professor
University of Massachusetts
Medical School

pcp
Enclosures

AMERICAN SOCIETY OF ANDROLOGY

Proposed Structure and Officers

With the formation of the Comité Internacional de Andrologia (CIDA) in 1970 and the publication of ANDROLOGIA shortly thereafter, American investigators in the field of andrology felt the need for closer interaction within the USA to further the objectives expressed by the international Committee. Several of us participated in the early planning stages, most notably Dr. Steinberger, who canvassed interested scientists and, having received over 50 positive responses in a short time, prepared to lay the groundwork for the creation of the American Society of Andrology. As a great number of American scientists interested in andrology are gathered here, it was thought advisable to initiate the activities of the Society at this meeting. A statement describing the proposed structure of the Society follows.

I. OBJECTIVES

The organization shall be conducted for scientific purposes, for the advancement and promulgation of knowledge regarding the male reproductive tract, and for the facilitation of personal relationships among investigators in the subject of andrology.

II. MEMBERSHIP

The Society shall consist of active members who will be required to maintain a subscription to ANDROLOGIA in addition to the payment of annual dues.

Eligibility. Any qualified physician or scientist in good standing shall be eligible for nomination to active membership.

Nomination and Election. Nominations for membership shall be made and seconded by members of the Society on blanks furnished by the Secretary and shall be submitted to the Council. The Council shall

determine eligibility, based upon evidence of contributions of the nominee to andrology as represented by publications or as described by nominators and shall vote by ballot upon nominations. A majority of votes cast shall constitute election.

III. MEETINGS

Annual. The annual meeting of the Society shall be held at such time and place as determined by the Council.

Council Meeting. At least one meeting of the Council shall be held at each annual meeting of the Society. In the interval between annual meetings, the President may on his or her own volition or at the request of two members of the Society submit questions by mail to the members of the Council for their consideration and decision.

IV. OFFICIALS

Officers. The officers shall be the President, the Vice President, who shall be elected annually for a term of one year by the members of the Society, the Secretary and the Treasurer, who shall be elected for a term of ~~four~~ years by the members of the Society. The Vice President shall assume the office of the President at the end of one year. The Secretary and the Treasurer may stand for re-election, with any other nominees proposed by the Nominating Committee. The officers shall enter upon their duties at the close of the annual meeting at which they are elected. The powers and duties of the officers shall be such as usually devolve upon their respective positions.

Council. The elected officers of the Society, the immediate Past President, and ten elected members shall be known as the Council. The term of office of members of the Council shall be two or three years, as determined by lottery, using the rotation system for replacement of members whose terms shall expire. The President of the Society shall be ex-officio the Chairman of the Council. The Secretary of the Society shall be ex-officio the Secretary of the Council.

V. AFFILIATION

The Society shall be affiliated with the Comite Internacional de Andrologia (C.I.D.A.) and the official journal of publication shall be ANDROLOGIA.

AMERICAN SOCIETY OF ANDROLOGY

Charter Membership and Dues

The proposed fees for Charter Membership in the American Society of Andrology will be \$40.00, which includes a subscription to ANDROLOGIA and annual dues.

Please complete the form below to state your intention regarding Charter Membership in the Society.

AMERICAN SOCIETY OF ANDROLOGY

I, (print NAME) _____

(ADDRESS) _____

wish to become a Charter Member of the American Society of Andrology.

AMERICAN SOCIETY OF ANDROLOGY

Officers and Members of Council

OFFICERS

PRESIDENT	Emil Steinberger ✓
VICE PRESIDENT	Eugenia Rosemberg
SECRETARY	M.-C. Orgebin-Crist ✓
TREASURER	Keith D. Smith

MEMBERS OF COUNCIL

Nancy Alexander ✓
Andrzej Bartke
Joseph Corriere
Donald Fawcett
Saad Hafez ✓
Mortimer B. Lipsett
C. A. Paulsen ✓
Richard Sherins ✓
Anna Steinberger ✓
Philip Troen ✓

AMERICAN SOCIETY OF ANDROLOGY

Election of Officers and Committee Members

In years to come we look forward to the appropriate election of officers and Council members of the American Society of Andrology. For the time being, it was felt that a slate of officers and members of council, appointed rather than elected this year, would expedite the early organizational stages of the Society. We are pleased to entrust the leadership of the new Society in the capable hands of one of its founders, Dr. Steinberger, who will serve as President for the first year. The Vice President, Secretary and Treasurer have accepted their appointments as indicated. The following proposed committees will be formed from the membership of the Society.

Membership Committee

Nominating Committee

Fiscal Committee

Publication Committee

Program Committee

By Law Committee



THE UNIVERSITY OF TEXAS
HEALTH SCIENCE CENTER AT HOUSTON

MEDICAL SCHOOL

John H. Freeman Building
Texas Medical Center

April 4, 1975

6400 West Cullen Street
Houston, Texas 77025
713/792-2121

Dr. Eugenia Rosenberg
Medical Research Institute of Worcester
Worcester City Hospital
26 Queen Street
Worcester, Massachusetts 01610

Dear Eugenia:

Thank you for your letter of March 17th. Basically I agree with everything you state in it and only have a couple of minor suggested changes. I agree that we should have the Agenda as you indicated. This Agenda probably should be typed on a separate sheet of paper. If you wish our print shop can provide a hundred copies of it. Please let me know immediately.

AGENDA

1. Background information - E. Steinberger
2. Relationship with CIDA and Andrologia - E. Steinberger & R. Eliasson
3. Proposed structure and officers - Eugenia Rosenberg
4. Charter membership and dues - Eugenia Rosenberg
5. Establishment of committees and their membership - Emil Steinberger
6. Election of officers and committee members - Eugenia Rosenberg
7. Structure of future meetings - Eugenia Rosenberg

Eugenia, please make whatever final changes you wish and as I indicated above send it to me immediately and we will print the copies.

I think we should have another sheet of paper where we state Officers of The American Society and the Executive Council.

President - Emil Steinberger
Vice President - Eugenia Rosenberg
Secretary - Orgebin-Crist (Incidentally I talked to her and she agrees to take the job)
Treasurer - Keith D. Smith

Dr. Eugenia Rosemberg
Worcester, Massachusetts

April 4, 1975
Page 2

Executive Council

Nancy Alexander
Andrzej Bartke
Joseph Corriere
Donald Fawcett
Saad Hafez
Mortimer B. Lipsett
C. A. Paulsen
Richard Sherins
Anna Steinberger
Philip Troen

I believe we should have a third sheet with a memo where we explain the reasons for the structure and the reasons why the officers were appointed, rather than elected, for the first year and we should indicate strongly at this meeting that the officers for the next year will be elected. On this sheet we can list the Committees:

Membership Committee

Nominating Committee

Fiscal Committee

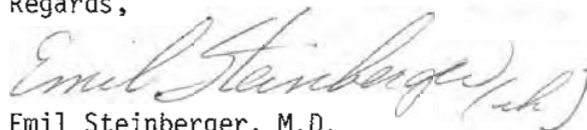
Publication Committee

Program Committee

By Law Committee

Eugenia, please let me know what you think about these items right away and if you wish, as I indicated, I can get all of this material printed pronto.

Regards,



Emil Steinberger, M.D.
Professor and Chairman
Department of Reproductive Biology
and Endocrinology

ES:rh



WAYNE STATE UNIVERSITY

SCHOOL OF MEDICINE

MAILING ADDRESS:
GORDON H. SCOTT HALL
OF BASIC MEDICAL SCIENCES
540 EAST CANFIELD AVENUE
DETROIT, MICHIGAN 48201

DEPARTMENT OF GYNECOLOGY/OBSTETRICS
DIVISION OF REPRODUCTIVE BIOLOGY

TO: T.N. Evans, M.D.
FROM: E.S.E. Hafez *Laad*
SUBJECT: American Society of Andrology
DATE: April 21, 1975

Today I received a suggested agenda for the ASA meeting to be held on April 24 at 5:00 at Scott Hall. The information was sent to me without a covering letter, but I presume that it is from Dr. Emil Steinberger. This agenda was not discussed with me before. You and I agreed on a different agenda which is printed in the program. May I suggest that we follow the agenda that you and I agreed upon then open the discussion for those interested.

As you suggested, we should select an executive committee to facilitate the proper selection of the officers just like any other scientific society.

cc: Emil Steinberger
Eugenia Rosenberg ✓
M.C. Orgebin-Crist
Keith D. Smith
Nancy Alexander
Andrzej Bartke
Joseph Corriere
Donald Fawcett
Mortimer B. Lipsett
C.A. Paulsen
Richard Sherins
Anna Steinberger
Philip Troen

AMERICAN SOCIETY OF ANDROLOGY

Agenda

Organizational Meeting of the American Society of Andrology (ASA)

April 24, 1975 -- 5:00 PM

1. Background Information - Emil Steinberger
2. Relationship With CIDA and Andrologia - Rune Eliasson
3. Proposed Structure and Officers - Eugenia Rosemberg
4. Charter Membership and Dues - Eugenia Rosemberg
5. Establishment of Committees and Their Membership - E. Steinberger
6. Election of Officers and Committee Members - Eugenia Rosemberg
7. Structure of Future Meetings - Eugenia Rosemberg
8. Discussion



AMERICAN SOCIETY OF ANDROLOGY

(to be founded in 1975 in Detroit, Michigan)

please print:

NAME:

(last name)

Initial

Degrees

MAILING ADDRESS:

Zip

UNIVERSITY or
HOSPITAL AFFILIATION:

MAJOR DISCIPLINE: (please check one)

- Biochemistry of Male Reproduction
- Urology
- Gynecology
- Male Infertility
- Reproductive Biology
- Other (please specify)

RESEARCH and CLINICAL INTERESTS (please check one)

- Morphology of Male Reproductive Organs, Man
- Morphology of Male Reproductive Organs, Animals
- Pituitary-Gonadal Relationships
- Physiology of Semen
- Biochemistry of Semen
- Biochemistry of Testes
- Sex Accessory Organs
- Male Infertility, Man
- Male Infertility, Animals
- Male Contraception
- Immunology
- Administration
- Other (please specify)

AMERICAN SOCIETY OF ANDROLOGY

INITIATION:

Because of increasing interest in the growing and important field of Andrology, a Society of Andrologists will be formed in Detroit, 1975. This Society Initiation will occur in conjunction with the International Conference on "THE HUMAN SEMEN AND FERTILITY REGULATION IN THE MALE" to be held at the Wayne State University School of Medicine, April 24-26, 1975. The organizational meeting, held in the afternoon of April 24, will be followed by an initiation banquet.

AIMS OF THE SOCIETY:

The aim of this society will be to bring American and non-American scientists, clinicians, etc. who share an interest in male reproduction, together in an annual meeting to exchange ideas and introduce new concepts. With the growth of the society, there will be consequent symposia and international conferences, for the purpose of encouraging basic and clinical research in male reproduction.

The society will be affiliated with CIDA (Comité Internacional de Andrologia) and will share its publication arm, the journal ANDROLOGIA

April 30, 1975

Emil Steinberger, M.D.
Program in Reproductive Biology
University of Texas Medical Center
6100 West Cullen Blvd.
Houston, Texas 77025

Dear Emil:

Just a quick note to ask you for a complete list of names of people connected with ASA. All I have is the list of officers and council members.

Thank you.

Regards,

Eugenia Rosenberg, M.D.
Director of Research

Research Professor
University of Massachusetts
Medical School

pcp

*Chairman +
Members
Committee*

7/24/75

AMERICAN SOCIETY OF ANDROLOGY

With the formation of the Comité Internacional de Andrologia (CIDA) in 1970 and the publication of ANDROLOGIA shortly thereafter, American investigators in the field of andrology felt the need for closer interaction within the USA to further the objectives expressed by the international Committee. Several of us participated in the early planning stages and canvassed interested scientists concerning the advisability of creating an American Society of Andrology. On April 24, 1975 the American Society of Andrology was created in Detroit, Michigan.

The Objectives of ASA are:

The organization shall be conducted for scientific purposes, for the advancement and promulgation of knowledge regarding the male reproductive tract, and for the facilitation of personal relationships among investigators in the subject of andrology.

Eligibility for Membership:

Any qualified physician or scientist in good standing and expressing interest in andrology shall be eligible.

OFFICERS:

- President - Emil Steinberger
- Vice President - S. J. Behrman
- Secretary - Saad Hafez
- Treasurer - Nancy Alexander
- Program Chairman - Eugenia Rosemberg

COUNCIL:

- | | |
|---------------------|------------------|
| Andrzej Bartke' | Donald Fawcett |
| Joseph Corriere | C. Alvin Paulsen |
| Fletcher C. Derrick | Richard Sherins |
| Tommy Evans | Anna Steinberger |
| Lourens Zaneveld | |

COMMITTEES:

- Bylaws Committee -- S. J. Behrman, Chairman
- Nominating Committee -- Donald Fawcett, Chairman
- Program Committee -- Eugenia Rosemberg, Chairman
- Membership Committee -- ~~Lourens Zaneveld~~ - *Andrzej Bartke*
- Liaison Committee -- S. J. Behrman, Chairman
- Publication Committee -- Eugenia Rosemberg, Chairman

New Finance Committee { *Evans*
Behrman Chairman }

AMERICAN SOCIETY OF ANDROLOGY

Proposed Structure and Officers

With the formation of the Comité Internacional de Andrologia (CIDA) in 1970 and the publication of ANDROLOGIA shortly thereafter, American investigators in the field of andrology felt the need for closer interaction within the USA to further the objectives expressed by the international Committee. Several of us participated in the early planning stages, most notably Dr. Steinberger, who canvassed interested scientists and, having received over 50 positive responses in a short time, prepared to lay the groundwork for the creation of the American Society of Andrology. As a great number of American scientists interested in andrology are gathered here, it was thought advisable to initiate the activities of the Society at this meeting. A statement describing the proposed structure of the Society follows.

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Eligibility. Any qualified physician or scientist in good standing shall be eligible for nomination to active membership.

Nomination and Election. Nominations for membership shall be made and seconded by members of the Society on blanks furnished by the Secretary and shall be submitted to the Council. The Council shall

May 1, 1975

Meeting of the
Incorporators

4/25/75

E.S.E. Hafez, M.D.
Department of Obstetrics & Gynecology
Wayne State University School of Medicine
Detroit, Michigan 48201

Detroit MI

Dear Saad:

As promised, I am sending you a suggested outline of the minutes of the Meeting of Incorporators of the American Society of Andrology.

In keeping with the spirit of open communication in the new Society, I am initiating a system of "round robin" correspondence, and hope that everyone else will do the same.

Best regards,

Eugenia Rosenberg
Program Chairman
American Society of Andrology

pop

P.S. I am also sending you the releases for my chapter in the Conference proceedings.

cc: E. Steinberger
J. Behrman

May 1, 1975

S. Jan. Behrman, M.D.
Department of Obstetrics & Gynecology
University of Michigan Medical School
Ann Arbor, Michigan 48103

Dear Dr. Behrman:

It was nice to see you and have the opportunity to converse with you at the Detroit meeting.

You will see from the enclosed that since Dr. Hafez asked me for a little help with the incorporation proceedings of ASA, I sent him a suggested outline for the minutes of the Meeting of Incorporators. As you know, you will have to seek legal assistance in the matter of incorporation as well as the request for non-profit status from the IRS. Regarding the latter, the purpose of the Society should be worded in such a way as to comply with Section 501(c)(3) of the Internal Revenue Code, that is, "the purposes shall be effectuated only in a scientific and educational manner" and "in the event of dissolution,...all of its then existing assets shall be distributed to religious, charitable, literary and educational organizations." This is the language used in one of incorporation proceedings for an organization I founded.

As to the matter of By-Laws of ASA, I strongly urge that we do not wait for proposals from the By-Law Committee. Rather, I think the incorporators should formulate these among themselves--and we should all agree--, perhaps using the list of headings in the suggested outline for Dr. Hafez. I urge this in the interest of time, since if we have to wait for the Committee it may be several months before we can begin to incorporate. The By-Laws can always be changed and we can make ample provision for this.

Best regards,

Eugenia Rosenberg
Program Chairman
American Society of Andrology

cc: E. Steinberger
E.S.E. Hafez

MINUTES OF THE MEETING OF THE
INCORPORATORS OF
AMERICAN SOCIETY OF ANDROLOGY

The meeting of the incorporators of the American Society of Andrology was held at (address) on the 25th day of April, 1975, at (time), notice of the meeting having been waived by the incorporators.

Present were the following:

Emil Steinberger
S. Jan Behrman
E.S.E. Hafez
Nancy Alexander
Eugenia Rosemberg

being all the incorporators.

On motion duly made and seconded, Dr. Emil Steinberger was selected to preside over the meeting.

On motion duly made and seconded, it was voted to proceed by ballot to the election of a temporary Secretary. Thereupon, Dr. E.S.E. Hafez was declared duly elected to discharge the duties devolving upon him as temporary Secretary at the meeting of incorporators of the American Society of Andrology.

On motion duly made and seconded, the proposed By-Laws were discussed and voted upon, and adopted.

- I. Name and Object (in compliance with Section 501(c)(3) of the Internal Revenue Code)
- II. Affiliation
- III. Membership
- IV. Meetings and Quorum
- V. Officials (including Council Members)
- VI. Nomination of Officers
- VII. Financial
- VIII. Publication
- IX. Changes in By-Laws

On motion duly made and seconded, the officers of the Society were elected as follows:

President	Emil Steinberger
Vice President	S. Jan Behrman
Secretary	E.S.E. Hafez
Treasurer	Nancy Alexander
Program Chairman	Eugenia Rosemberg

Minutes of the Incorporators
American Society of Andrology
Suggested Outline

-2

On motion duly made and seconded, the Council Members were elected as follows:

Andrzej Bartke
Joseph Corriere
Donald Fawcett
C.A. Paulsen
Richard Sherins
Anna Steinberger
Fletcher Derrick
Larry Zaneveld
Tommy Evans

On motion duly made and seconded, the Committees were named as follows:

Membership Committee
Nominating Committee
Fiscal Committee
Publication Committee
Program Committee
By-Law Committee

No further business, it was voted to adjourn at (time) .

Secretary

May 18, 1975

Emil Steinberger, M.D.
Program in Reproductive Biology
University of Texas Medical Center
6100 West Cullen Street
Houston, Texas 77025

Dear Emil:

Thank you for your letter of 5 May 1975, which includes the names of officers, Council and Committee members of ASA.

Before I can send you the proposed names of members for the Program and Publications committees, I need to know the procedure you plan to follow for approval of the members. You ask that nominations be sent to all officers of the Society; does this mean that a majority of the officers (3 out of 5) must approve the nominations? Also, how many members will make up each committee? I could probably use as many as 15 on the Publication committee and six on the Program committee for the proper back-up.

Please let me know by return mail your thoughts on this. I will send you my nominations as soon as I can.

Best regards,

Eugenia Rosenberg, M.D.
Program Chairman
American Society of Andrology

pcp



THE UNIVERSITY OF TEXAS
HEALTH SCIENCE CENTER AT HOUSTON

MEDICAL SCHOOL

John H. Freeman Building
Texas Medical Center

May 5, 1975

6400 West Cullen Street
Houston, Texas 77025
713/792-2121

TO: Officers of American Society of Andrology
FROM: Emil Steinberger, M.D.
Re: Organization of the American Society of Andrology and Election of Officers

The sequence and results of our deliberations in Detroit concerning the structure of the Society are summarized below. According to my notes and best recollections the following transpired.

- 1) A Committee of four was elected by the members of the Conference on March 25, 1975 and charged with election of a fifth member, election of officers among themselves, and election of members to the Executive Council. The members of the Committee elected by the Conference were:

med
Drs. Nancy Alexander, S. J. Behrman, Saad Hafez and Emil Steinberger
ESE ER

- 2) The Committee met and elected a fifth member, Dr. Eugenia Rosemberg. They also elected individuals from among themselves to the various offices of the Society as follows:

President - Emil Steinberger ✓
Vice President - S. J. Behrman ✓
Secretary - Saad Hafez ✓
Treasurer - Nancy Alexander ✓
Program Chairman - Eugenia Rosemberg ✓

- 3) The officers elected members of the Executive Council. They are as follows:

Andrzej Bartke
Joseph Corriere
Fletcher C. Derrick, Jr.
Tommy Evans
Donald Fawcett
Alvin Paulsen
Richard Sherins
Anna Steinberger
Larry Zaneveld

Lawrence
One position was left open for nomination from among individuals related to the pharmaceutical industry.

Several committees were established and their Chairman and in some cases members were elected. They are as follows:

By Laws Committee - S.J. Behrman, Chairman
Nancy Alexander
Saad Hafez
E. Steinberger
J. Corriere

Nominating Committee - Don Fawcett, Chairman
C. A. Paulsen

Program Committee - E. Roseberg, Chairman
Richard Sherins
Anna Steinberger

Membership Committee - L. Zaneveld, Chairman
F. Derrick, Jr.

Fiscal Committee - S. Behrman, Chairman
Nancy Alexander
T. Evans
A member from pharmaceutical industry

Liaison Committee - S. Behrman, Chairman

Publication Committee - E. Roseberg, Chairman

I would appreciate each Committee Chairman to select the appropriate number of Committee members and send their nominations to all officers of the Society.

Thank you.

ES:rh

Back to Index

The Meaning of Sperm Capacitation

A Historical Perspective

M. C. CHANG

Key words: sperm capacitation, acrosome reaction, *in vitro* fertilization, hyperactivation.

J Androl 1984; 5:45-50.

C. R. Austin (1951) reported in an Australian journal that "when sperms were introduced into the fallopian tube of rabbit before ovulation, most of the eggs subsequently recovered were fertilized. However, if the sperms were introduced after ovulation the eggs rarely showed signs of penetration." He concluded that "there seems to be a need for sperms to spend some time, apparently a few hours, in the female tract before they can penetrate the zona." The same year, Chang (1951) published a paper entitled "Fertilizing Capacity of Spermatozoa Deposited into the Fallopian Tubes" in which he stated that "It is quite clear that fertilization occurs when the spermatozoa have been in the tube for six hours before ovulation, which is perhaps the time required for a physiological change in the spermatozoa enabling them to attain fertilizing capacity." Based upon these two reports and his observations on the penetration of rat eggs examined at various times after mating, Austin (1952) introduced the term "Capacitation" to the literature of reproductive biology and concluded that "the sperm must undergo some form of physiological change or capacitation before it is capable of penetrating the egg."

Our knowledge of fertilization before 1951 was mainly from the study of sea urchins. One would expect that mammalian spermatozoa from the male genital tract are capable of penetrating the egg. When these experiments demonstrated that

*From the Worcester Foundation For
Experimental Biology,
Shrewsbury, Massachusetts*

mammalian spermatozoa do need to spend some time in the female genital tract to achieve their final fertilizing capacity, it was a stimulus to many scientists to seek the changes that occur in the spermatozoa during their sojourn in the female genital tract. But capacitation is a general term and may include many physiological and morphological changes about which we had no ideas at that time.

Due to the progress in the study of mammalian fertilization in recent years, capacitation of spermatozoa became a commonly used term, and the meaning of capacitation was held differently among scientists and even by the same author. This article, based mainly on review articles and some work done in the author's laboratory, attempts to clarify some of the confusion.

Capacitation and Decapacitation

There are various ways to study the capacitation of spermatozoa. By depositing ejaculated, epididymal spermatozoa, or spermatozoa recovered from the uterus at various times after mating, into the oviducts of rabbits soon after ovulation, Chang (1955) found that fertilization occurred only following deposition of spermatozoa recovered from the uterus; this showed that capacitation can be achieved in the uterus. Further experiments (Chang, 1957) revealed that when the capacitated spermatozoa recovered from rabbit uteri were treated with 5 to 20% rabbit, bull, or human seminal plasma, and deposited into rabbit oviducts soon after ovulation, fertilization did not occur. When treated uterine spermatozoa were deposited 6 hours before ovulation, fertilization was pos-

Supported by grant HD15291 from NICHD.
Reprint requests: M. C. Chang, Worcester Foundation for
Experimental Biology, Shrewsbury, Massachusetts 01545.
Submitted for publication August 26, 1983; accepted for pub-
lication October 18, 1983.

sible. These findings show that capacitated spermatozoa can be "decapacitated" by treatment with seminal plasma, while the decapacitated spermatozoa can be "recapacitated" in the oviducts. The so-called "decapacitation factor" was further studied by Williams et al (1967), and discussed by Austin (1969) and McRorie and Williams (1974) in polypeptide, molecular, and antifertility terms.

The Acrosome Reaction

The acrosome reaction of sea urchin spermatozoa upon contact with the jelly coat of the egg was first described by Dan (1952, 1956). The role of the mammalian sperm acrosome during fertilization was first studied by Austin and Bishop (1958) with a phase contrast microscope. They concluded that "the acrosome becomes modified in spermatozoa passing through the female genital tract and is detached before the spermatozoa penetrates the zona pellucida. These changes in the acrosome are considered to constitute 'capacitation'." The acrosome reaction is an obvious morphological change of spermatozoa during their sojourn in the female genital tract. By means of electron microscopy it was observed that the acrosome reaction involves membrane vesiculation or multiple fusion between the plasma and the underlying outer acrosomal membrane for the rat (Piko any Tyler, 1964) and for the hamster and rabbit (Barros et al, 1967). Ultrastructural changes in the sperm head during fertilization in the rabbit were also described by Bedford (1968). The acrosome of guinea pig spermatozoa, a very conspicuous structure, disappears after 14 to 18 hours in culture, and these capacitated spermatozoa are capable of penetrating eggs immediately (Yanagimachi, 1972). Various aspects of acrosome reaction *in vivo* and *in vitro* were discussed recently by Yanagimachi (1981).

Capacitation *In Vivo* and Fertilization *In Vitro*

The inhibition of capacitation in the uterus of pseudopregnant or progesterone-treated rabbits was reported by Chang (1958). The capacitation of rabbit spermatozoa in the isolated bladder, isolated colon, anterior chamber of the eye, and glandula vesicularis was described by Noyes and associates (1958). All these experiments, however, were conducted by depositing spermatozoa recovered from the uterus, or from these other organs, into the oviducts of rabbits soon after ovulation and examining them for possible fertilization.

Up to 1951, the possibility of fertilizing mammalian eggs *in vitro* using ejaculated or epididymal spermatozoa without capacitation was never authentically demonstrated. Since the recognition of capacitation of mammalian spermatozoa in the female tract, cytological evidence of fertilization of rabbit eggs *in vitro* by capacitated spermatozoa was reported by Thibault and associates (1954). The production of young, genetically true to their parents, following the transfer of rabbit eggs fertilized *in vitro* by spermatozoa recovered from the uterus was reported by Chang (1959). Later, *in vitro* fertilization of denuded rabbit eggs by spermatozoa recovered from the vagina was described (Chang et al, 1971). Thus, the successful *in vitro* fertilization of rabbit eggs by capacitated spermatozoa further reinforced the validity and importance of capacitation of spermatozoa in the female genital tract.

Capacitation of Spermatozoa *In Vitro*

The first successful fertilization of hamster eggs *in vitro* was described by Yanagimachi and Chang (1963). They reported that in Tyrode's solution containing glycine, 30 to 66% of the eggs were fertilized by spermatozoa recovered from the uterus 0.5 to 5 hours after mating but only 17% of the eggs were fertilized by epididymal spermatozoa. This shows that the capacitated spermatozoa recovered from the uterus are better able to fertilize eggs. If the final ability to penetrate the egg requires capacitation, then the epididymal spermatozoa must have capacitated *in vitro*. This finding changed the original notion that capacitation is achieved only in the female genital tract, and also opened the door to study capacitation *in vitro*. The possibility of fertilization of hamster eggs *in vitro* by epididymal spermatozoa was further confirmed by Barros and Austin (1967), who showed that a period of 4 hours is needed for sperm capacitation *in vitro* and described the close correlation between the acquisition of fertilizing capacity by spermatozoa and the occurrence of the sperm acrosome reaction. *In vitro* capacitation, including the acrosome reaction of hamster spermatozoa in the presence of tubal fluid of mouse and rat, was described by Barros (1968), and *in vitro* fertilization of hamster eggs in the presence of bovine follicular fluid was reported by Yanagimachi (1969).

Although the fertilization of mouse eggs *in vitro* by spermatozoa recovered from the uterus was described by Whittingham (1968), *in vitro* fertilization of mouse eggs by epididymal spermatozoa in the

presence of bovine follicular or rabbit tubal fluid was reported by Iwamatsu and Chang (1969). Finally, capacitation, including the acrosome reaction of hamster spermatozoa in the presence of blood sera, was described by Barros and Garavagno (1970) and Yanagimachi (1970a).

Successful *in vitro* fertilization of Chinese hamster eggs in media containing 1% bovine serum albumin was reported by Pickworth and Chang (1969), who also pointed out the advantage of preincubation of spermatozoa. By introducing 4 g/l of bovine albumin into the culture medium, Toyoda and associates (1971) were able to fertilize mouse eggs *in vitro* and concluded that "mouse epididymal spermatozoa can be capacitated *in vitro* in a chemically defined medium without the presence of female reproductive tissue fluid." These two studies revealed clearly that capacitation and fertilization *in vitro* can be achieved without the participation of specific substances from the female reproductive tissue and biological fluids.

The importance of serum albumin and metabolic intermediates for capacitation of spermatozoa and fertilization of mouse eggs *in vitro* was further described by Miyamoto and Chang (1973). *In vitro* fertilization of rat eggs in a chemically defined medium was achieved, and the development of such eggs following transfer was described (Toyoda and Chang, 1974). The capacitation of rabbit epididymal spermatozoa *in vitro* appeared to be difficult, but finally succeeded according to a procedure of washing twice and employing a longer preincubation time of 12 hours (Hosoi et al 1981). Based upon the study of *in vitro* fertilization of hamster eggs by epididymal spermatozoa (Yanagimachi and Chang, 1963) and the induction of sperm capacitation in the presence of tubal and follicular fluid (Barros and Austin, 1967), Edwards, Bavister, and Steptoe (1969) reported the first authentic evidence of *in vitro* fertilization of human eggs. They stated that "Our impression is that this preincubation (of human spermatozoa) led to the attachment of more spermatozoa to the zona pellucida, and to a higher incidence of penetrated and pronucleate eggs." Austin and associates (1973) estimated that the time required for capacitation of human spermatozoa *in vitro* was about 7 hours, which was much longer than the present estimation. It should be pointed out here that most investigators working on fertilization *in vitro* consider capacitation to include all the changes before

penetration because they consider capacitated spermatozoa as those able to fertilize eggs, not those only having some molecular changes in their membrane.

Capacitation and Hyperactivation

It was reported by Hamner and Williams (1963) that the uptake of oxygen by rabbit spermatozoa increased four-fold after they had been incubated for 6 hours in the uterus of estrous rabbit. Mounib and Chang (1964) found that "both uptake of oxygen and glycolytic activity of sperm were increased after incubation in the uterus of rabbit and the rise of consumption of oxygen was utilized to oxidize endogenous and exogenous substrates with a promotion of the hexose monophosphate shunt." The different motility pattern of golden hamster spermatozoa before and after capacitation was first noticed (1969) and described by Yanagimachi (1970b). It was observed that when hamster spermatozoa were incubated in media containing biological fluid, the spermatozoa agglutinate head to head within 30 minutes. About 2 to 3 hours later, agglutinated spermatozoa dispersed spontaneously, and free spermatozoa showed an extraordinary active movement, with vigorous whip-lash-like beating of the flagellum. Later on, Yanagimachi (1981), named this sperm movement "hyperactivation of spermatozoa" rather than "activation of spermatozoa", and stated that "the spermatozoa began to move extremely vigorously shortly before the acrosome reaction was initiated." A similar type of sperm motility was also described in the guinea pig (Yanagimachi, 1972; Barros et al, 1973) dog (Mahi and Yanagimachi, 1976) mouse (Fraser, 1977), rabbit (Cooper et al, 1979) and sheep (Cummins, 1982). It is difficult to say from these reports whether the hyperactivation of spermatozoa occurred before or after the acrosome reaction. According to Yanagimachi (1981), the acrosome reaction and hyperactivation can occur independently and should be considered as separate phenomena. If capacitation is defined to include all the changes in spermatozoa before they are capable of penetrating eggs, then the hyperactivation of spermatozoa is also one stage of capacitation. Whether hyperactivation starts before, during, or after the acrosome reaction was not exactly determined.

Separation of Capacitation and Other Changes

In a study of morphological aspects of sperm capacitation in mammals, Bedford (1970a) stated that "observations in the phase contrast and electron microscope fail to reveal any structural changes in rabbit sperm which can be interpreted as morphological concomitant of capacitation," because he found that capacitated rabbit uterine spermatozoa had intact acrosomes. In a review paper on sperm capacitation and fertilization in mammals, Bedford (1970b) remarked that "no morphological changes occur before the onset of acrosome reaction, which is not considered as a facet of capacitation itself. After capacitation, sperm become competent to undergo the acrosome reaction in response to stimuli which seem to exist in the vicinity of the egg, and in follicular fluid." Such statements rather deviate from the original meaning of capacitation, which includes all the changes that enable spermatozoa to penetrate eggs. On the other hand, the absence of acrosome in capacitated hamster (Yanagimachi, 1966) mouse (Iwamatsu and Chang, 1969) and guinea pig spermatozoa (Yanagimachi, 1972) has been reported. If we accept Bedford's notion (1970a) that the acrosome reaction of capacitated rabbit spermatozoa *in vivo* only occurs in contact with eggs, it does not necessarily contradict the original meaning of capacitation (changes undergone by mammalian spermatozoa in the female genital tract) because the acrosome reaction of rabbit spermatozoa occurs when the sperm and eggs are in the oviducts, which are part of the female genital tract. Moreover, we cannot say that all capacitated rabbit uterine spermatozoa have intact acrosomes because the acrosome reaction of rabbit spermatozoa is difficult to examine, and the acrosome reaction of rabbit uterine spermatozoa has not been thoroughly examined as far as the author is aware.

In an article entitled "Capacitation of Golden Hamster Spermatozoa During Incubation in Culture" Bavister (1973) remarked that "since there is some controversy over the meaning of the term 'capacitation,' it is used below to denote only those changes undergone by spermatozoa after leaving the male reproductive tract and before the occurrence of acrosome reaction." But the results he presented in his article were based on the penetration of the eggs, which requires all the changes in spermatozoa before fertilization.

In an article entitled "Components of Capacitation" Austin and associates (1973) reported their study of *in vitro* sperm penetration in the golden hamster, mouse, and human. It was concluded that "capacitation is an essential physiological change in all three species studied, and in each, the spermatozoa were clearly capable of undergoing this process *in vitro*." Because preincubation of spermatozoa in medium without eggs for 3 to 4 hours presumably did not induce acrosome reaction, but produced a large reduction in the ultimate time between insemination and penetration, they further concluded that "the separate nature of capacitation and acrosome reaction is indicated by observation on preincubation of hamster spermatozoa." It should be pointed out here that "these experiments gave variable results," as the same authors stated, and that they did not determine the occurrence of acrosome reaction after preincubation. Moreover, even after preincubation for 3 to 4 or 6 to 7 hours, it still requires 1 to 2 hours after semination for the spermatozoa to penetrate the eggs. This shows that what has happened during preincubation is only a part of, or a preparation for capacitation, rather than the whole process of capacitation. The definition of capacitation applied originally did not fragment the process; it denoted all the changes in the spermatozoa that enable them to penetrate and fertilize the eggs.

Dealing with membrane fusion and fertilization, Austin (1975) further stressed the separation of capacitation and the acrosome reaction. He considered capacitation to involve the removal of the glycoprotein coat from spermatozoa. The removal of the extraneous coat unlocks the acrosome reaction, while the acrosome reaction allows the escape of hydrolytic enzymes for the penetration of the zona pellucida. Johnson (1975) discussed capacitation and acrosome reaction separately from membrane reaction and immunological reaction, based upon extant knowledge at the macromolecular level. In a recent review article by Yanagimachi (1981), capacitation and acrosome reaction were discussed separately. He listed nineteen detected or suspected phenomena in the sperm membrane associated with sperm capacitation from 56 references, but he was not certain whether to define capacitation strictly as a preparation for the acrosome reaction. The acrosome reaction, however, can be induced rapidly in guinea pig spermatozoa without preliminary incubation by causing calcium

uptake through the influence of ionophore A23187 (Singh et al, 1978). In a recent review article entitled "Significance of the Need for Capacitation Before Fertilization in Eutherian Mammals," Bedford (1983) stressed the influx of calcium during capacitation for acrosome reaction. He postulated that due to the loss of the oocytes' stimulation of the acrosome reaction, as in the sea urchin, and the unusually formidable egg investments in the vertebrate, mammalian spermatozoa must undergo capacitation in the female genital tract.

As sea urchin spermatozoa undergo the acrosome reaction without obvious capacitation, it is inconsistent to consider the acrosome reaction as an isolated event in one animal group and as an integral part of a more complex sequence of events in mammals. Whether or not the acrosome reaction of sea urchin spermatozoa may have some fast reactions similar to capacitation remains to be investigated.

The confusion created in recent years is mainly due to the fact that in the title of their articles, Austin et al (1973), Bavister (1973), and Bedford (1970a,b; 1983) imply that capacitation includes all the changes in the spermatozoa before they have the capacity to fertilize. But in the text of their articles, they have treated capacitation as a preparation for hyperactivation and acrosome reaction. The confusion is often caused by the change in the original meaning of the word.

Summary and Conclusions

It should be recalled that sperm capacitation was originally defined in 1952 as some physiological changes of the spermatozoa in the female genital tract before they are capable of penetrating and fertilizing the eggs. It was found further that capacitation can be achieved outside the female tract, first in the presence of biological fluids, and then in the absence of biological fluids. Later on it was found that capacitated rabbit uterine spermatozoa still have acrosome and that the acrosome reaction of rabbit spermatozoa occurred in contact with eggs in the oviduct. Thus, several authors separated acrosome reaction from capacitation and considered capacitation as a preparation for the acrosome reaction, even though the titles of their articles still implied that capacitation included acrosome reaction. During the past 30 years we have found many membrane changes on the molecular and immunological level in spermatozoa

that prepare them for physiological changes such as "hyperactivation," and morphological changes such as "the acrosome reaction." These events lead to more vigorous motility and to the release of various enzymes for the penetration of the egg. Undoubtedly, further study will reveal more molecular, physiological, and morphological changes in the mammalian spermatozoa before they are capable of fertilization. There are definite changes before hyperactivation and acrosome reaction, but these changes are parts of capacitation, if we prefer to keep its original meaning. It is proposed here that in order to save further confusion, capacitation of spermatozoa should be defined as originally proposed, that is, to include all the events that lead to the development of the capacity of mammalian spermatozoa to penetrate eggs. All the changes in the spermatozoa before hyperactivation and acrosome reaction should be defined as the first part of capacitation. Certainly the writers should clearly state whether or not acrosome reaction is included in their work on capacitation.

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Women in Andrology

5

Hatched in the Women's Room



Started by:

Jean Fourcroy

Sally Nyquist

Gail Prins

Susan Rothman

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A BRIEF HISTORY OF WOMEN IN ANDROLOGY

This summary was originally prepared by Dr. Sally Perreault with input from many important pioneers of the WIA. Revised February 26, 2005

- 1. WIA Mission Statement**
- 2. The Ladies Room Caucus**
- 3. First Organized Meeting**
- 4. Evolution of the WIA**
- 5. WIA Annual Luncheon**

Women in Andrology Mission Statement (Approved 1991)

The field of Andrology can best advance by optimizing contributions from all its members. The Women of Andrology (WIA) of the American Society of Andrology recognizes that the issues confronting women are often unique. The WIA was formed to promote women's contributions to and representation in the activities of the American Society of Andrology, specifically, and the field of Andrology in general.

The Ladies Room Caucus

During the 1991 ASA Interim (Fall) Council meeting, Gail Prins and Susan Rothmann raised objections to the predominately male candidate slate proposed by the Nominating Committee. ASA President David Hamilton challenged the women Council members to develop a plan to increase participation of women in the ASA. He called a recess and asked the four women present to caucus and then report back with a plan. Gail, Susan, Jean Fourcroy and Sally Nyquist met in the only available private space, the women's restroom. Gail Prins suggested that the Women in Endocrinology group of the Endocrine Society serve as a model for the female members of the ASA. A questionnaire would be sent to all women in the ASA asking what committees they would like to serve on and soliciting resumes. These documents would be given to the Nominating Committee and to all Committee Chairs to assist them in adding women to ASA governance. In addition, it was suggested that one Council position have only women candidates to ensure adequate representation of women. The women reported this recommendation to the Council and were encouraged to proceed. Council agreed to reserve one Council ballot position for women, which is still the practice in 2004-5. The Nominating Committee was thereby instructed to develop a new, more inclusive ballot. The importance of Dr. Hamilton's encouragement of this effort cannot be understated. David made sure that the process was supported during the critical first years when he was President and Past-President. His belief in the importance of a diverse ASA was an important factor in establishing the Women in Andrology.

The First Organized Meeting

Shortly thereafter, still in the fall of 1991, a group of women met at the American Fertility Society (now called the American Society of Reproductive Medicine) meeting, including Susan Rothmann, Gail Prins, Jean Fourcroy, Martha Anderson, and Grace Centola. They discussed the ASA Council Meeting, as well as strategies for starting the Women's Group and getting women elected. Gail sent a letter and questionnaire to all female ASA members on November 15, 1991, announcing an organizational meeting to take place at the 1992 ASA meeting. The names Woman's Caucus and Women in Andrology were both suggested.

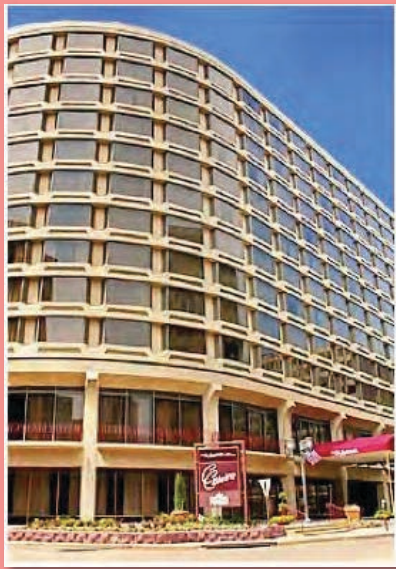
The first WIA breakfast took place at the 1992 ASA Annual Meeting in Bethesda, MD and was attended by 36 women. The name "Women in Andrology" was chosen. Grace Centola volunteered to serve as Acting Chairperson and sent a letter to all female ASA members, and formed an ad hoc steering committee: Martha Anderson, Grace Centola, Nina Davis, Erma Drobnis, Lyndall Erb, Jean Fourcroy, Gail Goldsmith, Trish Olds-Clarke, Gail Prins, Carol Sloan, Monica Vasquez-Levin, and Donna Vogel.

Evolution of The WIA

The WIA luncheon became a regular feature of the ASA meeting starting in 1993. Early meetings included a speaker on a scientific or career development topic. In 2000, the ASA instituted a WIA Lecture as part of its official program. This freed up time at the luncheon for networking and other career development activities. The WIA Co-Chair is automatically on the Program Committee for the following year (corresponding to the meeting year during which she will be WIA chair). She can then ensure adequate female representation on the scientific program and is usually consulted regarding the selection of the WIA Lecturer. Note that WIA do not "approve" the speaker (none of the lecture sponsors do) as that is the full responsibility of the Program Committee. The WIA Co-Chair's presence on the committee, however, does give her right to suggest potential speakers and in the final selection.

All female attendees of the ASA Annual Meeting are welcome and encouraged to attend the WIA Luncheon.

Birthplace of WIA



Marriot Hotel
Crystal City, VA
September 14, 1991

20 Years Later



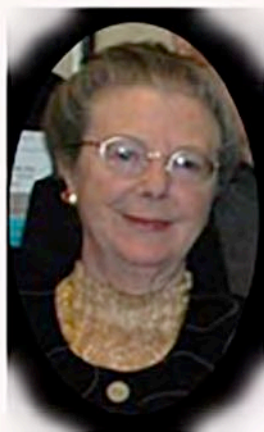
American Society of Andrology *Female* Presidents



Dates

Names

2012-2013	Donna L. Vogel, PhD
2011-2012	Gail A. Cornwall, PhD
2009-2010	Dolores J. Lamb, PhD
2006 -2007	Christina Wang, MD
2005-2006	Sally Perreault Darney, PhD
2003-2004	Gail S. Prins, PhD
2000-2001	J. Lisa Tenover, MD, PhD
1995-1996	Marie Claire Orgebin-Crist, PhD
1985-1986	Anna Steinberger, PhD
1979-1980	Nancy J. Alexander, PhD



Women in Andrology



Women in Andrology



American Society of Andrology *Female* Secretaries
(3-year appointments)

Dates	Names
2013	Jacquetta Trasler
2010	Patricia L. Morris
2007	Janice L. Bailey
2004	Steven Schrader
2001	Terry Brown
1998	Dolores Lamb
1995	Rex A. Hess
1992	Barry T. Hinton
1989	Terry T. Turner
1986	Joel L. Marmar
1983	Rupert Amann
1980	Howard R. Nankin
1977	Rudi Ansbacher
1975	E. S. E. Hafez

American Society of Andrology *Female* Treasurers
(3-year appointments)

Dates	Names
2014	Rex A. Hess
2011	Rex A. Hess
2008	Erv Goldberg
2005	Janice Evans
2002	Gail Cornwall
2000	Chris DeJonge
1997	Terry Brown
1993	Gail Prins
1990	Arnold Belker
1985	Brian H. Vickery
1981	Tom Lobl
1978	Richard J. Sherins
1975	Nancy J. Alexander

American Society of Andrology *Female* Awardees

Female Young Andrologist Awardees

As of 2014, 9 of 33 total

Dates	Names
1991	Patricia M. Saling
1997	Gail A. Cornwall
2001	Jacquetta M. Trasler
2003	Joanna E. Ellington
2004	Kate Loveland
2005	Janice Bailey
2006	Janice Evans
2008	Moira O'Bryan
2014	Sarah Kimmins, PhD

Female Distinguished Andrologist Awardees

As of 2014, 6 of 39 total

Dates	Names
1982	Eugenia Rosemberg
1990	Marie-Claire Orgebin-Crist
1993	Anna Steinberger
2010	Dolores Lamb
2013	Christina Wang
2014	Gail Prins

Female Distinguished Service Awardees

As of 2014, 6 of 21 total

Dates	Names
1997	Marie-Claire Orgebin-Crist
2001	Gail S. Prins
2004	J. Lisa Tenover
2007	Sally Perreault Darney
2011	Christina Wang
2014	Susan Rothmann

ASA Award Recipients 6

Distinguished Andrologist
Distinguished Service
Young Andrologist
Andrology Award



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Distinguished Andrologist Award

*This is the highest award of the Society, presented annually to an individual who has made an outstanding contribution to the progress of Andrology
Sponsored by the Eugenia Rosemberg Endowment Fund*

- 2015 Deborah A. O'Brien
- 2014 Gail Prins
- 2013 Christina Wang
- 2012 Erwin Goldberg
- 2011 Barry Zirkin
- 2010 Dolores Lamb
- 2009 William Bremner
- 2008 Bernard Robaire
- 2007 Eberhard Nieschlag
- 2006 Norman Hecht
- 2005 Mitch Eddy
- 2004 Ronald Swerdloff
- 2003 David M. de Kretser
- 2002 Geoffrey Malcolm Hasting Waites
- 2001 Frank S. French
- 2000 Bayard T. Storey
- 1999 Richard D. Amelar
- 1998 Ryuzo Yanagimachi
- 1997 Brian P. Setchell
- 1996 J. Michael Bedford
- 1995 Rupert P. Amann



Distinguished Andrologist Award

*This is the highest award of the Society, presented annually to an individual who has made an outstanding contribution to the progress of Andrology
Sponsored by the Eugenia Rosenberg Endowment Fund*

- 0
- 1994 **Richard J. Sherins**
 - 1993 **Anna Steinberger**
 - 1992 **C. Wayne Bardin**
 - 1991 **Philip Troen**
 - 1990 **Marie-Claire Orgebin-Crist**
 - 1989 **C. Alvin Paulsen**
 - 1988 **Yves W. Clermont**
 - 1987 **Emil Steinberger**
 - 1986 **Alfred D. Jost**
 - 1985 **Robert H. Foote**
 - 1984 **Mortimer B. Lipsett**
 - 1983 **Kristen B.D. Eik-Nes**
 - 1982 **Eugenia Rosenberg**
 - 1981 **Alexander Albert**
 - 1980 **John MacLeod**
 - 1979 **Thaddeus Mann**
 - 1978 **Robert S. Hotchkiss**
 - 1977 **Robert E. Mancini**
 - 1976 **Roy O. Greep and M.C. Chang**



Distinguished Service Award

*This award is bestowed annually to recognize an individual who has provided distinguished service to The American Society of Andrology
Sponsored by the Past Presidents Endowment Fund*

2015 Steven M. Schrader



2014 Susan Rothmann



2013 Rex A. Hess



2012 Terry Brown



2011 Christina Wang



2010 Joel Marmar



2009 Erwin Goldberg



2008 Matt Hardy



2007 Sally Perreault Darney

2006 Barry Zirkin



2005 Barry T. Hinton



2004 J. Lisa Tenover



Distinguished Service Award

*This award is bestowed annually to recognize an individual who has provided distinguished service to The American Society of Andrology
Sponsored by the Past Presidents Endowment Fund*

2003 **Arnold M. Belker**



2002 **Terry T. Turner**



2001 **Gail S. Prins**

2000 **Bernard Robaire**



1999 **David W. Hamilton**

1998 **Rupert P. Amann**



1997 **Marie-Claire Orgebin-Crist**



1996 **Philip Troen**



1995 **Andrzej Bartke**

1994 **C. Alvin Paulsen**



Young Andrologist Award

Now called the Matthew P. Hardy Young Andrologist Award. This annual award is bestowed upon an Active Member of the American Society of Andrology who at the time of the award, is less than forty-five (45) years of age and who has made significant contributions to the field of Andrology. Sponsored by the Matthew P. Hardy Endowment Fund

- 2015 Jon M. Oatley
- 2014 Sarah Kimmins
- 2013 Jacques J. Tremblay
- 2012 Wei Yan
- 2011 Humphrey Yao
- 2010 Peter Liu
- 2009 Michael Palladino
- 2008 Moira O'Bryan
- 2007 John K. Amory
- 2006 Janice Evans
- 2005 Janice Bailey
- 2004 Kate Loveland
- 2003 Joanna E. Ellington
- 2002 Christopher L.R. Barratt
- 2001 Jacquetta M. Trasler
- 2000 Matthew P. Hardy



Young Andrologist Award

*This annual award is bestowed upon an Active Member of the American Society of Andrology who at the time of the award, is less than forty-five (45) years of age and who has made significant contributions to the field of Andrology.
Sponsored by the Matthew P. Hardy Endowment Fund*

- 1999 **Stuart E. Ravnik**
- 1998 **William R. Kelce**
- 1997 **Gail A. Cornwall**
- 1996 **Paul S. Cooke**
- 1995 **Christopher J. De Jonge**
- 1994 **Wayne J.G. Hellstrom**
- 1993 **Robert Chapin**
- 1992 **Gary R. Klinefelter**
- 1991 **Patricia M. Saling**
- 1990 **Luis Rodriguez-Rigau**
- 1989 **Barry T. Hinton**
- 1988 **Larry Johnson**
- 1987 **Ilpo T. Huhtaniemi**
- 1986 **Stephen J. Winters**
- 1985 **Bruce D. Schanbacher**
- 1984 **Lonnie D. Russell**
- 1983 **William B. Neaves**
- 1982 **L.J.D. Zaneveld**



The *Andrology* Award

This annual award recognizes the best manuscript published within the preceding annual volume of the journal, *Andrology*. The awardee is selected by the Board of Associate Editors and the Chief Editors from among original studies published.

The Award is presented each year, alternating between the ASA and EAA (European Academy of Andrology)

Sponsored by the Andrology Journal Endowment Fund



- 2015 Maselli J, Hales BF & Robaire B. (2014) Paternal exposure to testis cancer chemotherapeutics alters sperm fertilizing capacity and affects gene expression in the eight-cell stage rat embryo. *Andrology* 2, 259–266.
- 2014 Shetty G, Uthamanthil RK, Zhou W, Shao SH, Weng CC, Taylor RC, Hermann BP, Orwig KE & Meistrich ML. (2013) Hormone suppression with GnRH antagonist promotes spermatogenic recovery from transplanted spermatogonial stem cells in irradiated cynomolgus monkeys. *Andrology* 1, 886–898.

EDITORIAL

Announcing the first *Andrology* Award

doi: 10.1111/j.2047-2927.2014.00223.x

¹Ewa Rajpert-De Meyts and ²Douglas T. Carrell¹Department of Growth and Reproduction, Copenhagen University Hospital (Rigshospitalet), Copenhagen, Denmark, and ²Departments of Surgery (Urology), Obstetrics and Gynecology, and Human Genetics, University of Utah School of Medicine, Salt Lake City, UT, USA

It is our great pleasure to announce the winner of the first *Andrology Award* for the best article in our journal published in 2013. As explained in our first editorial this year (Rajpert-De Meyts & Carrell, 2014), the award is selected by the Board of Associate Editors and the Chief Editors from among original studies published within the entire first volume.

It was by no means an easy choice, because the journal has published a good number of high-quality articles. After much deliberation, we have selected an excellent paper by Gunapala Shetty, working with Marvin L. Meistrich and other colleagues at the Department of Experimental Radiation Oncology, Division of Radiation Oncology, University of Texas MD Anderson Cancer Center, Houston, TX, USA (Shetty *et al.*, 2013). The winning article is a beautifully designed and conducted experimental study reporting improvement of spermatogenic recovery after germ cell transplantation in irradiated non-human primates by hormone suppression. The study has direct implications for human andrology and is a perfect example of translational science. One of the figures from this paper graced the cover of the November 2013 issue of *Andrology*.

The first author, Dr Gunapala Shetty, currently Assistant Professor, has worked with Dr Marvin Meistrich since 1997 and has made significant contributions to reproductive toxicology and endocrinology. The award includes travel to the 8th European Congress of Andrology which will be held in Barcelona, Spain, from 15 to 17 October 2014, where one of the authors will present a short lecture on the subject on the topic of his study.

We would also like to give a honourable mention to the two excellent runner-up papers, which have been nominated and highly prized by some editors, and received scores only a notch below the winning paper. In random order, the runners up are: a study by Frédéric Chalmel and colleagues, directed by Michael Primig of the IRSET team at Rennes University, France (Chalmel *et al.*, 2013), and a study by Ruth Kläver and Frank Tüttelmann from the group directed by Jörg Gromoll of the Centre of Reproductive Medicine and Andrology in Münster, Germany (Kläver *et al.*, 2013).

We congratulate the winner and the runners up and wish all of the authors of these excellent papers best of success in science and many more award-winning publications!



Drs Gunapala Shetty and Marvin Meistrich (back) are the first author and senior author of the prize paper for 2013.

REFERENCES

- Chalmel F, Lardenois A, Georg I, Barrionuevo F, Demougin P, Jégou B, Scherer G & Primig M. (2013) Genome-wide identification of *Sox8*-, and *Sox9*-dependent genes during early post-natal testis development in the mouse. *Andrology* 1, 281–292.
- Kläver R, Tüttelmann F, Bleiziffer A, Haaf T, Kliesch S & Gromoll J. (2013) DNA methylation in spermatozoa as a prospective marker in andrology. *Andrology* 1, 731–740.
- Rajpert-De Meyts E & Carrell DT. (2014) Entering the second year of the transatlantic *Andrology* collaboration. *Andrology* 2, 1–2.
- Shetty G, Uthamanthil RK, Zhou W, Shao SH, Weng CC, Tailor RC, Hermann BP, Orwig KE & Meistrich ML. (2013) Hormone suppression with GnRH antagonist promotes spermatogenic recovery from transplanted spermatogonial stem cells in irradiated cynomolgus monkeys. *Andrology* 1, 886–898.

EDITORIAL

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doi: 10.1111/andr.12039

Announcing the 2014 *Andrology* Award

^{1,2,3}D. T. Carrell and ⁴E. Rajpert-De Meyts

¹Department of Surgery (Urology), University of Utah School of Medicine, Salt Lake City, UT, USA, ²Department of Obstetrics and Gynecology, University of Utah School of Medicine, Salt Lake City, UT, USA, ³Department of Human Genetics, University of Utah School of Medicine, Salt Lake City, UT, USA, and ⁴Department of Growth and Reproduction, Copenhagen University Hospital (Rigshospitalet), Copenhagen, Denmark

It is with great pleasure that we announce the winner of the second annual *Andrology Award* for the best manuscript published in *Andrology* during 2014. The award is selected from all manuscripts published in *Andrology* during 2014 and is chosen by the Board of Associate Editors and the Editors-In-Chief (Rajpert-De Meyts & Carrell, 2014).

The award paper for 2014 comes from the laboratory of Dr. Bernard Robaire at McGill University in Montreal, Canada, and is entitled 'Paternal exposure to testis cancer chemotherapeutics alters sperm fertilizing capacity and affects gene expression in the eight-cell stage rat embryo' (Maselli *et al.*, 2014). The elegant design of the study, the potential importance of the results in a translational sense, and the clear and organized presentation of the study in the manuscript contributed to the selection of this article as the award recipient.

The first author, Dr. Jennifer Maselli, completed this study as part of her doctoral dissertation. Dr. Maselli was awarded her doctorate last year and is currently working in industry. The senior authors, Dr. Barbara Hales and Dr. Bernard Robaire, are well known for their longtime productive research in reproductive biology. Dr. Robaire will present this study in an oral presentation at the annual meeting of the American Society of Andrology in Salt Lake City April 18–21, 2015, at which time he will receive the award on behalf of the research team.

We emphasize that the selection of one 'award' manuscript is very difficult when numerous worthy manuscripts were published. We hope that this award not only gives recognition to the high quality of the award manuscript, but also highlights the excellent quality of manuscripts in general published in the



Andrology. We sincerely thank you for making *Andrology* a leader of the field.

REFERENCES

- Maselli J, Hales BF & Robaire B. (2014) Paternal exposure to testis cancer chemotherapeutics alters sperm fertilizing capacity and affects gene expression in the eight-cell stage rat embryo. *Andrology* 2, 259–266.
 Rajpert-De Meyts E & Carrell DT. (2014) Entering the second year of the transatlantic *Andrology* collaboration. *Andrology* 2, 1–2.

The Archives Committee on a regular basis has prepared posters for presentation at the annual ASA Meeting. The following 4 posters were presented to honor former recipients of the Young Andrologist Award.

(The print is small because each poster was printed large enough to fit a large poster board)

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Building a Solid Future for the American Society of Andrology: A Look at our Young Andrologists Through Time



Young Andrologist Award

This annual award is bestowed upon an Active Member of the American Society of Andrology who, at the time of the award, is less than forty-five (45) years of age and who has made significant contributions to the field of Andrology. This award was introduced in 1982.

To the Trainees of the American Society of Andrology: we hope you find the energy of these awardees contagious and are inspired by their accomplishments. You too can achieve your goals and make a difference in the ASA. You are the future of Andrology.

40 and forward

2004: Kate Loveland



When did you join the ASA and who introduced you to the society?
I do not have a specific recollection of this. I would attribute this to my collective mentors: Professors Raymond Stone, Mitch Edley and David de Kretser.

What is your current position? What is your main area of research?
Professor and National Health and Medical Research Council (NH&MRC) Senior Research Fellow, Research Laboratory Head, Endo Development and Stem Cell Biology Group, Monash PRF Institute for Medical Research and Head of Postgraduate Studies, School of Clinical Science, Monash University. My main area is investigation of developmental pathways that control male germ-line function in normal and neoplastic development.

Have you been involved in the ASA and if so, how?
I have been actively serving the ASA for many years as a section Committee member and as a Council member. I implemented the Basic Science Workshop in 2000 and, as Chair of the Committee, have led its organization.

How did the ASA impact your career?
My involvement in the ASA meeting provides ongoing opportunities to network with international research and clinical leaders and it has allowed me to develop my own leadership skills. I am consistently inspired and reassured by the supportive research mentors and colleagues who have become friends, and this has given me confidence to apply for leadership positions in my host institution.

2005: Janice Bailey



When did you join the ASA and who introduced you to the society?
I joined around 1999 and was introduced by Raymond Stone.

What is your current position? What is your main area of research?
Professor and National Health and Medical Research Council (NH&MRC) Senior Research Fellow, Research Laboratory Head, Endo Development and Stem Cell Biology Group, Monash PRF Institute for Medical Research and Head of Postgraduate Studies, School of Clinical Science, Monash University. My main area is investigation of developmental pathways that control male germ-line function in normal and neoplastic development.

Have you been involved in the ASA and if so, how?
I served on many committees (Committee and Bulletin, Publications, Future Meetings and maybe others) and I was Chair of Membership and Chair of Women in Andrology. I served on Council, was Secretary and also Program Chair for ASA 2011 in Montreal. I also served on the Board of Editors for J Andrology and was Associate Editor.

How did the ASA impact your career?
How? - ASA provided me with my first experience in governance. A lot of my leadership skills that I currently sport were first nurtured in the ASA. I still value the consistency that is so strongly written in the ASA.

2006: Janice P. Evans



When did you join the ASA and who introduced you to the society?
Raymond Stone introduced me to ASA.

What is your current position? What is your main area of research?
Associate Professor, Department of Biochemistry and Molecular Biology, Johns Hopkins University. My current research program focuses on fertilization, female meiosis and oocyte maturation.

Have you been involved in the ASA and if so, how?
Council, Treasurer, committee chair - best of all was being program chair for the 2012 annual ASA meeting with Ajay Bangal!

How did the ASA impact your career?
The ASA has allowed me to develop special and wonderful friendships with so many in the Society. Most notably, going to the ASA meeting was the start of "the fun" - sharing a room together at meetings - now, nearly 30 years after that first one, we're the all-time married couple!

2007: John K. Amory



When did you join the ASA and who introduced you to the society?
I joined in 1998. I was introduced by Bill Bremner MD, PhD.

What is your current position? What is your main area of research?
I am Professor of Medicine, University of Washington. My research focuses on endo differentiation and male infertility.

Have you been involved in the ASA and if so, how?
I was a Council member for 1 year. I am currently Associate Editor of Andrology and I serve the editorial board of the Journal of Andrology. I am also a member of the Publications and Communications Committee.

How did the ASA impact your career?
I love the ASA. It is the only place where a clinician gets to interface with basic scientists in reproduction on an intimate setting. Really great, smart people across the board!

2008: Moira K. O'Bryan



When did you join the ASA and who introduced you to the society?
I think it was in 1996. I was introduced by David de Kretser who was at the time my postdoctoral mentor.

What is your current position? What is your main area of research?
I am a National Health and Medical Research Council of Australia Principal Research Fellow. I am also the Deputy Head of Department within the Dept. of Andrology and Experimental Biology at Monash University in Australia.

Have you been involved in the ASA and if so, how?
I have served on many committees, including the Program Committee, Constitution and By-Laws Committee as well as the International Union Committee. I am currently serving on the Executive Council (2010-2013).

How did the ASA impact your career?
My involvement in ASA has had a very positive impact. It has proven to be a very productive venue to meet many of the clinical and research leaders in the broader field of Andrology. Indeed it has been the catalyst for numerous collaborations. My involvement in ASA committees has been particularly very positive by Australian funding bodies e.g. as evidence of international recognition. The ASA annual meetings have proven to be a great means of finding the best and most relevant research in my field.

2009: Michael A. Palladino



When did you join the ASA and who introduced you to the society?
I joined in 1990 and Dr. Barry T. Hinton introduced me to the ASA.

What is your current position? What is your main area of research?
Professor of Biology, Dean of the School of Science at Morehead State University. Research areas: female meiosis and spermatozoal regulation of male reproductive organs, molecular responses to oxidative and hypoxic injury of the testis.

Have you been involved in the ASA and if so, how?
I have served on many ASA committees as well as the Editorial Board of Journal of Andrology. I was Chair of the Trainee Affairs Committee and I am currently Chair of the Finance Committee. I also served on the Executive Council from 2006-2009.

How did the ASA impact your career?
Without question the ASA has been the most valuable organization that has helped me develop as a scientist. It was the first national society that I was involved in as a graduate student. I value the interactions between basic scientists and clinicians. The friendly and supportive environment of ASA and its annual meeting - from its most distinguished and accomplished member to the trainee attending for the first time - is something that I value greatly. Mentorship and support from other ASA members has been invaluable throughout my career.

2010: Peter Liu



When did you join the ASA and who introduced you to the society?
I joined in 2005. I was introduced when I joined Drs. Swettloff and Wang at a clinic.

What is your current position? What is your main area of research?
Attending Endocrinologist, Harbor-UCLA Medical Center. Professor in Residence, David Geffen School of Medicine, UCLA. My main area of research is reproductive endocrinology, male hormonal optimization, male fertility and androgen action. Specifically I am interested in understanding the molecular mechanisms of the reproductive system, particularly testosterone, and how this can lead to metabolic health.

Have you been involved in the ASA and if so, how?
I am and have been a member of many committees including Trainee Affairs, Membership, International Union, Basic Science Workshop, Diversity, Nominations and the Program Organizing Committee. Highlights have been my leadership role on the Trainee Affairs Committee and being elected to Council in 2015.

How did the ASA impact your career?
ASA membership has been a wonderful way to network with like-minded scientists from worldwide fields. The ASA's strong support of trainees. Being active in the society has been a wonderful way to contribute back to the discipline.

2011: Humphrey Yao



When did you join the ASA and who introduced you to the society?
I became a member of ASA in 2007.

What is your current position? What is your main area of research?
I am a Principal Investigator at National Institute of Environmental Health Sciences (NIEHS), one of the 27 NIH Institutes. My research interest is to investigate whether defects in the development of the reproductive system during life, caused by genetic mutations or exposure to environmental chemicals, have a long term impact on adult reproductive health.

Have you been involved in the ASA and if so, how?
I was a member of the Diversity Committee in ASA.

How did the ASA impact your career?
ASA membership gives me an opportunity to interact with many prominent scientists, who generously provide me invaluable advice on my career. Chances to share my work with others are abundant in the Society. ASA also allows me to offer on different functions of the society. These practices enable me to build the brand and make other scientists associate my research.



Building a Solid Future for the American Society of Andrology: A Look at our Young Andrologists Through Time



2012: Wei Yang



When did you join the ASA and who introduced you to the society?
I joined in 2008 and was introduced through Dr. Ronald Swerdloff at Harbor UCLA.

What is your current position? What is your main area of research?
Professor of Physiology, Molecular and Cellular Biology, Director of Single Cell Genomics Core and Genome Editing Core, University Illinois School of Medicine. My research interests are in genetic and epigenetic control of gametogenesis and gamete contribution to zygote development.

Have you been involved in the ASA and if so, how?
I have served as a member on the Nominations Committee and the Program Committee for the past several years.

How did the ASA impact your career?
The ASA has made a positive impact on my career development. Through the ASA meetings and events, I have been constantly reminded that findings from the basic research need to be translated into clinical applications that benefit patient care. This major translational genetic, including the development of non-hormonal male contraceptives and non-invasive genetic quality control method, are ongoing in the Yan lab.

2013: Jacques J. Tremblay



When did you join the ASA and who introduced you to the society?
I joined in 2008 as a trainee and at the meeting I was awarded the ASA Outstanding Trainee Investigator Award. Some of my trainees also became ASA trainee members and have received Trainee Merit Awards, something I am very proud of.

What is your current position? What is your main area of research?
Professor, Department of Obstetrics, Gynecology and Reproduction, Faculty of Medicine, Laval University. My main area of research is to better understand the molecular mechanisms that control Leydig cell differentiation and function as well as the mechanisms of endocrine disruptor action on Leydig cells.

Have you been involved in the ASA and if so, how?
Member, ASA Executive Council (2013 present)
Chair, ASA Communication and Media Committee (2013 present)
Member, ASA Nominating Committee (2011-2013)
Member, Program Committee for the 2013 and 2015 annual meetings

How did the ASA impact your career?
The ASA was instrumental for my professional development. By being a member of the ASA, I have had the privilege to meet great andrologists and to develop scientific collaborations with several of them. I also learned a great deal on my involvement on various committees and that through my participation, I have contributed to the development of the society.

2014: Sarah Kimmins



When did you join the ASA and who introduced you to the society?
I joined the ASA in 2007 and was introduced to the society by Jacquetta Trailler and Janice Bailey.

What is your current position? What is your main area of research?
I am an Associate Professor at McGill University. I hold a Canada Research Chair in Epigenetics, Reproduction and Development and am currently the Associate Director of the McGill Centre for the Study of Reproduction. My research focuses on the epigenome. I am particularly interested in understanding how environmental exposures like the father (e.g. diet and stress) can interact with the developing foetus, and how this is transmitted to the embryo.

Have you been involved in the ASA and if so, how?
I am currently Chair of Women in Andrology. I have served on the Awards Committee, the Nominations Committee, the Constitution & Bylaws Committee and the Publications & Communications Committee. I am the incoming Chair of the Publications & Communications Committee.

How did the ASA impact your career?
I have and continue to value the excellent science at the annual ASA meeting and the affiliated symposium Topics Workshops. These are excellent meetings for investigators and their trainees. I have developed collaborations and friendships over the years that have bolstered what we have been able to achieve scientifically.

Young Andrologist Award Recipients

- 1982 L.J.D. Zaneveld
- 1983 William B. Neaves
- 1984 Lonnie D. Russell
- 1985 Bruce D. Schanbacher*
- 1986 Stephen J. Winters
- 1987 Ipo T. Huhtaniemi
- 1988 Larry Johnson*
- 1989 Barry T. Hinton
- 1990 Luis Rodriguez-Rigau
- 1991 Patricia M. Saling*
- 1992 Gary R. Klinefelter
- 1993 Robert Chapin*
- 1994 Wayne J.G. Hellstrom
- 1995 Christopher J. De Jonge
- 1996 Paul S. Cooke
- 1997 Gail A. Cornwall
- 1998 William R. Kelce*
- 1999 Stuart E. Ravnik
- 2000 Matthew P. Hardy
- 2001 Jacquetta M. Trasler
- 2002 Christopher L.R. Barratt*
- 2003 Joanna E. Ellington
- 2004 Kate Loveland
- 2005 Janice Bailey
- 2006 Janice Evans
- 2007 John K. Amory
- 2008 Moira O'Bryan
- 2009 Michael Palladino
- 2010 Peter Liu
- 2011 Humphrey Yao
- 2012 Wei Yan
- 2013 Jacques J. Tremblay
- 2014 Sarah Kimmins

* We were unable to reach this recipient



Young Andrologist Award

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To the Trainees of the American Society of Andrology: we hope you find the energy of these awardees contagious and are inspired by their accomplishments. You too can achieve your goals and make a difference in the ASA. You are the future of Andrology.

40 and forward

ASA Lecture Recipients

**Emil Steinberger Memorial Lecture
Women in Andrology Lecture
ASA International Lecture
Serono Lecture
ASA Lecture
AUA Lecure**



Emil Steinberger Memorial Lecture

Sponsored by the Emil Steinberger Endowment Fund



- 2015 Marisa S. Bartolomei, PhD**
- 2014 Rudolf Jaenisch, MD**
- 2013 Deborah A. O'Brien, PhD**
- 2012 William F. Crowley, Jr., MD**
- 2011 Leendert Looijenga, PhD**
- 2010 Andrew Sinclair, PhD**

American Urological Association (AUA) Lecture

- | | |
|---|---------------------------------|
| 2015 Paul J. Turek, MD | 2000 Anthony Atala, MD |
| 2014 Jay I. Sandlow, MD | 1999 Paul H. Lang, MD |
| 2013 Tom F. Lue, MD | 1998 Jacob Rajfer, MD |
| 2012 Donald J. Tindall, PhD | 1997 Irwin Goldstein, MD |
| 2011 Peter N. Schlegel, MD | 1996 John Donohue, MD |
| 2010 Larry I. Lipshultz, MD | |
| 2009 Raymond Rosen, PhD | |
| 2008 Anthony Atala, MD | |
| 2007 Arul M. Chinnaiyan, MD, PhD | |
| 2006 Gail S. Prins, PhD | |
| 2005 Ian M. Thompson Jr, MD | |
| 2004 Myles Brown, MD | |
| 2003 George Bosl, MD | |
| 2002 Edward Kim, MD | |
| 2001 Fernand Labrie, MD, PhD | |
| Michael Marberger, MD | |

Women in Andrology Lecture

- 2015 Janice L. Bailey, PhD**
- 2014 Gail S. Prins, PhD**
- 2013 Jacquetta M. Trasler, MD, PhD**
- 2012 Margaret Morris, PhD**
- 2011 Sylvie Breton, PhD**
- 2010 Rebecca Z. Sokol, MD, MPH**
- 2009 Diane Robins, PhD**
- 2008 Mary Croughan, PhD**
- 2007 Renee A. Reijo-Pera, PhD**
- 2006 Mary Ann Handel, PhD**
- 2005 Deborah A. O'Brien, PhD**
- 2004 Diana Myles, PhD**
- 2003 Mary M. Lee, MD**
- 2002 Barbara Hales, PhD**
- 2001 Mary Ann Handel, PhD**
- 2000 Holly Ingraham, PhD**

ASA International Lecture

- 2015 Kate Loveland, PhD, Australia
- 2014 Manuela Simoni, MD, PhD, Italy
- 2013 Moira K. O'Bryan, PhD, Australia
- 2012 Jorma Toppari, MD, PhD, Finland
- 2011 Christiaan de Jager, PhD, South Africa
- 2010 Masaru Okabe, PhD, Japan
- 2009 Peter Koopman, PhD, Australia
- 2008 Claudia Tomes, PhD, Argentina
- 2007 Eberhard Nieschlag, MD, Germany
- 2006 John Robert Aitken, ScD, FRSE, Australia
- 2005 Yoshitake Nishimune, MD, Japan
- 2004 Bernard Jegou, PhD, France
- 2003 Luiz Renato de Franca, PhD, Brazil
- 2002 Hector E. Chemes, MD, PhD, Argentina
- 2000 Alberto Darszon
- 1999 Patricia S. Cuasnicu

SERONO LECTURE

Renamed the ASA Lectureship after 2004

2004	Judith Kimble	1991	Tony M. Plant
2003	Victor D. Vacquier	1990	David C. Page
2002	David Botstein	1989	Frank S. French
2001	John D. Gearhart	1988	Roger Guillemin
2000	Bert O'Malley	1987	Roger V. Short
1999	Neal First	1986	Ronald S. Swerdloff
1998	Jurrien Dean	1985	David M. De Kretser
1997	Patrick C. Walsh	1984	C. Wayne Bardin
1996	Norman B. Hecht	1983	J. Michael Bedford
1995	Marie-Claire Orgebin-Crist	1982	Kevin J. Catt & Maria L. Dufau
1994	Michael D. Griswold	1981	Pierre Soupart
1993	Leroy Hood	1980	C. Alvin Paulsen
1992	Yves Clermont		

ASA LECTURE

*Formerly the Sero Lectureship before 2005; Renamed the
Emil Steinberger Memorial Lectureship after 2009*

2009	Blanche Capel
2008	Haifan Lin
2007	Rudolf Jaenisch
2006	John Aitken
2005	David Page

PAST ASA AWARDS

WHO AWARD

Sponsored by the World Health Organization

- 2012 Leping Ye
- 2010 Oluyemi Akinloye, Tang Yuxin, Marta Olszewska, Sara Marchiani, Arash Khaki
- 2009 Qing Yuan, Hui Wang, Marilia Patrao Sonja Gruenwald, Claire Borg

ASA UROLOGY AWARD

Sponsored by ASA

- 2008 Trinity Bivalaqua, Thomas Walsh

COOK UROLOGY AWARD

Sponsored by Cook Urological

- 2007 Cigdem Tanrikut, Thomas Walsh
- 2006 Shai Shefi
- 2005 Darius Paduch, Alan Shindel
- 2004 Kirk Lo, Yongbing Pu

SCSA DIAGNOSTIC CLINICAL AWARD

Sponsored by SCSA Diagnostics, Inc.

- 2007 Cristian O'Flaherty
- 2006 Sonja Gruenwald
- 2005 Tamer Said, Kalyana Nandipati
- 2004 Jeanne O'Brien, Rupesh Raina

CONCEPTION TECHNOLOGIES AWARDS

Sponsored by Conception Technologies

- 2009 Howard Kim

ASA Trainee Awards

**Outstanding Trainee Investigator
Research Excellence-Female Trainee
Trainee Merit Award
Thomas S.K. Chang Trainee Travel
Lonnie D. Russell Trainee Travel
International Trainee Travel**



Outstanding Trainee Investigator Award

This award is conferred upon anyone qualified to be a Trainee Member of the Society who, in the judgment of the Awards Committee, has presented at the Annual Meeting the best original laboratory or clinical research report in andrology. This award was known as the New Investigator Award from its inception in 1986 through 2004.

2015	Qi Fu	1996	Linda R. Johnson
2014	Andrew Midzak	1995	Michael A. Palladino
2013	Mary Samplaski	1995	Mehdi A. Akhondi
2012	Andrew Major	1994	John Kirby
2011	Matthew Marcello	1993	Robert Viger
2010	Michael Elliott	1992	Donna O. Bunch
2009	Catherine Itman	1991	Tracy L. Rankin
2008	Duangporn Jamsai	1990	Stuart E. Ravnik
2007	Steve Tardif	1989	Peter Grosser
2006	Liwei Huang	1988	Mark A. Hadley
2005	Tara Barton	1987	Peter S. Albertson
2004	Darius Paduch		Randall S. Zane
2003	Mustafa Faruk Usta	1986	Thomas T. Tarter
2002	Ebtesam Attaya		
2001	Alexander T.H. Wu		
2000	Jeffrey J. Lysiak		
1999	Jacques J. Tremblay		
1998	Dolores D. Mruk		
1997	Loren D. Walensky		
1996	Wei Gu		
	Daniel B. Rudolph		

Research Excellence Award to a Female Trainee

*Established by Dr. Anna Steinberger and
supported by Women in Andrology*

- 2015 Oceane Albert**
- 2014 Hanna Valli**
- 2013 Genevieve Plante**
- 2012 Anne Marie Downey**
- 2011 Sophie La Salle**
- 2010 Elizabeth Snyder**
- 2009 Claire Borg**
- 2008 Sarika Saraswati**
- 2007 Jenny Kaeding**
- 2006 Allison Gardner**
- 2005 Michaela Luconi**
- 2004 Cathryn Hogarth**
- 2003 Alexis Codrington**
- 2002 Constance Kersten**
- 2001 TanYa M. Gwathmey**
- 2000 Asha Jacob**
- 1999 Cynthia Christian**
- 1998 Dolores D. Mruk**
- 1997 Caroline M. Markey**

Trainee Merit Award

*Sponsored by the American Society of Andrology
These awards are conferred upon those individuals qualified to be Trainee Members of the Society who, in the judgment of the Awards Committee, have presented meritorious original laboratory or clinical research reports at the Annual Meeting*

2015 Brett Nixon	2007 Yue Jia	1999 Donnie M. Simmons
2015 Mickael Di-Luoffo	2007 Zaohua Huang	1999 Cynthia Christian
2015 Ross Anderson	2007 Evemie Dube	1999 Hewa B.S. Ariyaratne
2015 Mahmoud Aarabi	2006 Amelie Tetu	1999 Sero Andonian
2014 Keith Siklenka	2006 Polina Danshina	1998 Lance Walsh
2014 Clotilde Maurice	2006 Alexis Codrington	1998 Gayle Sutton
2014 Jason Kovac	2006 Tara Barton	1998 Yanhe Lue
2014 Mickael Di-Luoffo	2005 Zhibing Zhang	1998 Janice P. Evans
2013 Erick Silva	2005 Peter Liu	1998 Tonia Doerksen
2013 Mayra Miranda Rodrigues	2005 Hannah Galantino-Homer	1997 Andrea Wagenfeld
2013 Shu Ly Lim	2005 Mark Baker	1997 Jennifer McGaughy
2013 Linnea Anderson	2004 Sarah Netzel-Arnett	1997 Yauhe Lue
2012 Elizabeth Snyder	2004 Kirk Lo	1997 Renshan Ge
2012 Edward Nguyen	2004 Denise Holsberger	1997 Tonia Doerksen
2012 Matthew Marcello	2004 Laura Braydich-Stolle	
2012 Steven Mansell	2003 Steve Tardiff	
2011 Jun Zhang	2003 Alexis Codrington	
2011 Raifish Mendoza	2003 Haitham Badran	
2011 Adam Koppers	2002 Yuji Maeda	
2011 Carolina Jorgez	2002 Kathryn Jervis	
2010 Matthew Marcello	2002 Ian Fowler	
2010 Carolina Jorgez	2002 Johanna Barthelemy	
2010 Yue Jia	2001 Isabelle Therien	
2010 Shuo Han	2001 Lixin Feng	
2009 Bingfang Xu	2001 Mohamed A. Bedaiwy	
2009 Xuejiang Guo	2001 Ebtesam N. Attaya	
2009 Vinali Dias	2001 Sero Andonian	
2009 Mariano Buffone	2000 Venkatraman Sriraman	
2008 Chun Zhao	2000 Sadhana A. Samant	
2008 Matthew Marcello	2000 Eric Legault	
2008 Evemie Dube	2000 Stephane Lefrancois	
2008 Trinity Bivalaqua	2000 H. Habermann	
2007 Matthew Marcello	1999 Emma Kristine Steele	

Thomas S.K. Chang Trainee Travel Award

2015	Shy Ly Lim		María Belén Herrero
2014	Keith Siklenka		Phuong N. Huynh
2013	Shaye Lewis		Stephane Lefrancois
2012	Matthew Marcello		Jeffrey J. Lysiak
2011	Katya Rubinow		Amy L. Way
2010	Michael Elliott	1999	Trinity J. Bivalacqua
2009	Avenel Joseph		Kam Chan
2008	Matthew Marcello		Dave L. Luttinen
2007	Shannon Whirledge		Dolores Mruk
2006	Alexis Codrington		Anjali Redkar
2005	Ekaterina Zubkova		Yuming Si
2004	Darius Paduch	1998	Sandra Esteves
2003	Carin Hopps		Rachel Moreland
	Mustafa Usta		Dolores Mruk
2001	Yuris Erenpreiss		Brett Nixon
	Michaela Luconi		Budhan Pukazhenth
2000	Sero Andonian	1997	Francesca Griffin
	Trinity J. Bivalacqua		Michaela Luconi
	Donna O'Dell Bunch		Dolores Mruk

Lonnie D. Russell Travel Award

2015	Elizabeth Snyder, PhD (Mentor: Robert Braun)	2010	Matthew Marcello (Mentor: Janice Evans)
2014	Tegan Smith, Hanna Valli (Mentors: Nicolas Da Silva, Kyle Orwing)	2009	Petrice Brown (Mentor: Patricia Morris)
2013	Akanksha Mehta (Mentor: Darius Paduch)	2008	Katja Wolski (Mentor: Moira O'Bryan)
2012	Yue Jia (Mentor: Ronald S. Swerdloff)	2007	Zaohua Huang (Mentor: Deborah O'Brien)
2011	Jun Zhang (Mentor: Jeffrey Lysiak)	2006	Polina Danshina (Mentor: Deborah O'Brien)

International Trainee Travel Award

Sponsored by the Lalor Foundation

- | | | | |
|------|--|------|---|
| 2015 | Duangporn Jamsai
Lin qi
Indrashis Bhattachsarya
Sandhya Ananad
Linxi Li
Paula Intasqui
Marwa Ahmed | 2009 | Seppan Prakash
Jorge Farias
Catherine Itman
Duangporn Jamsai
Sundararajan Venkatesh |
| 2014 | David Fleck
Jing Wang
Joshi Chetanchandra
Monis Bilal Shamsi
Xiao Gu | 2008 | Oluyemi Akinloye
Alexandra Amaral
Julieta A. Maldera
Seppan Prakash
Natasha Zamudio
Chun Zhao
Hong-yu Zhou |
| 2013 | Alexandra Amaral
Elisabetta Baldi
Shuly Lim
Mayra Miranda Rodrigues
Goran Ronquist
Durgesh K. Singh
Panagiota Tsounapi
Haifeng Wang | 2007 | Hui Zhu
Nicolas Garrido
Debora Cohen
Seppan Prakash
Chen Xu
Jose Luis Fernandez
Sonja Grunewald |
| 2012 | Catherine Itman
Yu Xiao
Camilla Ribeiro
Seppan Prakash
Maria Agustina Battistone
Vyacheslav Chernykh | 2006 | Cristina Jimenez-Gonzalez
Brett Nixon
Debora Cohen
Menno van Leeuwen
Guo-rong Chen
Hiroshi Harayama
Monika Fraczek |
| 2011 | Juan Ernesto
Neil Youngson
Hassan Bakos
Wardah Alasmari
Vyacheslav Chernykh
Francisco Rivera
Prakash Seppan
Emma Holmes
Marcos Meseguer Carlos Souza | 2005 | Mark Baker
Michaela Luconi
Yasuhiro Matsuoka
Natalia Rozwadowska
Tetsuo Hayashi
Katja Wolski
Geng-Long Hsu
Chen Xu |
| 2010 | Peter Liu
Sundararajan Venkatesh
Xiao-Heng Li
Marcos Meseguer
Lei Zhang | 2004 | Dolores Busso
Claire Kennedy |

History of ASA Publications

7

Journal of Andrology

Andrology

Handbook of Andrology

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HISTORY OF THE JOURNAL OF ANDROLOGY

First Editor of *J. Andrology* 1980:
Andrzej Bartke, Ph.D.

First Editors of *Andrology* 2013:
Douglas T. Carrell
Ewa Rajpert-De Meyts



Erv Goldberg's
collection

Journal of Andrology

1980; Volume 1 / Number 1

Message from the President

The American Society of Andrology was formed in 1975. Only five years later, the *Journal of Andrology* has come into existence as an expression of the efforts of individuals in this field. We believe that the Journal will be an important source of information for all investigators and clinicians interested in male reproduction.

In recent years, andrology has been a rapidly expanding area of scientific inquiry and now includes the clinical and experimental aspects of such areas as animal husbandry, biochemistry, developmental genetics, endocrinology, family planning, histology, immunology, molecular biology, pathology, pediatrics, pharmacology, physiology, psychology, and urology.

One may object to specialized journals because they restrict exchanges of ideas across interdisciplinary lines. However, we believe that the Journal will expose a diversity of investigators to new basic and applied research on normal and pathologic reproductive processes as well as on the regulation of fertility. We hope that the Journal

will provide a forum for the presentation of data on comparative aspects, clinical applications, current methods, differential diagnoses, and safe therapeutic approaches to the problems of male infertility and fertility.

The willingness of members of the Editorial Board and Dr. Andrzej Bartke, Editor, to accept the additional responsibility of publishing a scientific journal is evidence of our members' commitment. Many other individuals, too numerous to name, have generously worked toward the actualization of this journal. I wish to thank them on behalf of the Society. Dr. Eugenia Rosemberg, Chairman of the Publication Committee, deserves special recognition for her tireless efforts.

Let us all work together to make this an excellent journal. Your participation in this venture, through manuscripts and comments, is welcomed.

NANCY J. ALEXANDER, *President*
The American Society of Andrology

Early Years of the Journal of Andrology

Andrzej Bartke
2002

From the time when the American Society of Andrology (ASA) first came into existence, there were debates about creation of a specialty journal. Some members of the council and the Society felt that a U.S. andrological journal would be important for the development of the field of Andrology in North America. Others, including myself, felt that the field of andrology was too small to support yet another Journal in this field. It was argued that rather than creating a new journal, ASA should become co-sponsor of the International Journal of Andrology, which was published in Europe. However, in 1978 when the ASA Council decided to launch a new journal and offered me a chance to be its first editor, I accepted this challenge. The Publication Committee chaired by Dr. Eugenia Rosenberg negotiated a contract with Lippincott Co. and the *Journal of Andrology* was born.

The first editorial board consisted of Drs:

Nancy J Alexander
Rupert P Amann
Richard D. Amelar
Rudi Ansabacher
Marie-Claire Orgebin-Crist
C. Alvin Paulsen
Kenneth L. Polskoski
Eugenia Rosenberg
Martin Dym
Stuart S. Howards
Fernand Labrie
Thomas J Lobl
Richard J Sherins
Emil Steinberger
Philip Troen.

I selected this group hoping that these prominent figures in the field of Andrology would be reassuring to prospective authors.

Most members of the Council appeared very confident that the journal would be successful. However, there was also a tangible feeling of concern and suspense. Would we receive enough manuscripts to allow timely publication of scheduled issues? Would the manuscripts be of high quality? I knew Dr. Frank Comhaire, editor of the *International Journal of Andrology*, through a common interest in distribution of testosterone in different compartments of the testes. We both felt strongly that neither of us would consider doing anything to undermine the activities of the other journal, and thus our 'competition' was friendly from the very beginning.

The first issue appeared in January 1980. It consisted of papers provided by members of the Council and the Editorial Board, or submitted in response to our solicitations. Support provided by Society officers and Editorial Board members continued to be very important during the first years of the existence of the journal, but naturally, our success hinged on submission of manuscripts from outside this small group. I sent many letters to members of ASA and others soliciting manuscripts for the Journal of Andrology. These included many individuals whom I was able to "sign is" as members a few years earlier when ASA was created and I took on chairmanship of the Membership Committee. Although manuscripts initially trickled in at a fairly low rate, it was very clear to all of us that the journal would not succeed if we did not maintain high standards of peer review and acceptance. I vividly remember the task of composing rejection letters that would hopefully not offend the authors or discourage them from submitting other manuscripts to the Journal.

We quickly developed a list of reliable reviewers. Those who were tardy and unresponsive to reminders will never know that they may have received a "black testis award" initiated by Lynn Rudloff, Editorial Assistant, duly marked on their index card in our address file.

I had a great deal to learn, including some technical aspects of journal production. We enjoyed excellent working relationship with Lippincott. On several occasions, when the number of accepted manuscripts was particularly low, I had to find out from Lippincott what was the "real," i.e. the absolute rather than our standard deadline for assuring that the new issue of the journal would appear on time.



Early Years of the *Journal of Andrology*

First Editor's Memoir

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Looking back at this exciting period, it is difficult not to be amazed by how much everything has changed since the early days of the *Journal*. Did the editorial office really function without e-mail and Fax? Many younger members of ASA might find it hard to believe when our journal was started, microsurgery of the male reproductive system was an exciting novelty, research on inhibin was considered controversial, automatic systems from analysis of sperm motility were yet to be developed, and if anyone had the foresight to contemplate the use of intracytoplasmic sperm injection, it certainly would have been labeled science fiction.

Gradually, the *Journal of Andrology* found its niche and a group of loyal supporters. We were certainly helped by the decision of the Institute for Scientific Information to include us in "Current Contents" almost from the start. Happily, our citation index quickly placed us at the top of the list of andrology journals.

In 1983, I resigned from the editorship because of election to vice-presidency of the ASA. In the hands of my successor, Dr Marie-Claire Orgebin-Crist, the *Journal of Andrology* grew in size, quality, and prestige, a trend that continues to this day.

Andrzej Bartke
Department of Physiology
Southern Illinois University
School of Medicine
Springfield, Illinois



**Special Section: Commemorating
the *Journal of Andrology's*
Distinguished History**



**Parting Messages From Current and
Former Editors of the *Journal of Andrology*
(*just the first and last printed here*)**

First Editor's Memoir

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Andrzej Bartke, Editor-in-Chief, 1980-83

Last Word

In 2007, it was our turn to take responsibility for the editorship of the *Journal*. We came aboard as 3 co-editors-in-chief, a new arrangement for the *Journal*, which had continued to grow in size and activity....Among our most honored rewards in service to the *Journal* was the continual interaction we had with Marvin Meistrich, chairperson of the ASA Publications and Communications Committee....He contributed as much to the success of the *Journal* during our tenure, as he did through his work to create the new journal, *Andrology*, which was considerable....Looking back over the history of the *Journal*, we are pleased to have seen a steady increase in its ISI impact factor, which was 3.14 in 2011....As we pass the baton to Doug Carrell and Ewa Rajpert de Meyts, editors-in-chief of *Andrology*, we wish for them the same rewards and satisfaction that we have enjoyed working together in trust for the *Journal of Andrology*.

Arthur L. (Bud) Burnett, Sally P. Darney,
Jay Sandlow
Co-Editors-in-Chief, 2007-12

Editorial

“ANDROLOGY”—The New Journal of the American Society of Andrology and the European Academy of Andrology

This article will be jointly published in the *Journal of Andrology* and the *International Journal of Andrology*.

Andrology and in profits and losses from journal revenues and expenses.

History

Andrology is the study of health issues specific to males, with a focus on basic aspects of their reproductive system (gonads, endocrine, and accessory organs), and diagnosis and treatment of medical problems associated with infertility, sexual dysfunction, and urological problems. In medicine, the development of Andrology as a specific specialty is rather recent; it had often been considered a subspecialty of urology or endocrinology. The field of Andrology, emerging over the past 40 years, has produced several specialty journals covering both the basic scientific and clinical areas. The *International Journal of Andrology* (IJA) began publication in 1978 and became the official journal of the European Academy of Andrology (EAA) in 1992. The American Society of Andrology (ASA) launched the *Journal of Andrology* (JA) in 1980. These 2 journals have been the leading journals in the field of Andrology, with current impact factors of 3.6 (IJA) and 3.1 (JA).

Merger

Andrology remains a small and specialized field, and the size of both journals has been modest, each publishing about 600 pages per year. With the goal of increasing the visibility, impact, and prominence of both journals, and to better promote the field of Andrology, the EAA and ASA have decided jointly to create a single, even more prominent journal, *Andrology*. The international spirit of cooperation between the 2 societies and the enhanced availability of worldwide electronic communication has made it possible to jointly publish this new journal. The 2 societies will share equally in the management and editorial decisions of

Transition Period: *Journal of Andrology* and the *International Journal of Andrology*

The 2 original journals will actively continue to publish throughout 2012, with the last issues being published as November/December 2012 issues. New papers submitted to these journals will be accepted for review through March 31, 2012. We encourage members of the 2 societies to continue to send their best work to JA or IJA so that we can keep the journals strong as we go into the merger. It is possible that some papers submitted to the original journals that need to be sent back to authors for significant revisions might not be accepted in time. If they are accepted later, they will appear in *Andrology*. Starting in late 2012, the back issues of both JA and IJA will be hosted on-line at the Wiley Online Library.

Andrology

The EAA and ASA are pleased to announce that a contract has been signed with Wiley-Blackwell, publisher of the IJA, for publication of *Andrology*. The journal will be published both in print and on-line, bimonthly, with accepted articles published on-line shortly after acceptance. We believe that there will be cost savings to both societies by eliminating duplications of effort in publishing and that the merged journal will result in increased profitability and income for the benefit of both societies. Ewa Rajpert-De Meyts, MD, PhD, of the Rigshospitalet of Copenhagen University, and Douglas Carrell, PhD, HCLD, of the University of Utah Medical School, have been chosen as Co-Editors-in-Chief. Members of the ASA (including trainees) and EAA will receive on-line subscriptions to *Andrology* with print subscriptions available at a modest extra charge. The greater distribution of the new journal will be a benefit

to authors; also, society members will now have access to the content that would have been in separate journals.

We believe that this larger, merged journal can more effectively compete with other journals and attract better articles. This more prominent journal should increase the prestige of the discipline of Andrology. *Andrology* will continue to publish basic, translational, clinical, and epidemiological research in andrology and will include all topics emphasized in both of the original journals. These include, among other areas, hormonal regulation, spermatogenesis, reproductive tract, accessory sex organs and external genitalia, sperm function and quality, prostate diseases including cancer, and male sexual physiology. Studies using mammalian and nonmammalian model systems and molecular and cellular investigations to understand male reproductive health and function in humans and important animal species will be considered. In addition, guidelines in clinical andrology and andrology laboratory science, as well as ASA and EAA society information, will appear in *Andrology*.

Impact Factor

Journal impact factors are published annually (June of each year) by the Institute for Scientific Information (ISI) in Thomson Reuters Journal Citation Reports. Although it will take several years for *Andrology* to fully establish its own impact factor, the combined impact factor of IJA and JA and *Andrology* can be computed to obtain an Impact Factor that authors can use to document the Impact of the Journal in which they are publishing. The June 2014 ISI Impact Factor report will list IJA and JA separately and represent the number of citations in 2013 to articles in the journals in 2011 and 2012 divided by the number of articles published in those 2 years; the numerators and denominators can be easily combined to calculate an overall impact for the 2 original journals. The 2015 ISI impact factor will list IJA, JA, and *Andrology*. For IJA and JA, the number will represent the citations in 2014 to articles published in 2012 divided

by the number of articles published in that 1 year; for *Andrology* the impact factor will represent citations in 2014 to articles published in 2013 divided by the number of articles published in that 1 year. Again, an overall impact factor can be calculated by combining all 3 numerators and denominators. Thus, an effective impact factor of the original and merged journals can be obtained during the transition. From 2016 onward, only the impact factor of the new journal *Andrology* will appear in the ISI database. Based on our goals for the merged journal, strong support of ASA and EAA for the merger, and an outstanding Editorial and Publishing team, we expect the eventual impact factor of *Andrology* to surpass those previously achieved by JA and IJA.

Launch

The first issue of *Andrology* will be published in January 2013. A submission site using the ScholarOne Manuscripts on-line submission and peer review system will be open at the start of April 2012 for submission of new manuscripts of original research in andrology. The Editors will be soliciting potentially outstanding review articles, and individuals with suggestions for reviews should contact one of the Editors-in-Chief. We encourage ASA and EAA members to support the launch of *Andrology* by submitting their best papers, especially during these most important first several years of the journal.

Marvin L. Meistrich

*Department of Experimental Radiation Oncology
University of Texas MD Anderson Cancer Center
Houston, Texas*

Ilpo T. Huhtaniemi

*Department of Reproductive Biology
Imperial College London, United Kingdom*

Co-Chairs of Journal Oversight Committee for Andrology

Special Section: Commemorating the *Journal of Andrology's* Distinguished History

Editorial

We hope you will enjoy this special commemorative section of the *Journal of Andrology's* final issue. It opens with an article written by all previous and current editors-in-chief to provide highlights of the *Journal's* history for each editorship, and thereby show how the field and the *Journal* progressed over time. We tried to convey our collective perspectives on the editors' roles in building an outstanding *Journal* and working with authors to ensure scientific credibility and integrity. Next, we provide a series of reviews selected to represent some "hot-button" research areas that have emerged in both the basic science and clinical practice of andrology during the lifespan of the *Journal of Andrology*, and that we expect to continue to motivate research in the future. We invited several notables of the American Society of Andrology (ASA) to write about them. Rather than writing exhaustive reviews, we asked these scientists to capture the major breakthroughs made to date in addressing the area, using a limited number of seminal references, and then to

pose critical unanswered questions that await andrologists to resolve in the future. These reviews span the field to include the principles of genetics in male fertility, the scope of study of spermatogonia, the role of reactive oxygen species in sperm function, the evolution of erectile dysfunction management, and the scientific nexus of aging and declining testosterone. Finally, we invited Marvin Meistrich, chair of ASA's Publications Committee, and Douglas Carrell, North American co-editor of *Andrology*, to combine in relating the story of how the *Journal of Andrology* and the *International Journal of Andrology* have come together and introducing the visions and goals for our new bigger and better journal.

Arthur L. (Bud) Burnett, MD
Sally P. Darney, PhD
Jay Sandlow, MD
Co-Editors-in-Chief

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Parting Messages From Current and Former Editors of the *Journal of Andrology*

Editorial

The proposal to produce this final commemorative issue for the *Journal of Andrology* arose during our regular discussions as current editors soon after it was announced that the *Journal* would complete its own life course and merge into a new publication (to be named *Andrology*) with the *International Journal of Andrology*. We considered the momentous occasion to be one that should be celebrated with an enduring tribute in recognition of the *Journal's* exceptional 33-year existence. Among the various contributions sought for inclusion in this issue, we envisioned an article assembling collected short essays from all living former editors drawing on notable events and highlights, if not less well-known challenges and successes arising during their editorship eras. We thought that any such production of musings, viewpoints, and most of all words of wisdom from those who have had major roles in the direction and accomplishments of the *Journal* would offer an illuminating read for the society's members and friends and provide all readers another venue to share in and enjoy the *Journal's* great history.

We are enthralled to have gathered these collections, all personal compositions of the former editors-in-chief, and for their effort that has helped us complete this special endeavor we express to them our tremendous gratitude. Serving as the *Journal's* last editors, we are also grateful to contribute our essay at the very end as part of this joyous chronicle.

First Editor's Memoir

From the time that the American Society of Andrology (ASA) first came into existence, there were debates about creation of a specialty journal. Some members of the council and society felt that a US andrological journal would be important for the development of the field of andrology in North America. Others, including myself, felt that the field of andrology was too small to support yet another journal in this field. It was argued that rather than creating a new journal, ASA should become cosponsor of the *International Journal of Andrology*, which was published in Europe. However, in 1978 when the ASA Council decided to launch a new journal and offered me a chance to be its first editor, I accepted this challenge.

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I had a great deal to learn, including some technical aspects of journal production. We enjoyed an excellent working relationship with Lippincott. On several occasions, when the number of accepted manuscripts was particularly low, I had to find out from Lippincott what the "real" (ie, the absolute rather than our standard) deadline was for assuring that the new issue of the *Journal* would appear on time.

Looking back at this exciting period, it is difficult not to be amazed by how much everything has changed since the early days of the *Journal*. Did the editorial office really function without e-mail and fax? Many younger members of the ASA might find it hard to believe that when our *Journal* was started, microsurgery was an exciting novelty, research on inhibin was considered controversial, automatic systems for analysis of sperm motility were yet to be developed, and if anyone had the foresight to contemplate the use of intracytoplasmic sperm injection, it certainly would have been labeled science fiction.

Gradually, the *Journal of Andrology* found its niche and a group of loyal supporters. We were certainly helped by the decision of the Institute for Scientific Information (ISI) to include us in "Current Contents" almost from the start. Happily, our citation index quickly placed us at the top of the list of andrology journals.

Excerpts presented with permission; Bartke, 2004.

Andrzej Bartke
Departments of Physiology and Internal Medicine
Southern Illinois University School of Medicine
Springfield, Illinois
Editor-in-Chief, 1980–83

The Early Years

The *Journal of Andrology* first appeared in January 1980, 5 years after the ASA was founded with 179 charter members. The wisdom of creating a new journal was vigorously debated by council. The assets of the society were only \$20,042 as of December 1979, but a poll of the membership indicated that 59.6% of the members wanted the ASA to have its own journal.

Dr Bartke accepted the daunting challenge to become its first editor-in-chief. In 1982 he was elected vice president of the society and announced that, at the completion of his 3-year term as editor, he could not be reappointed for a second 3-year term. I was very sorry that he could not continue to guide the growth of the *Journal* because he had done so much to get it off the ground.

I was asked to be the second editor of the *Journal of Andrology*. Honestly, looking back, I do not know why I accepted this task: the membership had grown from 179 in 1975 to 500 in 1983, but the number of manuscripts submitted between 1980 and 1983 hovered around 80, the finances of the society were tight, and this conditioned the terms of the contract with the Lippincott Publishing Company. However, I agreed with Andy Bartke that the *Journal of Andrology* was important for the society and that “the contents of the *Journal* were critical to its future success.” I accepted the challenge, hoping that I would not destroy what Andy had already achieved and with one goal in mind: insure the credibility of the *Journal* by publishing papers of high quality.

Dr Benjamin Danzo agreed to serve as associate editor, and we served a first 3-year term from 1983 to 1985 and were reappointed for a second 3-year term from 1985 to 1988. After that, council probably felt that it was too cumbersome to change editorial offices after a 3-year term and adopted a nonrenewable 5-year term for all subsequent editors. During our tenure the number of manuscripts received increased from 84 in 1983 to 110 in 1987. The rejection rate from 1983 to 1988 ranged from 32% to 55%, averaging 43%. The ISI citation index for the *Journal of Andrology* was 2.2 for papers published in 1987 and 2.17 for papers published in 1988.

There were problems, of course. The percentage of human-related manuscripts received in 1983 and 1984 was 49% and 40%, respectively. The council felt that a

clinical associate editor should be appointed to clearly send the message that the ASA encompasses both basic and clinical studies. I agreed and Dr Spyros Pavlou was appointed associate editor in 1986. This policy has been maintained to this day.

A worrisome aspect of publication was the length of time between reception of a manuscript and publication. It grew from 8.3 months in 1983 to 12.5 months in 1988. There were several reasons for this: There were only 6 issues published per year; the number of pages negotiated in the initial contract with Lippincott (400) was based on an estimation, a good estimation because the number of pages published in 1980, 1981, and 1982 were 320, 370, and 416, respectively. Although at the beginning sending an issue to the publisher required a leap in faith because I did not know if we would have enough accepted manuscripts for the next issue, soon there was a backlog of manuscripts. When the contract with the publisher was renegotiated in 1983, the number of contracted pages was increased to 448. At first this solved the problem, but as the membership grew to 698 and the number of manuscripts increased to 110, the backlog crept up again. In the initial contract Lippincott had agreed to cover the losses of the *Journal* in the first 3 years, but by the time the *Journal* moved to Vanderbilt, it was imperative that the *Journal* be solvent. Keeping in mind that pages contracted but not used would still be charged to the society, it was a difficult task for the Publication Committee to predict the number of pages needed for the next 4 years. Although in 1986 32 more pages were negotiated, we ended in 1988 with a backlog of 2 issues. This, of course, was unacceptable and it was solved by negotiating a new contract and increasing the number of contracted pages to about 900. Balancing the number of manuscripts with the number of contracted pages was the most frustrating aspect of my tenure as editor-in-chief.

During our tenure, we were confronted with several thorny ethical issues. With advice from the Publication Committee and the Officers of the Society, we tried to resolve each issue as fairly as possible. I was glad that in 1988 in consultation with the Publication Committee Guidelines for Ethical Standards were adopted for the *Journal of Andrology*.

Finally, I was very concerned with the fact that I was operating as editor-in-chief without liability insurance covering the society and the *Journal*. This was brought to the attention of the council in 1983 and figured as new business in each council meeting until 1988. It was slightly unnerving.

Looking back on these 6 years, I am grateful to the associate editors, Drs Benjamin Danzo and Spyros Pavlou; the editorial assistant, Carol Walter; the chairs of the Publication Committee, Drs Martin Dym, Anita Hoffer, and David Hamilton; and the officers of the

society. This was clearly a collective effort. Personally, I was pleased to see the ISI citation index at 2.2 in 1987. This was higher than all other andrology journals as well as the *Journal of Reproduction and Fertility*, and slightly lower than *Fertility and Sterility* (2.35) and *Biology of Reproduction* (2.3). To achieve this in a short 8 years was certainly what I was most proud of. I felt that I had not let down Andy Bartke and the society that had entrusted me with the *Journal*.

Marie-Claire Orgebin-Crist
Center for Reproductive Biology Research
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Nashville, Tennessee
Editor-in-Chief, 1983–88

Bully for Andrology

The merger of the *Journal of Andrology* and the *International Journal of Andrology* into a single crosscutting publication presents an unprecedented opportunity to advance andrology as a discipline, promote investigative collaborations among andrologists, and augment the fiscal fitness of the editorial enterprise. From the standpoint of a former editor, it is gratifying to witness the commitment on the part of andrologists, European and American, to band together for the purpose of establishing a vehicle to publish important new findings across all aspects of basic and clinical andrology. The new journal sharpens the resolve of the founders of the European and American societies to publish manuscripts offering novel insights spanning all domains of andrology. The opportunity to disseminate scientific and clinical advances so widely through digital technologies promises to expand the boundaries of andrology and facilitate the application of basic and clinical advances to a far broader set of global constituents. Given the progress made in andrology over recent decades, few if any would be willing to predict the scale and scope of future advances made in this discipline. The new editors, nevertheless, have a substantial platform to extend the mechanistic integration of processes directing reproductive success, and ultimately improve the clinical outcome of patients suffering from reproductive disorders.

On a personal note, the opportunity to serve as editor of the *Journal of Andrology* provided a clinic for learning about the economic, ethical, legal, social, political, and scientific aspects of serving as proxy for the *Journal's* readers. Within the crucible of editorial responsibilities resides the reality that each manuscript embodies the sweat, blood, and tears of one or more authors whose promotion, tenure, compensation, and funding may rest

on an editorial decision. The task of providing for the fair, prompt, and thorough review of manuscripts coupled with the need for editorial adjudication, with reasoned suggestions for revision and clarification, provided a prism to view all facets of scientific scholarship.

If past is prologue, the new editors should prepare themselves to deal with scientific indiscretion (Jasny et al, 2011). The problems are not new, but they are unnerving to uncover and manage on one's editorial watch. The disturbing rise in the number of manuscripts retracted from journals, across all fields, serves to remind investigators, reviewers, and editors of the imperative that manuscripts contain scientific findings that are novel, replicable, and untainted by conflicts of interest (Cressey, 2012). Sustaining scientific progress and preserving the public trust requires vigilance on the part of all who obtain scientific data and publish their results.

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Bloomberg School of Public Health
Johns Hopkins University
Baltimore, Maryland
Editor-in-Chief, 1988–93

Expansion to Co-Editors-in-Chief, Reflection of the ASA

In 1993, we were very excited to take over the editorship of the *Journal of Andrology*. We knew that we had some big shoes to fill from the outstanding achievements of previous editors. We believed that having a basic scientist and a clinician as co-editors-in-chief would better reflect the strength of the ASA. We selected 3 associate editors to broaden the expertise of the *Journal* and expanded the editorial board to reflect the diverse disciplines of the society. Our tenure began with a new publisher, Allen Press. This self-publishing model with Allen Press as a printer and distributor instituted by the Publication Committee has provided an excellent example for other societies for managing a journal. Our new editorial assistant, Denise Lecy, attended a journal editorial seminar sponsored by Allen Press in preparation for this new process. Over the years, Ms Lecy attended all of our annual meetings in order to interact with and become familiar with the members. Ms Lecy proved her value to the *Journal* in many ways. Thus, we depended on her to ensure that the *Journal* met the high standards expected from the society.

Our initial goal was to introduce more rapid processing of papers and reviews. A computer software program was installed to track papers more efficiently. We instituted a

new section called Minireviews as an integral part of the *Journal*, and the first one appeared in the *Journal* in the September/October issue of 1993. In 1994, we introduced color photos on the cover of the *Journal* in order to enhance its appearance and to call attention to specific articles. This quickly evolved into a competition for selection to the cover spot. In 1994, we also published a unique supplement honoring Prof Alpay Kelami, a pioneer clinician in andrology. The idea of this supplement, which was paid for by industrial sponsors, came from one of our leading members, Arnold Belker. This was truly an international effort. It included cutting-edge procedures and science in the andrology field, many of which would later become standard procedures in our field.

With the decision of Dr Lewis to accept an offer as chief of urology at the Medical College of Georgia in late 1994, it was decided that we could maintain our service to the *Journal* as co–editors-in-chief by keeping the main office at Mayo Clinic in Rochester, Minnesota, but splitting the work effort and relying on e-mail communication and monthly conference calls. It worked perfectly for the remainder of our 5-year tenure. This was fully approved by the Publication Committee and the executive board of the society. In the July/August 1995 issue of the *Journal*, we introduced a new format for scientific interchange called Letters to the Editor, which included short, definitive reports of highly significant and timely findings in the field of andrology, striving for a rapid 10-week publication. The first such paper, by Stanley Meizel and Kenneth O. Turner, appeared in July/August 1996. In that same issue, we solicited the first Ethics Editorial, by Sandra Webb. In the March/April 1997 issue, we introduced the first Book Review, by Tom Abney, PhD.

In 1998, we turned over the editorial duties to David Hamilton and Jon Pryor who were just up the road in Minneapolis. We enjoyed our adventure as editors of this *Journal*. Both of us valued the ASA as the perfect blend of clinical and basic science. Friendships made there were lasting and mutually respectful. We always sought to bring innovation to the *Journal* in order to enhance its value for our members and the scientific community interested in all aspects of andrology. We thank the society for this opportunity and will value it always not only for the value to us for making our personal friendship stronger and lasting but for the chance for service to the ASA. Thanks for the memories.

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Don Tindall
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Co–Editors-In-Chief, 1993–97

Change is in the Air

David and I became co–editors-in-chief in 1997, following the Ron Lewis and Don Tindall era . . . big shoes to fill. Fortunately, Ron and Don got us off to a good start by spending hours going over what worked and did not work during their tenure. As we reflect back on the challenging yet rewarding 5 years as co-editors, there are several highlights that come to mind:

- Within the editorial office David and I decided to split editorial duties by reproductive site. So instead of one of us reviewing all manuscripts on the front end and the other doing editorial work on the back end, David worked on submissions regarding testis, sperm, and epididymis from submission to publication, and I did the same for the prostate and penis. The benefits of this change in workflow was if one of us was gone for any extended period of time, the other person knew the entire process from start to finish and could easily fill in.
- We changed the function of the editorial board from primary reviewers to advocates and advisors of the *Journal*. In addition, to improve the quality of the board, we revised the board member policy from an automatic 5-year term to renewable 1-year terms; we kept on the members who participated in a meaningful way and rotated out those who just wanted the title.
- Because we now were not using the board as extensively for reviewers, we worked hard to reach out to new reviewers, thinking that those who participated were more likely to submit manuscripts in the future.
- We added several new sections to the *Journal*: a Bioethics/Law Forum, Andrology Lab Corner, and Androlog online discussion.
- The net result of all of this is that the *Journal* nearly doubled in size during our tenure.
- There is one more significant focus of our tenure as co-editors– we worked extensively with the authors to get good articles that were not particularly well written ultimately accepted. It would have been easy to reject many of these manuscripts, but the science behind these selected manuscripts was of high quality. The extra effort required a lot of going back and forth with the authors, but both of us felt great pleasure seeing many of these articles in print. We

thank our editorial assistants, the editorial board, and all the authors who submitted articles that helped us take the *Journal* to the next level.

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Jon L. Pryor
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 Milwaukee, Wisconsin

Co-Editors-in-Chief, 1997–2002

The Penultimate Journey

The *Journal* moved to the Big Apple in 2002, making the Population Council and Weill Cornell Medical College its new home. Matt and I were ecstatic to continue the tradition of co-editors from basic and clinical backgrounds to the *Journal*. If we were to recognize what changes the next 5 years would make in our lives, I'm not sure we would have been so excited.

At the time the *Journal* moved to New York, we were primarily buried in paperwork (old manuscripts, reviews of manuscripts, etc) that was completely gone by the time our editorship ended. Certainly, the entire publishing business was changing dramatically—to the point where I don't think any of us were certain that paper journals as we knew them would continue to exist in the future. When the *Journal of Andrology* left the University of Minnesota and Jon and David's capable hands, the FedEx budget for processing reviews and manuscripts alone would have dwarfed our editorial office budget. We were grateful to Jennifer Bellask for coordinating our initial shift to electronic communication with authors that was completed with the transfer of physical office activities to Jansen Editorial Services and HighWire Press' manuscript tracking system. The input of the Publication Committee, Drs Bernard Robaire and Marvin Meistrich, was instrumental in facilitating these changes—as daunting as they initially seemed to be.

We began the difficult job of balancing the new sections of the *Journal* with the core, peer-reviewed manuscripts. We loved the sections of the *Journal* introduced by the prior co-editors that brought new perspectives: Andrology Lab Corner (a site for new techniques & lab-oriented insights), Androlog Summary (an overview of the very active Androlog Listserv so ably coordinated by Andy Meacham and Craig Niederberger), and Bioethics and Law Forum (a wide-ranging set of discussions relevant to andrology that Susan Benal

Kerr brought new insights to), as well as reviews and minireviews that are critical to the reputation of the *Journal*. We shared with prior and subsequent editors the challenges of getting an adequate number of able reviewers for manuscripts in the relatively small field of andrology, as well as the delight of supporting a journal that provided a critically important niche in our field.

The challenges of editorship were compounded when I was named chair of urology at Cornell; Matt carried the challenges well as co-editor, demonstrating great flexibility of scheduling and extended sharing of duties. Never once did Matt complain of having to take on a broader role, and it was his work that allowed the *Journal* to grow in quality of manuscripts published during this time. A major emphasis of this time was to increase the number of scientifically sound but clinically relevant papers, especially those with a focus on the genetics of male infertility. We were pleased at the number and quality of those papers that were published, but sadly also realized that impact factor ratings were driven more by review papers than solid peer-reviewed manuscripts.

Sadly, Matt passed away as our tenure as editors was completed, an untimely death that brought a tremendous amount of sadness to all of us, and a great loss to our field of andrology. A talented researcher and a dynamic, thoughtful investigator with boundless enthusiasm for teaching, life, and love for his wife, Dianne, the loss of Matt stunned us in ways that could not have been predicted. His loss will be forever commemorated at Weill Cornell Medical College by the Matthew P. Hardy Distinguished Professorship, an endowed chair currently occupied by Dr Marc Goldstein, his close friend and colleague. We still miss him tremendously.

Peter N. Schlegel
 Matthew P. Hardy¹
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 Weill Cornell Medical College
 and Center for Biomedical Research
 The Population Council
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Co-Editors-in-Chief, 2002–07

Last Word

In 2007, it was our turn to take responsibility for the editorship of the *Journal*. We came aboard as 3 co-editors-in-chief, a new arrangement for the *Journal*, which

¹ Deceased.

had continued to grow in size and activity. We distributed responsibilities to a large extent based upon each of our areas of academic expertise for reviewing manuscripts and steering them through the manuscript review process, Bud handling sexual medicine and prostate diseases both at basic science and clinical levels, Sally handling andrological basic science broadly, and Jay handling male reproductive medicine and andrological clinical science. Our collective position also took on a new dimension resonant with the modern era of electronic communication and publishing. Although each of us was geographically situated in different cities (Baltimore, Research Triangle Park, and Milwaukee), we worked together in a virtual editors' office. Regular teleconferences, now fashionable in the conduct of journalistic business, enabled us to discuss editorial issues, including several very interesting publication ethics questions.

Among our most honored rewards in service to the *Journal* was the continual interaction we had with Marvin Meistrich, chairperson of the ASA Publications and Communications Committee. From the start, Marv was actively engaged in our monthly conference calls. Much of our effectiveness is owed to his boundless energy in exchanging ideas, offering guidance, and constantly executing necessary chores that assisted greatly in our editor roles. He contributed as much to the success of the *Journal* during our tenure, as he did through his work to create the new journal, *Andrology*, which was considerable. Together with input from Marv, the Publications and Communications Committee, and our editorial board, we also implemented new procedures and policies surrounding manuscript submission, review processing, and peer review, which heightened the efficiency, transparency, and accuracy of these activities.

Much as our predecessors had done, as editors we strived for excellence and quality in the *Journal*, a foremost objective to preserve its high impact and recognition. Looking back over the history of the *Journal*, we are pleased to have seen a steady increase in its ISI impact factor, which was 3.14 in 2011. During our tenure, we maintained its breadth of content, welcoming research articles that represented all areas of andrology laboratory science, clinical and epidemiologic studies, reproductive genetics and endocrinology, sperm biology and assisted reproduction, and spermatogenesis and male reproduction. We maintained the *Journal's* special sections and beyond research articles sought to include case reports, andrology lab corner submissions, memorials and perspectives, and editorials. We expanded its features as well, such as soliciting more scholarly review articles, including those based on presentations at

the ASA annual meeting. We also published a number of special editions, which will serve as lasting resources in the field, including Proceedings of the 2008 ASA Workshop, "Therapeutic Strategies for Male Sexual and Hormonal Health" (Burnett, 2009); Proceedings of the 2009 XXth North American Testis Workshop, "Testicular Function: Levels of Regulation" (McCarry and Eddy, 2010); and Proceedings of the 2011 Fifth International Conference on the Epididymis, "The Epididymis: Present Progress, Future Directions" (Avellar and Cuasnicu, 2011).

As expressed by the other editors, we enjoyed experiencing the progression of andrological science firsthand over the 5 years of our term. At the same time, we also learned a lot about the ever-changing publications field. Judy Jansen and her staff in Jansen Editorial Services continued to provide us with timely input and editorial support, beginning with training us in the efficient use of the Benchpress software for manuscript processing. Their oversight helped us operate effectively as "virtual editors" across time and space. We also greatly appreciate Kristen Anderson and the staff at Allen Press, who help ensure optimal organization of content within each issue, meaningful cover graphics, and timely production of each issue. These many behind-the-scenes activities all contributed to the excellence of our *Journal*.

Scientific credibility depends heavily upon critical and constructive peer review. Our editorial board members and ad hoc reviewers were the heroes here. They ranged from young "hotshots" in the field to established investigators who helped ensure appropriate attribution of ideas to the pioneers in the field. They took time from their own professional activities to help colleagues and the *Journal* to succeed. We acknowledged their invaluable input individually in the final issue of each volume.

Finally, we offer a take-home message for authors. The papers that fly through peer review are those that convey a very clear and compelling rationale up front, and conclude with how this new information will advance the field of andrology by offering new or improved methodology, by elucidating our understanding of basic biology, and/or by advancing clinical practice. We had no trouble finding good reviewers for such papers, which are exciting to read and relatively easy to critique. We have enjoyed working with all authors and hope each of you will continue to submit your best research findings to *Andrology*.

As we pass the baton to Doug Carrell and Ewa Rajpert de Meyts, editors-in-chief of *Andrology*, we wish for them the same rewards and satisfaction that we have enjoyed working together in trust for the *Journal of Andrology*.

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Co-Editors-in-Chief, 2007–12

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Evolution of the *Journal of Andrology* and a Bright Future for *Andrology*

Editorial

Historical Perspective

In the 1970s andrology really emerged as a specific discipline. The American Society of Andrology (ASA) was founded in 1975. In 1978, under the guidance of Dr Rune Eliasson, publication of the *International Journal of Andrology* was initiated, and in 1992 it became the official journal of the European Academy of Andrology (EAA). In 1980, the ASA began publication of the *Journal of Andrology* under the editorship of Dr Andrzej Bartke (Burnett et al, 2012). In addition to these, 3 other journals specifically devoted to andrology are also currently published.

Andrology originally was a branch of medicine treating health issues specific to males with a focus on their reproductive system, and included studies of the gonadal, endocrine, and accessory organ systems, and diagnosis and treatment of medical conditions related to fertility, sexual function, and the urogenital system. The ASA has taken a broad view and has promoted and supported basic research on model organisms that leads to an understanding of the mechanisms underlying these systems. In addition, there are parallels between research applicable to human fertility and the reproduction of animal species important for economic or conservation purposes; significant publications in these areas are also included in the *Journal of Andrology*.

Since 1980, there have been huge advances in biomedical science in general, and in aspects that particularly apply to andrology. Molecular biology and genome sequencing has led to the knowledge of genes that affect the development of the reproductive organs, male fertility, and disorders of the reproductive system. The addition of in vitro fertilization (IVF) and intracytoplasmic sperm injection (ICSI) to the repertoire of assisted reproductive technologies (ART) has overcome major barriers to male infertility. Although they have diminished the importance of andrology research in aspects of sperm characteristics related to fertilizing ability, such as motility, because they bypass the natural barriers, the widespread use of such techniques has

increased the need for andrology lab facilities as a component of such procedures and spawned research into genetic and epigenetic consequences of eliminating this natural selection process.

Major Contributions of Papers in Journal of Andrology

Examination of papers with high citation rates in the *Journal of Andrology* over the life of the journal provides a measure of the areas to which the journal has made significant contributions to the field of andrology (Table). Some of those areas may have had more impact on the development of the field of andrology over the past 32 years and others are very highly relevant to current and future issues in andrology. Although this list does not cover all the areas of contribution of the journal to the progress in andrology, and citation rates do not always give a full measure of the impact of articles, this selection nevertheless highlights areas in which the *Journal of Andrology* has published numerous significant studies and reviews, and honors the contributions of the authors.

Oxidative Stress in Testis and Spermatozoa—Papers in the area of oxidative stress in spermatozoa and also in testes were in general the most highly cited (Alvarez et al, 1987; Aitken and Clarkson, 1988; de Lamirande and Gagnon, 1992; Saleh and Agarwal, 2002; Turner and Lysiak, 2008). The studies in the *Journal of Andrology* defined mechanisms and emphasized the relationship between the generation of reactive oxygen species in the testis and sperm with infertility. Modulating reactive oxygen species generation offers the hope of improving testicular function and semen quality. Currently there is much activity in using relatively common oral, readily available antioxidant therapies for treatment of male infertility, both for the purpose of achieving natural pregnancies and in ART procedures (Aitken et al, 2012). Although these therapies have often been shown to achieve better sperm function and improve pregnancy rates, appropriate placebo-controlled clinical trials have not been performed and are still needed; trials with these antioxidants should be an important area for future research.

Sperm Chromatin—The next category of numerous highly cited papers involved analysis of sperm chromatin

Table. Most highly cited articles in the Journal of Andrology^a

Authors	Title	Citations
All years of publication		
Alvarez et al, 1987	Spontaneous lipid peroxidation and production of hydrogen peroxide and superoxide in human-spermatozoa. Superoxide dismutase as major enzyme protectant against oxygen toxicity	491
Aitken and Clarkson, 1988	Significance of reactive oxygen species and antioxidants in defining the efficacy of sperm preparation techniques	359
Evenson et al, 2002	Sperm chromatin structure assay: its clinical use for detecting sperm DNA fragmentation in male infertility and comparisons with other techniques	339
Irvine et al, 2000	DNA integrity in human spermatozoa: relationships with semen quality	292
Hammerstedt et al, 1990	Cryopreservation of mammalian sperm: what we ask them to survive	276
Published since 2000 ^b		
de Rooij and Russell, 2000	All you wanted to know about spermatogonia but were afraid to ask ^c	256
Hellstrom et al, 2002	Vardenafil for treatment of men with erectile dysfunction: efficacy and safety in a randomized, double-blind, placebo-controlled trial	158
Saleh and Agarwal, 2002	Oxidative stress and male infertility: from research bench to clinical practice	148
Published since 2006		
Chohan et al, 2006	Comparison of chromatin assays for DNA fragmentation evaluation in human sperm	91
Kort et al, 2006	Impact of body mass index values on sperm quantity and quality	72
Nieschlag et al, 2006	Investigation, treatment, and monitoring of late-onset hypogonadism in males: ISA, ISSAM, and EAU recommendations ^d	66
Traish et al, 2009	The dark side of testosterone deficiency: I. Metabolic syndrome and erectile dysfunction	66
Faheti et al, 2006	DNA damage in bovine sperm does not block fertilization and early embryonic development but induces apoptosis after the first cleavages	64

^a As of March 2012.

^b In addition to Evenson et al (2002) and Irvine et al (2000).

^c See de Rooij and Griswold (2012).

^d Jointly published in the *International Journal of Andrology* (Nieschlag et al, 2005).

and relationship to semen quality and fertility. Since the advent of IVF and ICSI, the focus of semen analysis has expanded from just the motility and acrosomal properties of the spermatozoa necessary for accessing and fusing with the oocyte to a more detailed analysis of the quality of the sperm's genetic material that is delivered. This concern has been heightened by the fact that in ART, defective sperm that might be carrying more genetic damage can be used for successful fertilization, transmitting the genetic defect to the next generation.

Indeed, sperm with poor semen quality by classical criteria did display DNA-strand breakage by the comet and in situ nick-translation assays (Irvine et al, 2000). The description of a rapid and practical flow cytometric assay for quantifying DNA strand breakage and chromatin packaging abnormalities in large numbers of sperm by the sperm chromatin structure assay (SCSA) in an *Andrology Lab Corner* paper provided a description of background and protocols to enable this assay to be more widely used in many andrology labs, where it now is an important part of semen evaluation (Evenson et al, 2002). Furthermore, this assay has proven valuable in environmental epidemiology studies on the

potential impact of pollution on male reproductive health. Comparison of the different assays with others such as terminal deoxynucleotidyl transferase dUTP nick end labeling (TUNEL) and sperm chromatin dispersion (SCD) demonstrated a good correlation between the SCSA, TUNEL, and SCD assays, and these could be used to assess sperm DNA damage, which is higher in infertile than in fertile males (Chohan et al, 2006). Although there is general agreement on the association between sperm DNA damage and infertility, the presence or absence of such damage does not absolutely distinguish fertile from infertile individuals; an excellent discussion of the value and limitations of those tests for patients undergoing specific procedures, including intra-uterine insemination, IVF, and ICSI, was presented in a very useful review in the *Journal of Andrology* (Zini and Sigman, 2006). An animal study has been successfully used to experimentally test the level of DNA damage that causes failure of embryo development and determine the stage of embryo development at which developmental defects predictive of blastocyst apoptosis can be observed (Fatehi et al, 2006); these methods can be used to select more viable embryos in human ART procedures. Finally,

a well-cited paper (Aoki et al, 2006) describing variation in protamine levels in infertile men has portended greatly increased interest in the roles in embryogenesis of epigenetic factors including DNA methylation, the presence of and localization of specific residual histones on the chromatin, and the presence of activating and repressive posttranslational modifications of these histones.

Semen Cryopreservation—One of the most highly cited papers in the *Journal of Andrology* (Hammerstedt et al, 1990) was in the area of semen cryopreservation and involved an in-depth analysis of the membrane properties of sperm and how that affected the survival of the cells during a freeze-thaw cycle. Further studies into the initiation of capacitation-like (Bailey et al, 2000) and apoptotic-like (Ortega-Ferrusola et al, 2008) reactions as a result of the freeze-thaw cycle and their roles in the reduced life spans of the surviving populations have been widely cited. Although the data in these papers were based largely on bull, ram, and equine sperm, as semen cryopreservation and artificial insemination are economically important in those species, the general principles elucidated are also applicable to improving the cryopreservation of human sperm, which is assuming new importance with the need to preserve the viability and DNA integrity of the low numbers of testicular sperm obtained from testicular biopsies of azoospermic men.

Metabolic Syndrome, Obesity, Hypogonadism, and Erectile Dysfunction—The *Journal of Andrology* has published well-cited studies relating the current increases in obesity and type 2 diabetes to disorders of the male reproductive and genital systems. One such study demonstrated that increased body mass index was associated with a dramatic decrease in the numbers of normal motile sperm cells and also a decrease in sperm integrity (Kort et al, 2006). Because obesity is now considered as one factor comprising metabolic syndrome, a more recent review (Traish et al, 2009) suggested that hypogonadism (specifically androgen deficiency) was associated with and might be responsible for an increase in metabolic syndrome, and furthermore that erectile dysfunction may be a consequence of the metabolic syndrome. Both the *Journal of Andrology* and the *International Journal of Andrology* have published important, widely used recommendations resulting from collaborations between several societies to carefully outline the patient assessment and response criteria for evaluating the benefits and risks of testosterone therapy for late-onset hypogonadism appearing in aging males (Nieschlag et al, 2005, 2006; Wang et al, 2009). The mechanisms that account for age-related declines in testosterone and therapeutic hormone replacement approaches continue to be an active area of study (Zirkin and Tenover, 2012). The *Journal of Andrology*

has also published several well-cited studies supporting the use of phosphodiesterase-5 inhibitors for treatment of erectile dysfunction (Guay et al, 2001; Hellstrom et al, 2002), as well as numerous basic research studies of mechanisms involved. Recent advances and new challenges on this topic are discussed by Burnett and Hellstrom (2012).

Merger With the International Journal of Andrology

The *Journal of Andrology* and the *International Journal of Andrology* have similar scopes and impact factors, but also have historically had unique areas of emphasis. Some particularly strong areas that are emphasized more in the *International Journal of Andrology* include effects of environmental toxicants and endocrine disruptors on development of the gonads and the male accessory organs and the consequences of this disruption on pubertal development, fecundity, and malignancy; pathogenesis of testicular germ cell cancer; and studies of genetic causes (eg, Y-chromosomal defects) in infertility. Conversely, the *Journal of Andrology* has had a greater breadth of basic science studies and animal model studies. To draw from the strengths of the 2 journals, the ASA and EAA will merge them to form a new journal, *Andrology*, which has begun accepting submissions and will publish its first issue in January 2013 (Meistrich and Huhtaniemi, 2012).

The major motivation for the merging of the *Journal of Andrology* and the *International Journal of Andrology* is to strengthen and improve the quality of the new merged journal. Rather than continuing in a competitive mode between the top 2 journals, the goal of the merger is to establish *Andrology* as the clear leading publication for studies on male reproductive science and medicine. It is the goal of the societies and editors that the merger will establish a clear first-choice journal in the field of andrology that will effectively compete with journals in related disciplines and enhance the perception of the field of andrology. With a broader base of papers to draw from, it is hoped that the quality of papers published will clearly reflect a high level of scientific investigation that will foster attention and respect for the field of andrology, thus helping to facilitate further growth and development in the field of andrology. The editorial team, composed of co-editors-in-chief from North America and Europe and associate editors and editorial board members from 6 continents and 22 different countries, carefully selected to represent all areas of study relevant to andrology, reflects the intention of establishing a truly global journal.

Although the merger provides a stronger foundation to build upon, an improvement of the stature and impact factor of the journal is not automatic, and will

be contingent on *Andrology* successfully navigating through challenges and obstacles, some of which are reflective of the current state of scientific journal publishing and some of which are specific to the merger and launching of a new journal. For example, the dramatic advances in electronic publishing, which facilitate more rapid submission, editing, and publishing of manuscripts, has enabled the launching of new journals, evidenced by the abundance of new, “low-impact” journals in many areas of biomedicine, including andrology. So there will be, and already is, a line of new journals ready to fill the void left by the *Journal of Andrology* and the *International Journal of Andrology*. Therefore, it is imperative that *Andrology* establish itself quickly and firmly as the journal of choice for top manuscripts in the field. The journal oversight committee, the editors, the editorial board, and the publisher, Wiley-Blackwell, will work hard to advance the journal by improving the review and editing process, enhancing the appearance and functionality of the journal, maximizing accessibility consistent with a business model to recoup costs, and striving to assure the highest level of publishing integrity and fairness to authors. However, ultimately the success of the journal is dependent on the submission of top-quality papers, especially by members of the ASA and EAA.

To increase the visibility and usability of the new journal, the editors are working closely with the EAA and ASA publications committees, the latter chaired by Jacques Tremblay, to enhance the flow of information from the journal through social media sites to society members and the public. Such efforts will include the highlighting of breakthrough manuscripts and online discussion of manuscripts.

The Future of Andrology

We expect that *Andrology* will be the leading publication in new developing areas of andrology. Although it is impossible to predict future breakthroughs in andrology, certain fields of study seem to portend high impact in the future.

For example, it is likely that there will be major advances in the genetics of infertility through complete genome sequencing of patients and controls, which will uncover structural variations and rare polymorphisms that likely account for a high percentage of male infertility (de Rooij and Griswold, 2012). These genetic tools may benefit other areas of andrology as well. Similarly, studies of epigenetic alterations have the potential to demonstrate the role of the environment and drastically advance our understanding of diseases of the reproductive tract, including cancer and infertility.

Another example of a potentially major advance in the treatment of reproductive diseases is the ongoing

growth of stem cell biology and technology. The basic concepts in characterizing mammalian germ cell stem cells were clearly explained to a wide audience in a highly cited paper by de Rooij and Russell (2000), which contributed to an increase in research and outstanding progress in this area over the last decade. Nevertheless, challenges continue (de Rooij and Griswold, 2012). Stem cell studies have the potential of dramatically enhancing our knowledge of basic biological mechanisms, as well as the hope for new treatment modalities. Such therapeutic benefits could benefit numerous areas of andrology, from improved options for patients attempting fertility preservation prior to cancer therapies to addressing various forms of abnormal spermatogenesis.

The field of ART may be an area that will benefit from recent technological advances in sperm selection procedures and sperm cryopreservation. There appear to be promising new techniques to select sperm for ICSI that contain less DNA damage than unselected sperm in the ejaculate. As our understanding of what makes a sperm competent for normal embryogenesis increases, sperm selection may become a key topic of andrology research. Also, the recent advances in recovering sperm from testicular biopsies in men with nonobstructive azoospermia have highlighted the need for enhanced sperm cryopreservation techniques for these patients with limited sperm. Sperm vitrification may be one tool for improving cryopreservation success in these men and in severely oligozoospermic patients.

Lastly, it is likely that novel pharmaceutical advances, ultimately based on progress in pharmacogenetics, will alter the way sexual dysfunction and other disorders of the male reproductive system are treated. Underscoring all the potential clinical applications will be the continued progress of understanding cellular and endocrine biology, and technological advances in cell analysis, cell separation techniques, genomics, and proteomics. *Andrology* stands ready to publish in all areas of male reproductive studies and will anxiously await the next breakthroughs and major contributions.

Concluding Remarks

The *Journal of Andrology* and the *International Journal of Andrology* have both independently established fine reputations of quality scientific publishing and are the top 2 journals in the field of andrology. Together they have laid an excellent foundation for *Andrology* to become a global leader in publishing studies of male reproductive health and science. We invite submission of all high-quality manuscripts, and will actively solicit reviews on cutting-edge topics from leading researchers.

We encourage active participation in the journal by submitting top studies for publication, accepting review requests, and providing the editors with your ideas and suggestions.

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EDITORIAL

A new era of 'Andrology'

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In the inaugural issue of *Andrology*, we take this opportunity to momentarily celebrate the merging of the two leading journals in the science and medicine of male reproduction. The collaboration of the European Academy of Andrology and the American Society of Andrology in the merging of their prior journals, *International Journal of Andrology* and *Journal of Andrology*, and their joint oversight of *Andrology* lays a firm foundation on which the advances in our field can be better disseminated and highlighted to scientists, clinicians, and the general public. In addition to celebrating the launch of *Andrology*, we highlight a few of the challenges ahead, with a call for the support of you, each of our readers.

The merging of two journals is a difficult undertaking under any circumstances, but particularly so when the journals represent two societies that are geographically, and in some regards culturally, different. It should be noted that the merger has been discussed previously, in fact on multiple occasions. So why was the merger accomplished now? We would suggest the following as some of the key reasons for the merging of the journals and the new creation of *Andrology*:

- 1 While the prior two flagship journals overlapped in scope, each had particular strengths that if merged together result in the potential of an improved journal in both impact factor and coverage. There should be no mistaking that all involved in the merger hope for an improved impact factor, which reflects well upon our field as a whole and attracts attention from researchers, funding agencies, academic review committees, and the broader audience.
- 2 The publishing industry is undergoing dramatic changes that have facilitated the easy establishment of niche journals, particularly 'for-profit' online journals that often provide inadequate peer review or editorial responsibilities that threaten to harm the quality of published information available to clinicians and researchers. Additionally, technological advances have revolutionized the positive options available in publishing. At this key juncture, it is imperative that the field of andrology has a flagship journal that evolves and implements technological advances from a position of strength and integrity, which the merger facilitates. In the coming issues, we will highlight some of the trends and options which all journals must navigate, but it is important that *Andrology* faces these challenges and makes decisions

based on unwavering dedication to scientific excellence and publishing ethics.

- 3 The development of *Andrology* was ultimately due to the dedication, vision, and persistence of key members of the two societies, including Ilpo Huhtaniemi and Marvin Meistrich (former chairmen of the publication committees of the European Academy of Andrology and the American Society of Andrology), the editors of the predecessor journals, the leaders of the two societies, and the representatives of our publisher, Wiley-Blackwell. Difficult and serious questions were faced throughout the process, and will continue to arise, but the dedication of those involved in the process of 'making it work' for the good of all has been unusual and necessary.

The history of the merger and information concerning the impact factor of the new journal during the two-year-long transition period was described in detail in a recent editorial published jointly in *Journal of Andrology* and *International Journal of Andrology* (Meistrich & Huhtaniemi, 2012). The two journals were occupying two top positions on bibliometric lists in this field, so *Andrology* begins with a respectable composite. We shall post updated information on the *Andrology* website (www.wileyonlinelibrary.com/journal/Andrology). We encourage you to look at this website, which has been active since April 2012. In addition to Early View of accepted papers, you can find on the website announcements of upcoming andrology meetings, highlights of the best papers and society-related information.



The two societies and publishing committees took care to balance the influence of the andrology communities on both sides of the Atlantic: the new editorial team comprises equal numbers of Americans and Europeans, and all other continents are represented on the board. We are happy that the board includes many world-renowned experts in andrology and reproductive medicine but besides scientific excellence, the editors are distinguished by their willingness to contribute constructively to the peer-review process.

So, with the foundation strong we ask for the continued support of you, the leading andrologists of the world. Ultimately the continued success of *Andrology* is dependent on the submission of your science to our journal and your participation in the peer

review process. We, as co-editors, have committed to honest, fair, and rapid review of your work, as well as continued creative efforts to advance the quality of the journal. With the technological and scientific breakthroughs that continue to accelerate advances in science and medicine, and with your support, we anticipate that *Andrology* will fulfill its mandate to better support advances in the field of andrology.

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HANDBOOK OF ANDROLOGY

Second Edition



The American Society of Andrology

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Handbook of Andrology
Second Edition

<http://www.andrologysociety.org/Andrology-Press/Andrology-Handbook,-2nd-Edition.aspx>

Preface

Since the first edition of the Handbook of Andrology, published by the American Society of Andrology 15 years ago, over 20,000 printed copies, as well as uncounted numbers of electronic copies, have been distributed to colleagues and trainees around the world. The first edition was translated into Spanish, Italian and Chinese. Most of the fundamental information provided in the first edition is still valid; however, the volume of scientific literature on the various facets of the subject of andrology has expanded tremendously. This has resulted in a constantly growing body of knowledge, not only in basic science but also in the clinical management of men's health issues.

In this edition, we have increased the number of chapters from 24 to 41, but have made every effort to retain a style that will allow trainees to be introduced to the field of Andrology and become as excited about working in this field as are the contributing authors. Our chapters encompass the wide range of topics that characterizes the field of Andrology, from molecular biology to veterinary and human medicine, from applied research to ethics. We once again have been extremely fortunate to have as authors world-renowned Andrologists who are experts in the various subjects included in the Handbook; we wish to thank each of them for their valuable contributions.

With the advances in information technology, we feel that it is time to drop the traditional format of a paper bound book and move to an electronic only version for this edition of the Handbook. With the support of the American Society of Andrology, this edition of the Handbook will be freely available to all members of the Society. The electronic version is available as a single PDF or as PDFs of individual chapters. We believe that this approach will allow for a wider scope of circulation of the Handbook, permit more frequent updates of the content, and help save a forest of trees.

It is our hope that this second edition of the Handbook of Andrology lays the foundation for basic scientists, clinician scientists, healthcare professionals, trainees, policy makers and anyone who has an interest in the discipline to acquire the relevant knowledge that they seek.

Finally, we would like to acknowledge the dedicated secretarial support of Ms. Elise Boivin-Ford and to thank all the contributors and various members of the American Society of Andrology for their assistance and support in making this Handbook possible.

Bernard Robaire and Peter Chan
Co-Editors
February 2010

Lessons Learned in Andrology

An Editorial section introduced in 2014

By invitation, leaders in the field of andrology
Submit brief essays on valuable lessons from their
distinguished careers

EDITORIAL

Lessons Learned in Andrology: Seeing is believing

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Editors' Note: With this issue of *Andrology* we introduce a new feature entitled 'Lessons Learned in Andrology'. By invitation, leaders in the field of andrology will submit a brief essay that addresses valuable lessons they have learned in their distinguished career, possibly including short historical vignettes. The objective of this new feature is to assist others, especially young investigators, in considering important lessons that are learned in a successful career, providing a deeper historical understanding of the field of andrology and helping all to better appreciate the contributions of leaders of the field. In this inaugural essay, Professor Masaru Okabe recounts a valuable lesson he learned in carefully considering assumptions.

Masaru Okabe received his Ph.D. in Pharmaceutical Sciences from Osaka University and now is a Professor Emeritus of Osaka University, Japan. He studied the mechanism of fertilization by producing many gene-manipulated animals such as calmegin- and IZUMO1-disrupted mice. He also made the world's first 'green mouse', transgenic for the green fluorescent protein (GFP, normally present in jellyfish), which is used in over 1000 laboratories globally.



Our lives are driven by many assumptions. When we undertake a research project, we design experiments based on various assumptions. After results are obtained, we use our knowledge and imagination to interpret the data. Some experiments provide simple data, which require no imagination for interpretation and tell us clearly, yes or no: 'Seeing is believing'. But the application of this truism might have a pitfall. Here is my story.

Calmegin is a molecular chaperone specifically expressed in pachytene stage male germ cells. We produced calmegin-disrupted mice by homologous recombination, expecting a phenotype on spermatogenesis. Despite the fact that calmegin is expressed only in male germ cells, the disruption of calmegin did not cause any defect in spermatogenesis. The spermatozoa were morphologically normal and swam as vividly as those from wild-type mice. Ours was a typical but disappointing story of a strong candidate gene encoding a protein that initially appeared to have 'no essential effect'. However, when mated with females, we found that the calmegin-disrupted males were infertile.

For mammalian fertilization to occur, spermatozoa must bind and penetrate the zona pellucida, an extracellular matrix

surrounding the egg. The importance of zona binding observed in vitro seemed to be obvious. Moreover, ZP3, a component of the zona pellucida, is reported to induce the acrosome reaction in spermatozoa. Considering these facts together, it was widely believed that the sperm acrosome reaction must be induced by the zona pellucida when spermatozoa bound to the zona. Only the acrosome reaction induced in this manner was thought to facilitate spermatozoa to penetrate the zona pellucida and fertilize eggs (Theory A).

With Theory A in mind, we tried to examine the mechanism of infertility in the calmegin-disrupted males by observing in vitro fertilization. In wild-type spermatozoa, the eggs started to rotate with the tail beats of the many spermatozoa bound to the zona, but the spermatozoa from calmegin knockout mice bounced off the zona pellucida and were not able to bind to eggs. No wonder the calmegin-disrupted males were infertile! Seeing is believing! We took a movie of the spermatozoa bouncing off the zona pellucida and presented it at many conferences. I think we significantly contributed to strengthening Theory A.

Since then, more than 10 genes have been newly reported as essential for spermatozoa to retain their zona-binding ability. Interestingly, all of these spermatozoa shared one more phenotype: the inability of spermatozoa to move beyond the uterotubal junction (UTJ), thus failing to migrate into the oviduct. (This was attributed to the lack of ADAM3, as all of these gene-disrupted mouse spermatozoa lacked ADAM3 on their surfaces.)

However, to our surprise, we found that when we placed these infertile spermatozoa directly into the oviduct to bypass the UTJ, the eggs were fertilized! According to Theory A, the acrosome reaction should be induced upon contact with the zona pellucida. Why could the spermatozoa which lost their so-called 'zona binding' ability still fertilize eggs? What was the meaning of our movie showing the spermatozoa failing to bind to the zona pellucida? Perhaps the so-called 'zona binding' we observed in vitro using eggs deprived of the cumulus layer reflected artificial

aspects of the sperm functions. We never see this many spermatozoa swarming to naked eggs in vivo.

Recently, using fluorescent protein-tagged spermatozoa, a majority of the zona penetrating mouse spermatozoa were confirmed to be acrosome reacted before reaching the zona pellucida. Moreover, the timing of the acrosome reaction in the mouse was demonstrated to be less strict than previously thought. When spermatozoa that had penetrated the zona were collected and subjected to a second round of IVF, these spermatozoa penetrated the cumulus layer and zona pellucida a second time, fertilizing a second egg.

'Seeing is believing' may be a golden rule in science, but magicians can make a coin seem to penetrate glass by guiding our assumptions to a wrong direction. One of my most memorable lessons learned from Mother Nature is that she sometimes behaves like a magician. Are the assumptions driving your research really correct?

EDITORIAL: LESSON LEARNED IN ANDROLOGY

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Lessons learned in andrology: Learning from experience – getting it wrong is alright

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Richard Sharpe is a basic scientist who gained his PhD in 1979. His research interests and publications have embraced Leydig cell function, spermatogenesis/fertility, sexual differentiation, gonadal development (and disorders thereof), foetal programming and the effects of lifestyle/diet and environmental chemical exposures on these events, especially impacts on steroidogenesis by the foetal testis. He is increasingly interested in how reproductive development/function intersects with, and influences, more general health. He currently heads a research programme on developmental disorders of male reproductive health in the Medical Research Council/University Centre for Reproductive Health in Edinburgh. He is a keen science communicator, and is highly committed to better public communication of scientific research.



I recognize that making it to where I am today has been, and still is, a daily learning curve. The steepness of the curve varies, but it is incessant, and is an exciting and invigorating aspect of scientific research. Much of this learning is generic, not specific to andrology, but I have tried in this article to give it an andrological context wherever possible. A valuable outcome of the lessons I have learned from 'making mistakes' is that I routinely use these experiences to enlighten students and young post-docs – especially when they slump dejectedly in a chair opposite my desk, after a failed experiment, and complain that 'they can never hope to reach my level'. My response is 'you are years ahead of where I was at your age', because I was a slow developer with an uninspiring academic track record.

When I arrived in Edinburgh in 1974 at the Medical Research Council (MRC) Reproductive Biology Unit run by Roger Short, I was already hooked on male reproduction, but oh what reinforcement awaited me! There were two visitors on a year's sabbatical to the Unit – Niels Skakkebaek and David de Kretser. Considering the heights to which these two andrology giants were already climbing, for me to come under their guidance and

inspiration at such a formative time was game changing. The fact that both are still youthfully active and energetic with their ideas, and the research to match it, despite being well beyond 'retirement age', speaks more eloquently than I can of how important an influence they have exerted on andrology, and on me, personally.

Advances in understanding in andrology are not about individuals but about ideas, but it is individuals who form the ideas. What sets Niels and David apart is that they always anchored their ideas. Both were practising clinicians, which meant that seeing the reality of patient's reproductive problems always gave their ideas a practical attachment, no matter if their ideas turned out right or wrong. Basic scientists such as myself do not have this anchor, but I learnt from them to always focus on 'real-world' reproductive health problems, their causes and prevention (or correction); for this reason, I consider 'keeping your feet on the ground' a great compliment to pay to someone.

It seems remarkable (or more accurately, remarkably stupid on my part) that I had no interest in sperm counts, as opposed to spermatogenesis, until talking with Niels Skakkebaek 20 years

ago while writing my chapter for *Physiology of Reproduction* on 'Spermatogenesis' (Sharpe, 1994). He told me about their studies suggesting a 50% fall in human spermatozoa counts over the previous 50+ years (Carlsen *et al.*, 1992), a conversation that completely changed the focus of my thoughts and my research. Until then, the idea that sperm count per se was important didn't really gel because I worked on the rat, in which highly organized, super-efficient 'Rolls-Royce' spermatogenesis coupled with sperm storage made such issues irrelevant. But for the human, with disorganized, highly inefficient spermatogenesis and no sperm storage it was, and is, a big issue. This also got me interested in understanding species differences so that I could select the best models for the human (Sharpe *et al.*, 2003; Mitchell *et al.*, 2008), something I recommend as essential to all basic researchers who use rodents 'as human models'. Never presume that the rodent is a good model, first prove it (more evidence below).

In 1998 I was giving a talk on 'Environmental hormones, reproductive development and human health' to the Tyndall Forum at the Royal Institute in London, where you present to policy makers, politicians and other influential folk – an opportunity to sell your research. In a quaint English way, the presentations were followed by 'supper', at which I was sat opposite Lord Somebody from the UK House of Lords, who looked ancient and who I foolishly labelled (in my head) as old and dodder. During supper he said to me 'Thank you in your talk for taking me to the borders of ignorance'. My first reaction was that it was some sort of insult, but on reflection I thought it one of the wisest comments made to me. Indeed, I use it in talks and especially when dealing with the media. It captures the inherent problem with scientific research, namely, that our coalface is at the borders of ignorance – so don't be surprised that much of what we discover there subsequently turns out to be wrong or only a fragment of the truth.

This is not the only lesson I've learnt about (my) ignorance! I have a great imagination (my only talent), which will readily construct a hypothesis if you throw a handful of facts/data at it. It has served me wonderfully well, but when I was younger, I took it very personally if my hypotheses were proved wrong. But the maxim that 'Science makes fools of us all' is something that I've now learned to enjoy. Back in 1993, the inspiration from Niels Skakkebaek resulted in he and I writing a hypothesis article for the *Lancet*, the so-called 'Oestrogen hypothesis' which proposed that increased in utero exposure of males to estrogens (from various sources) might underlie common male reproductive disorders (Sharpe & Skakkebaek, 1993). It has become a citation classic (hint; to get high citations, never include data!). Yet time and further research has proved that the hypothesis is fundamentally flawed, because human foetal Leydig cells do not express full-length oestrogen receptor alpha (ESR1) as do rodent foetal Leydig cells, and it is ESR1 that mediates the adverse effects of estrogens on the foetal testis (Mitchell *et al.*, 2013). Nevertheless, it was still a good hypothesis because it focused and stimulated research that advanced understanding. That is what hypotheses are for, vehicles for advancing scientific understanding, irrespective of whether they prove right or wrong. I now take pride in 'being wrong 90% of the time', as I tell my students each time I suggest one of my brilliant ideas to them! Progress comes from making mistakes, because we learn best from mistakes. I have a sign in my office that I point out to students

when they have just discovered they ruined an experiment through a mistake, 'Good judgement comes from experience; experience comes from bad judgement'.

Working for much of my earlier career on spermatogenesis inevitably led me into the path of (the late) Lonnie Russell, a giant in the field, though clearly not everyone's cup of tea. Lonnie was someone you loved or hated, the result I'm sure of his devilish love of being provocative. Once you recognized and embraced this as 'harmless fun', Lonnie turned out to be one of the best catalysts I have encountered. I still smile when recollecting the hours I spent kicking ideas back and forth with him, invariably in a bar drinking beer. Truly inspirational, as his more direct trainees will tell you better than me, as all have gone on to be andrology stars themselves. Research progress inevitably needs hard work, but it is the ideas that drive progress. These ideas, once kicked around and mixed with beer, are what generates a hypothesis which then progresses as described above. At the heart of this process are the catalysts, and Lonnie was among the best.

Last, but not least, I want to emphasize the role that humour has played in my career in andrology. Research has many downs, and good humour is one way of coping. All know that I like telling jokes, but they may not realize that I learned my art from two masters in andrology – Focko Rommerts and Doug Stocco. Anyone who has heard Focko deliver his 'Testomania' talk at a scientific meeting will have learnt that research on the testis can be fantastic fun. Doug is simply an outstanding story-teller, who could tell jokes non-stop for 2 h, for most of which I literally cry with laughter. In my opinion, humour has a serious role to play in science and in andrology in particular. I have learnt that humour is one of the very best vehicles for communicating serious science. Virtually everyone appreciates humour, can identify with it and will remember what you tell them by association, so I try always to add humour into my talks. Andrology lends itself to humour – indeed many of the jokes you hear in pubs and elsewhere are often andrology related, none more so than in my area of 'masculinization', which touches on male-female comparisons which we can all identify with and laugh about. Anyone who doubts the role of humour in andrology should check out this link (<http://youtu.be/xFKDjS4efS>) which, believe it or not, was a UK MRC-sponsored stand-up comedy routine by yours truly to help celebrate 100 years of MRC support for research. But I think I'll stick to the research as a career! Maybe I'll even get it right eventually if I keep getting it wrong often enough.

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Lessons Learned in Andrology: Back to the future: making children in bed (at the right time)

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Manuela Simoni, MD, PhD was born in 1956 in Italy. She obtained her MD in 1982, the specialization in endocrinology and metabolism in 1985, and the PhD in the same field in 1991. Between 1990 and 2007, she worked at the Institute of Reproductive Medicine of the University of Münster, Germany, where she was professor from 1998. From 2008, she is full professor of endocrinology at the University of Modena and Reggio Emilia, Italy, where she currently holds the following positions: Chair of Endocrinology, Director of the Clinical Unit of Endocrinology at the NOCSAE Hospital, Director of the School of Specialization in Endocrinology, Deputy Director of the Department of Biomedical, Metabolic and Neural Sciences. Her research interests are gonadotropin and androgen action, testicular function, genetics of male infertility, endocrinology and pathophysiology of reproduction. She is a member of several societies, including the European Academy of Andrology (EAA) and the European Society of Endocrinology (ESE), and serves in the editorial boards of several journals in the fields of endocrinology and reproduction.



I was lucky. I had my first child at the age of 38 and the second at 45. The strange thing is that they were made in the old-fashioned, traditional way: in bed and not in the assisted reproductive technologies (ART) department. No exogenous gonadotropins, no oocyte pickup, no semen collection in a soundproof room, no intracytoplasmic sperm injection. Just fun. Not even Caesarean section. Just luck (and a good obstetrician).

For a woman in career postponing pregnancy is becoming the rule. If you want to become a physician, in most European countries you need to go through 13 years of school, 6 years of university and 4–5 years of residency. Entering primary school with 6, you end up at the age of 30 with nothing in your hands other than a diploma. Then you start looking for a job and, depending on which country you live in, at least other 5–10 years pass until you get a permanent position. Exactly at the age between 35 and 40 you start thinking about reproduction. If you are a woman, your reproductive potential may be naturally gone. If you are a man, you may discover only then that you are infertile. Often this happens after many years of active couple contraception without having ascertained the fertility status in advance. At this point, as an established professional couple, you are ready to make the fortune of ART centres. Obviously, we cannot expect our colleagues OB&G to be active against this trend. So, perhaps we, the andrologists, should become active on multiple fronts and do something against the reproductive emergency of the Western countries.

Andrological societies are young: ASA was grounded in 1975, other national societies shortly thereafter, the European Academy of Andrology in 1992. The oldest article dealing with male infertility I could find in PubMed dates back to 1945 (Walker, 1945). In his communication to the Royal Society of Medicine, Dr Walker, a surgeon urologist, correctly identified the main clinical features and some diagnostic procedures of male infertility which are still valid today but the proposed treatment consisted of garlic extracts against infections, testosterone and X-ray applications to the testis. Meanwhile we have antibiotics, we understood the contraceptive effect of exogenous testosterone and appreciated that radiations deplete, rather than nurture, germ cells. However, our therapeutic equipment was not enriched by any really effective medicine, apart from gonadotropins in case of hypogonadotropic hypogonadism. The approach to the infertile male is still inefficient and many treatments are empirical: if sperms are lousy and the partner is over 35, the chance of natural pregnancy remains very low, irrespective of the medical treatment you try.

How to get out of this frustration? Certainly, we should diagnose and treat the male as much as possible and work in interdisciplinary teams with gynaecologists to optimize the conception probability, but it is time to widen the action spectrum of Andrology to further levels.

EDUCATION

Women do not appreciate enough that their fertility potential declines sharply after a certain age (Heffner, 2004). Men do not know about it either. Most couples ignore the importance of having intercourse with exact timing in the presence of normal cycles (Wilcox *et al.*, 1995; Zollner *et al.*, 2013), not an issue at young age with frequent sexual activity but a possible problem in older, busy couples. There is some inter-individual variability (my husband and I obviously belong to the very fertile end of the Gaussian distribution) and some genetic factors regulating ovarian longevity are being identified (Stolk *et al.*, 2012). However, we do not have any test predicting the rate of fertility drop. Even if we had it, would women be willing/able to adjust their reproductive project according to it? Some ART centres start to offer 'social' ovarian cryopreservation to educated women willing to postpone pregnancy. As an elderly mother approaching her sixth decade of life with teenager children, I am not sure that this is the right path to follow.

Scientific societies should engage in educational programmes in schools, raising the awareness of the issue well in time, and guiding young people to find the right information in the web jungle. Men and women should be able to make an educated choice about their reproductive fate early enough not to blame themselves or anyone else later in life. Of course, one can always borrow gametes and uteri (and there is a florid market thereof), but we have too little knowledge about the long-term psychological, philosophical, medical and social consequences of such surrogate parenthood for the individuals concerned.

PREVENTION

Preserving good fertility potential across the life phases presupposes that reproductive health receives the same attention as other health-related issues. While women visit a gynaecologist relatively early in life, e.g. searching advice for contraception, and thereby receive medical attention focused on reproduction, men usually go to the doctor only when they are really sick (Wang *et al.*, 2013). Not to say about visiting an andrologist (what is andrology?). Average men talk a lot about sex, dispelling ancestral fears of untellable reproductive inadequacy, but when it comes to their own sex/fertility problem, they are often unable to cope with it. Even in the prevention of sexually transmitted diseases, men are left behind: in my country, the National Health System offers human papillomavirus vaccination to girls but not to boys, as they would be naturally immune and not vehicle of the infection.

With our Italian Society of Medical Andrology and Sexual Medicine (SIAMS) we have started some prevention campaign in secondary schools (www.amicoandrologo.it) and during public events (www.androlife.it). Through these instruments, young men have the possibility to get information, ask questions in a confidential way and obtain a free visit. In addition, media campaigns, e.g. about erectile dysfunction, premature ejaculation, etc. are supported jointly by the scientific societies concerned, creating a new reproductive culture. These initiatives are important for the prevention of andrological diseases, as they increase awareness and result in early diagnosis of treatable conditions

(e.g. infections, varicocele, and testis tumour). They are usually very well received and contribute to orientate unsure and hesitant men.

ACTING ON THE STAKEHOLDERS

There is too little support for reproductive research. Funding agencies fuelled by public money feel obliged to carry on research programmes dealing with more serious diseases, such as cardiovascular, neurodegenerative, diabetes and cancer, just to mention the best sellers. To me, it is illogical: wealth increases the epidemiological relevance of diseases partly due to overfeeding and, instead of instructing people to eat less and conduct a healthier life, we spend public money in seeking medicines to fight the consequences of having eaten too much. Life expectation increases steadily, so that 'healthy ageing' is a major thematic area in several finalized research programmes. In Western countries with an established social security system, as in the EU, the progressive ageing of the population is exhausting public finances at the expense of the young generations, who are jobless, frustrated and with no lust for making children: a very strange and short-sighted demographic policy indeed.

Andrologists should take the lead and act whenever and wherever possible to convince the stakeholders that reproductive health and research are as important as other fields of medicine, if not more: if cancer is lethal for the individual, infertility is lethal for the species. Recurring to ART when the physiological reproductive age is over may be an option for wealthy people but is unfair to the majority. Infertility should be recognized, researched on, prevented and treated on time. Policies supporting young couples in their family planning are essential for a sustainable vision of the future.

My personal vision of the future is that Andrology should support making children in bed at the right time in all possible ways: with medical care, research, education, prevention and political action.

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EDITORIAL

Lessons Learned in Andrology: What I have learned

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Editors' Note: This is the second feature entitled 'Lessons Learned in Andrology'. By invitation, leaders in the field of andrology will submit a brief essay that addresses valuable lessons they have learned in their distinguished career, possibly including short historical vignettes. The objective of this new feature is to assist others, especially young investigators, in considering important lessons that are learned in a successful career, providing a deeper historical understanding of the field of andrology and helping all to better appreciate the contributions of leaders of the field.

Niels E. Skakkebaek is a professor and former chairman, now senior researcher, of the Department of Growth and Reproduction at Rigshospitalet, Copenhagen, Denmark. He received his medical degree from the University of Copenhagen and in addition to his clinical responsibilities has been a prolific researcher and mentor. He has published more than 500 peer-reviewed manuscripts in international journals and been a leader in cutting-edge research including the areas of carcinoma *in situ* of the testis, endocrinological aspects of growth and development, and environmental aspects of male reproduction, including developing the 'testicular dysgenesis syndrome' hypothesis. Professor Skakkebaek has received numerous awards for his contributions and continues to be a mentor and inspiration to many young researchers.



What have I learned in my professional life as a scientist and clinician? Not enough to avoid continuing making errors. Perhaps my answer should be that the fact that I am still learning something every week has made me more humble and also curious to learn more. However, looking back at some events were more shining than others. I will first mention the importance of learning from giants in the field. A giant I met when I was very young was professor, Yves Clermont, McGill University, Montreal. In a few weeks he introduced me to the world of mammalian spermatogenesis, first rat, then human spermatogenesis (Clermont, 1963).

My early work describing carcinoma *in situ* testis (CIS) had not been possible without an intense training in Clermont's laboratory. Before I left his laboratory, I was able to distinguish between A-dark, A-pale and B spermatogonia; spermatocytes and spermatids and used his system to analyse testicular specimens from infertile men. However, back in Copenhagen, specimens from two infertile men did not fit into the Clermont system. The nuclei

of the basal layer of germ cells in the seminiferous tubules were bigger (10–11 μm nuclear diameter rather than 6–7 as the diameter of type A and B spermatogonia) and the chromatin was coarse, even more coarse than in type B spermatogonia. Our pathologist did not appreciate the significance of these cells. However, because of what I had learned from Yves, I was sure that I had picked up something important and wanted to publish it.

After initial rejection from *Acta Endocrinologica* (now *European Journal of Endocrinology*), I had my findings accepted for publication in *Acta Pathologica* as a cell abnormality in two infertile men (Skakkebaek, 1972a). However, before the article appeared in the journal, both men developed invasive germ cell cancer. It was detected early because one of the men had accepted a second biopsy for studies of the cells by electron microscopy and during open biopsy procedure the surgeon noted that the testicle had grown since previous biopsy and the new specimen now revealed an embryonic carcinoma. First then did I fully understand the nature of the cells and contacted the other patient with the same peculiar cells. Amazingly, also he had developed invasive tumour and I hurried up to write a second paper, appearing in the *Lancet*, suggesting that the abnormal cells were, in fact, precursor cells for testicular germ cell cancer (Skakkebaek, 1972b). Luckily, both men survived without spread from the tumours.

During the next 10 years I learned what many others also have experienced: It may take many, many, years to obtain acceptance of research findings. In fact, my story about carcinoma *in situ* testis was considered very controversial and not fully

accepted until the mid-1980s, although I was never in doubt, not a second, because of my training with Yves Clermont.

The story also taught me the importance of translational human research to obtain the full picture of a health problem. The andrologist who himself does microscopy on testicular specimens of his infertile patient has a great advantage with regard to correct diagnosis of a testicular disorder. Although we all know that 'oligozoospermia' and 'azoospermia' are symptoms and not diagnoses, in andrological literature these words are often used as surrogates for clinical diagnoses and basis for intervention. Testicular biopsy is of course neither indicated nor possible in many men with fertility problems. However, whenever a biopsy specimen is available, the clinical andrologist has a unique chance to use information from it in diagnostic work-up of the patient, particularly if the spermatogenesis and Leydig cell appearances are evaluated semi-quantitatively (McLachlan *et al.*, 2007). The pathologists do not do that. The andrologist must acquire the skill him/herself, also for correct classification of infertile men participating in clinical research projects.

Another important mentor for me, when I was young, was the Danish epidemiologist Dr Johannes Clemmesen, who was a pioneer in testis cancer epidemiology. He started the first national cancer registry, the Danish, in 1943. He was not only the first to appreciate the increasing trends in testicular germ cell cancer; he also noted strong birth cohort effects with increasing risks among the more recently born cohorts. In addition, he pinpointed the enormous differences in incidences in testis cancer within the Nordic countries, where Denmark had four to fivefold higher rates than Finland and hypothesized that environment or lifestyle played a role (Clemmesen, 1981). He inspired me to explore these conspicuous differences between two apparently similar countries and thereby obtain information about the aetiology of testicular cancer. His own hypothesis was that mothers smoking in pregnancy could explain the differences, as Danish women smoked much more than the Finnish – even cigars. Later studies did not confirm the smoking hypothesis, but the foetal hypothesis is still very much alive and supported by evidence from studies of the CIS cell. Most likely, other environmental factors are to blame (Skakkebaek *et al.*, 2006, 2011).

I first learned the importance of setting up a unit for translational research in andrology by visiting another giant when I was

young, Mortimer Lipsett at NIH, Bethesda. I was fascinated by the idea of having clinical management of patients in one wing of the building and laboratories in the neighbouring wing with people running back and forth all the time. A similar structure became the corner stone of the University Department of Growth and Reproduction which was initiated at Rigshospitalet in 1990. Here clinical and basic research go hand in hand. It has created a wonderful research environment, now chaired by Professor Anders Juul. During my years in paediatrics and andrology, I had learned that many cases of male infertility and even testicular cancer should be seen as late onset of perinatal or paediatric problems. And to address those clinically and scientifically we needed many disciplines to work together, including people with expertise in paediatric and adult endocrinology, andrology, molecular biology, epidemiology, statistics and chemistry. We did in fact manage to bring all the expertise together and I believe that I have learned more from colleagues with such skills during the last 20 years than I picked up earlier.

In conclusion, I have learned to stand on the shoulders of giants, because nobody creates alone.

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EDITORIAL - LESSONS LEARNED IN ANDROLOGY

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Germ cells and fertilization: why I studied these topics and what I learned along the path of my study

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Professor Ryuzo Yanagimachi received his Doctor of Science degree from Hokkaido University in Japan in 1960. He then served as a post-doctoral fellow at the Worcester Foundation for Experimental Biology in the United States under the direction of the distinguished reproductive biologist M.C. Chang. After a brief period of working in Japan, Dr. Yanagimachi joined the faculty of the University of Hawaii, where he ultimately established and directed the Institute for Biogenesis Research until 2004. Professor Yanagimachi is responsible for many seminal studies and advances in reproductive biology, including studies in sperm capacitation, in vitro fertilization, and cloning. He has received numerous awards and honorary degrees, including induction into the U.S. National Academy of Sciences, induction into the Hall of Honor of the NICHD, the Marshall Medal (UK), and the Distinguished Andrologist Award of the American Society of Andrology.-Professor Yanagimachi is known by his many students, fellows, and colleagues not only for his creative and elegant experimental designs, but also for his genuine collegiality and friendships.



INTRODUCTION

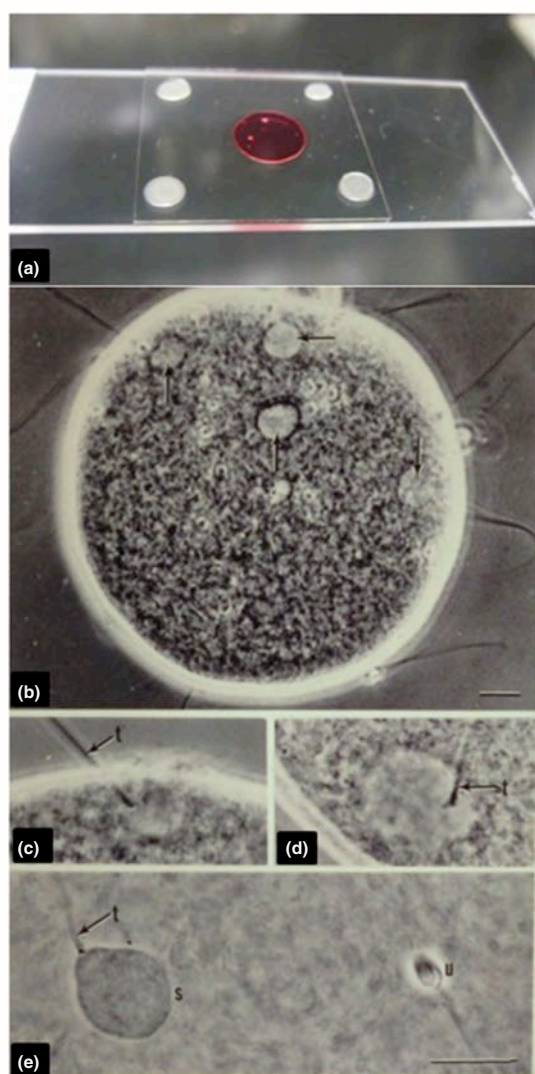
I used to be good in preparing photo-micrographs and drawing diagrams myself, but now I am struggling with the newer electronic methods of preparing micrographs and diagrams. Most of the things that were the forefront 40-50 years ago are obsolete today. The world and technologies keep changing rapidly, but there are some things that do not change. People's wish to pursue happiness is an example. Uncertainty and apprehensions of one's future is just other example. Today some young, smart persons with great talent see nothing but a bright future. In my time I was certainly not one of them, in fact I was quite opposite. Despite the many handicaps I had (lacking proficiency in the English language, for instance), I managed to survive a competitive, yet enjoyable life in science. Here, I share with you: (a) how I got interested in germ cell and fertilization research, (b) what I studied and what I learned in the past, (c) what I should have known when I was young, and (d) a few other thoughts that entered my mind.

HOW I BECAME INTERESTED IN GERM CELL AND FERTILIZATION

I was a zoology major student of Hokkaido University, Japan (1949–1952). Of many interesting biological concepts and theories I learned during undergraduate and early graduate years, none struck me more than the concept of germ cells as stated in the quote: 'The child does not inherit its characters from parent body, but from the germ cells; so far as heredity is concerned the body is merely a carrier of germ-cells'. (Nussbaum-Weisman; cited from the introduction of Wilson, 1925). Until then, I thought that either the brain or the heart is the centre of the human being. From that moment on, at least to me, germ cells rather than brain or heart cells became the centre of ourselves (and all organisms). Metaphorically, germ cells vs. somatic cells are like a queen bee (fertile) vs. worker bees (infertile) that support the queen.

My Ph.D. thesis was concerned with fish fertilization and the life cycle of parasitic barnacles. In those days, most brilliant zoologists used invertebrate species (e.g. sea urchin, annelids,

Figure 1 Examination of eggs and spermatozoa between a slide and coverslip. (A) A mixture of vaseline-paraffin-bee's wax (9 : 1 : 0.5 by weight) is melted. Slide glasses each with four melted dots of above mixture are prepared and stored. A drop of physiological medium containing eggs is placed at the centre of four vaseline-paraffin dots and covered with a coverslip which is compressed until eggs are flattened like a thin pancake. Living eggs can be examined using a phase-contrast or interference-contrast microscope. To fix eggs, run 4% glutaraldehyde in phosphate-buffered saline (PBS) from a side of the coverslip to the opposite side using a piece of filter paper. Leave the slide in a coplin staining jar containing the fixative 10 min to overnight (if glutaraldehyde is not available, fix eggs overnight in 10% formalin in PBS). Then, replace the fixative between the slide and coverslip with acetic alcohol (freshly prepared by mixing three parts of 100% ethanol and one part of glacial acetic acid) for 5 min. Drain the slide and stain the eggs with aceto-carmin for 5–10 min. Eggs can be examined immediately using a phase-contrast microscope. To store slides, replace the staining solution with acetic acid-water-glycerol mixture (4 : 4 : 2) and seal the coverslip with a nail polish (nitrocellulose in solvent). (B–D) Phase-contrast micrographs of live zona-free hamster eggs containing swollen human sperm heads. (E) A fixed and stained hamster egg with human sperm heads before and after swelling within egg's cytoplasm.



etc) or lower vertebrates (e.g. amphibian) for their studies of germ cells and fertilization because we could obtain a large quantity of fully mature gametes at a time and could observe fertilization within a dish (in vitro) without any problem. In fact, we

had to wash 'our hands and instrument' thoroughly to avoid accidental in vitro fertilization. Virtually all important information about germ cells and fertilization in animals were from studies using invertebrates and lower vertebrates. Our knowledge of mammalian germ cells and fertilization was minimal when I was a student 60 years ago. This was largely because of the difficulty in collecting a large number of eggs at a time and fertilizing them in dish (in vitro). Most medical students never learned, or knew very little, about human eggs, spermatozoa and pre-implantation embryos. Some gynaecology textbooks had photographs of human eggs cleaving, but obviously they were dying or dead with cytoplasmic fragmentation.

Originally, I wanted to be a professor or a research specialist of aquaculture, but was unable to get a proper position. In those days in Japan there were no public announcements for open positions. Specialty and/or political power of professors were major factors in determining a students' future career. My professor suggested me to become a high school teacher which I did for one full year. As I did not want to give up my research carrier, I resigned from the school to become a research fellow without salary. Because I saw no hope to become a researcher in Japan and I wanted to be different from other colleagues who obtained positions I envied, I considered other possibilities. A year before finishing my Ph.D., I wrote a letter to Dr. M.C. Chang of the Worcester Foundation for Experimental Biology (WFEB, Shrewsbury, Massachusetts) wanting to become his postdoctoral fellow. Luckily, I was accepted and thus began the study of mammalian gametes and fertilization in 1960.

WHAT I STUDIED AND LEARNED AFTER 1960

At WFEB

Shortly after I arrived at the WFEB, I was in Chang's office. He asked me what is common between fish and mammals. He knew that I worked on fish fertilization for some years. I thought about this a little and said 'cortical granules' (CGs) are in both fish and mammalian eggs. C. R. Austin (Austin, 1956) had already reported that he could readily examine CGs in living eggs of the golden (Syrian) hamster by using a phase-contrast microscope. Chang wanted me to show him CGs. When I showed him very large CGs in medaka (killifish) eggs and tiny CGs in golden (Syrian) hamster eggs, Chang was very pleased. This is how I began to use the golden hamster as one of my favourite experimental animals. Hamster eggs are very clear, and spermatozoa have large acrosomes. Morphological alternation in the acrosome before and after the acrosome reaction (AR) could be readily examined in living spermatozoa without killing and staining them. Examination of hamster eggs before, during and after fertilization was easy by combination of phase-contrast microscopy and the egg-fixation method I learned from Chang (Fig. 1). While I was at the WFEB, I succeeded in fertilizing hamster eggs in vitro without any contribution from the female tract (Yanagimachi & Chang, 1963, 1964). Until then it was thought that sperm capacitation can take place only in vivo. I also examined the whole process of sperm passage through the zona pellucida of hamster eggs, which became the first report in mammals (Yanagimachi, 1966).

Some mentors allow their students to work only on the projects he/she assigned. Chang was not like that. A week after I

arrived at the WFEB he called me into his office and gave me a research project that involved the study of leucocytes in the female genital tract and sperm capacitation. He must have thought that leucocytes might have some role in sperm capacitation *in vivo*. He said to me: 'This is your bread and butter. There are five work days a week. Use 3 days for this project. You may use the two remaining days for the research you want to do'. In other words, he gave me some freedom. *In vitro* fertilization of hamster eggs (Yanagimachi & Chang, 1963, 1964) was started by using one of these free days. I transmitted this work code to my postdoctoral fellows I had after moving to the University of Hawaii.

For many years, I was puzzled by the fact that Chang had accepted me to work in his laboratory. Several years before he died in 1991, he and Mrs. Chang came to Hawaii. While travelling through the Hawaii Volcano National Park, I asked him why he accepted me as a postdoctoral despite my total lack of research experience with mammals. His reply was brief: 'Well, you did good work with fish'. If he had not given me a chance, I would not be where I am today.

After moving to the University of Hawaii

I joined the Department of Anatomy and Reproductive Biology of the University of Hawaii Medical School in 1966. In addition to the hamster, the guinea pig became my favourite model animal to study sperm capacitation, AR and *in vitro* fertilization (Yanagimachi, 1981, 1994). I knew guinea pig spermatozoa had gigantic acrosomes, but I never thought of using them for my study until my colleague – Milton Diamond – had to euthanize many guinea pigs to terminate his neuro-endocrinological study. Even though acrosomes of hamster spermatozoa are much larger than those of mouse and human spermatozoa, guinea pig sperm acrosomes are even far larger than acrosomes of hamster spermatozoa. My colleagues and I combined *in vitro* sperm capacitation and fertilization techniques with light- and electron-microscopy work to study capacitation, the AR and sperm interactions with eggs.

Sperm capacitation

While I was trying to capacitate hamster spermatozoa *in vitro*, the spermatozoa were first moving very slowly. I thought they were going to die. However, when I re-examined them a few hours later, they were moving very vigorously as if they were going to jump out of the dish. I first called it 'activation' (Yanagimachi & Usui, 1974), then renamed it 'hyperactivation' (Yanagimachi, 1981). In a non-viscous medium, hyperactivated spermatozoa display a tortuous tail movement, while in a viscous medium they exhibit a snake-like motion. We found that hyperactivated spermatozoa have greater vigour than pre-activated spermatozoa (Katz *et al.*, 1978). Ca^{2+} – dependence of both sperm hyperactivation, the AR and spermatozoa–egg fusion – was quickly established by using both the hamster and guinea pig (for reviews, see Yanagimachi, 1981, 1982).

Spermatozoa–egg fusion

To study spermatozoa–egg fusion, we first freed eggs from zonae pellucidae using enzymes (e.g. trypsin), then inseminating them with acrosome-intact and acrosome-reacted spermatozoa. We found that only live acrosome-reacted spermatozoa could

fuse with *zona-free* eggs, suggesting that some important physiological change occurs in the sperm plasma membrane upon the AR (Yanagimachi & Noda, 1970; Yanagimachi, 1994). Proper concentrations of H^+ and Ca^{2+} in the medium are essential for successful spermatozoa–egg fusion (Yanagimachi *et al.*, 1980; Yanagimachi, 1988). We found that *zona-free* hamster eggs can fuse with not only hamster spermatozoa but also spermatozoa of various other animals including humans as long as they are acrosome-reacted (Yanagimachi *et al.*, 1976). Even though a *zona-free* hamster egg fused with a single human spermatozoon develops into the pronuclear stage and even into 2-cell stage, it cannot develop further, perhaps because of the incompatibility between the human sperm nucleus and the hamster egg cytoplasm (Yanagimachi, 1977). I first thought that *zona-free* hamster eggs could be used to assess the fertilizing ability of human spermatozoa, but what can be assessed are (i) the ability of acrosome-reacted human spermatozoa fuse with egg plasma membrane of hamster and perhaps human egg and (ii) the ability of human sperm nucleus to develop into a pronucleus. Inoue *et al.* (2005) used hamster *zona-free* eggs to study if antibodies against *Izumo* (spermatozoa-born membrane fusion protein) could prevent membrane fusion of human spermatozoa with eggs. *Zona-free* hamster eggs were also used to examine chromosome constitutions of human spermatozoa (Rudak *et al.*, 1978). We later found that we can examine human sperm chromosomes after mechanical injection of spermatozoa into mouse eggs (Lee *et al.*, 1996; Rybouchkin *et al.*, 1996). Perhaps, eggs of any species can be used to examine human sperm chromosomes by microsurgical injection.

Egg activation

We found that Ca^{2+} ionophore activates eggs of a variety species (including mammal) by releasing Ca^{2+} from intracellular store (Steinhardt *et al.*, 1974). Spermatozoa seem to bring in a factor that triggers Ca^{2+} release from the egg's internal store. We reported that perinuclear material within the sperm head carries this egg-activating factor (at least part of it) (Kimura *et al.*, 1998a).

Spermatozoa *in vivo*

While I was studying spermatozoa and fertilization *in vitro*, I thought that it would be important to know what spermatozoa are doing *in vivo*. I wanted to know how and where spermatozoa are capacitated and reach the ampullary region of the oviduct to fertilize eggs. Using the hamster and guinea pig again, we found that spermatozoa can complete capacitation in the isthmus region of the oviduct (Smith & Yanagimachi, 1989), migrate to the ampullary region of oviduct perhaps being aided by a hormone-dependent adovarian peristaltic movement of the oviduct (Battalia & Yanagimachi, 1979, 1980), with amazing reduction in the number of spermatozoa reaching the ampulla (Cummins & Yanagimachi, 1982; Smith *et al.*, 1987). Based on this information, I made a grant proposal to the NIH to study sperm behaviour and physiology *in vivo*. I thought it was the best proposal I had ever made. To my surprise and disappointment, the proposal received the lowest possible score and it was not funded. One of the referees commented that 'we cannot learn anything from *in vivo* study'. Of course I was very disappointed. Retroactively speaking, I was not intelligent enough to refute this irrelevant criticism. I thus temporarily

discontinued my study along this line. Today we all know that everything on the sperm surface is not involved in the sperm interaction with eggs. Some play critical roles in spermatozoa–epithelium interaction and sperm ascent through the female tract (Okabe, 2013).

Study of sperm nucleus

When I began to study mammalian fertilization in 1960, only very few people were studying spermatozoa and fertilization in mammals. During next 20 years the number of researchers in this field increased exponentially. Molecular approaches to the problem were thought to be the only way to solve the problems of fertilization and reproduction. It was fashionable to study the sperm AR and spermatozoa–zona pellucida interactions at the molecular level. I was already over 60 years old. It was troublesome for me to learn rapidly evolving molecular technologies. Some of our papers were rejected by journals and ratings of my NIH grant applications became lower than before. In other words, I struck a wall. I asked myself what is the most important thing of all I have studied? What is the essence of fertilization? Is it sperm activation, the AR, sperm interaction with the zona pellucida or spermatozoa–egg fusion, and so on? ‘Aha. The heart of fertilization is the union of male and female genomes. The essence of fertilization is a creation of a new individual whose genomic makeup did not exist before and will not exist again in future’. I had forgotten about it. To my surprise, mammalian *sperm nucleus* itself had not been studied much by others. There was room for me, I thought.

My associate Tsuyoshi Uehara and I previously found that the hamster sperm head (nucleus) injected microsurgically (*so-called ICSI*) into a mature egg was able to decondense and transform into a pronucleus even after freeze-drying of spermatozoa (Uehara & Yanagimachi, 1976). We also found that the nuclei of testicular spermatozoa were able to develop into pronuclei (Uehara & Yanagimachi, 1977). However, our study at that time was largely ignored by others. In fact, some even laughed at us. ‘Why did you inject spermatozoa into eggs? They would enter eggs anyway’.

Because I wanted to know if spermatozoa-injected eggs could develop into normal offspring with known genetic makeup, I switched experimental animals from the hamster to the mouse. My associates and I soon found that injection of isolated sperm heads (nuclei) into eggs resulted in normal development of embryos (Kuretake *et al.*, 1996). Freeze-dried spermatozoa could produce normal offspring by ICSI (Wakayama & Yanagimachi, 1998). Because spermatids have haploid nuclei, they might be used as substitutes for mature spermatozoa to produce offspring, which we found to be the case (Ogura *et al.*, 1994; Kimura & Yanagimachi, 1995a). When we injected nuclei of the secondary and primary spermatocytes into mature eggs, each underwent meiosis, two haploid nuclei then united and some eggs developed into live offspring (Kimura & Yanagimachi, 1995b; Kimura *et al.*, 1998b). In the human, injection of eggs with round spermatid nuclei has had mixed results and is still considered to be experimental (Practice-Committee & the Society for Assisted Reproductive Technology of The American Society for Reproductive Medicine, 2004). At least in the mouse, we can obtain live offspring after round spermatid injection. It is important to note that mice (and common laboratory rodents) are ‘exceptional’ in that they do not need the sperm centrosome

for syngamy, the union of spermatozoa and egg pronuclei. Other species, including rabbit, monkey and humans seem to require good sperm centrosome for successful union of spermatozoa and egg pronuclei (Hewitson *et al.*, 2002; Terada *et al.*, 2010). The centrosome in round spermatids may be too ‘immature’ to serve as the centre of microtubular aster formation necessary for orderly movement of spermatozoa and egg chromosome (Tachibana *et al.*, 2009). However, full term foetuses were obtained by treating eggs (rabbit) with ionomycin before and after round spermatid injection (Hirabayashi *et al.*, 2009). I do not believe in ‘exception’. Exception may be telling us something most important.

In the mouse, the readiness of male germ cell nuclei to support normal embryo development is as follows: testicular and epididymal spermatozoa > spermatids > secondary spermatocytes > primary spermatocytes. Interestingly, some spermatozoa with severely abnormal head morphology were able to produce normal offspring by ICSI (Burrue *et al.*, 1996). Germ cells of mouse males lacking the CREM gene cannot develop beyond the round spermatid stage, yet their round spermatid can produce normal offspring by injection into eggs (Yanagimachi *et al.*, 2004).

Mouse cloning

While we were studying the nuclei of spermatozoa and spermatogenic cells, the birth of a sheep, cloned from an adult somatic cell, was announced (Wilmut *et al.*, 1997). Because ‘Dolly’, the sheep, was the only one that survived after birth, people began to wonder if this sheep was really cloned from an adult somatic cell. A scientific magazine listed 10 research Institutions that might report a second cloned animal. Our research team was not among them because we never attempted to cloning animals in our laboratory. However, we had all the equipment necessary for cloning. The instrument we were using for ICSI could be used without any modifications. A postdoctoral fellow Teruhiko Wakayama from Japan was interested in animal cloning – since his childhood – and attempted to clone mice using his free time. Wakayama showed me a midterm foetus cloned using a cell of cumulus oophorus. We were collecting mature unfertilized eggs of mice almost every day for our studies. Cumulus cells were routinely discarded. Soon, Wakayama obtained a live young which was named ‘Cumulina’. Maurizio Zuccotti and I suggested and helped Wakayama to isolate and use Sertoli cell and brain cell nuclei for cloning. The paper we prepared was quickly rejected by a journal which said ‘this is not the subject of general interest’. We then submitted the same paper (with more data) to Nature. One of the two referees approved our paper immediately, but the other was skeptical saying that mice we obtained could be parthenogenetic. It took over 6 months before a third referee approved our paper for publication (Wakayama *et al.*, 1998). Wakayama left my group in 1999, but we continued working on cloning efficiency and epigenetic problems associated cloning in collaboration with Kunio Shiota of the University of Tokyo (Ohgane *et al.*, 2001), Randal Sakai of the University of Cincinnati (Tamashiro *et al.*, 2002) and Rudolf Jaenisch of Whitehead Institute of Massachusetts Institute of Technology (Humphrey *et al.*, 2001), John McCarrey of the University of Texas at San Antonio (Murphey *et al.*, 2009) among others.

Over 10 years ago, I received a frozen cadaver of a transgenic mouse from a friend. This male mouse, died of an unexpected flood, was the sole animal with unique genotype. To make this story short, we could not clone this mouse because that time we did not know how to recover and handle cells from frozen body for cloning, which can be performed today (Wakayama *et al.*, 2008). Nevertheless, cloning by somatic nuclear transfer should be a temporal, supplemental method for animal reproduction. Total dependence of animal reproduction to cloning, which eliminates genomic diversity among individuals in a colony, would be detrimental for long term survival of any species.

After my retirement

Although I retired from the University of Hawaii in 2005, I continue to work on mammalian fertilization at a much slower pace than before (Watanabe *et al.*, 2013). In addition, I started to work on fertilization in non-mammalian animals (e.g. fish and insect) with big help from my friends (e.g. Yanagimachi *et al.*, 2013). Because I was a zoology major student when I was in Japan, working with non-mammalian species is no problem. It is fun and exciting to uncover something new, even if many others think the subjects are trivial and insignificant.

WHAT I SHOULD HAVE KNOWN WHEN I WAS YOUNG

When I was a graduate student, I thought I did all the hard work and my mentor did nothing. I thought I knew new things better than the mentor. I was totally wrong. Nothing started without his direction and advice. Students should not forget about this. I know a few persons who did Nobel class research, yet did not respect each other enough and could not go along. It was a pity to see such occurrence. The subject of our scientific research is nature, but it is us – humans – who do the work. If human relationships are not good, there can be no real success in scientific research.

When I was a student, I thought everything written in scientific papers and books are facts. I did not doubt ‘well-known’ reports, theories and concepts. Now, I think the majority of the reports in papers are not reporting the truth. Of course, authors believe that they are reporting facts. ‘Facts’ are, however, authors’ interpretations and are not necessarily facts. Humans tend to see what we believe in or wish. Most of us feel comfortable by accepting currently popular concepts or ‘dogmas’. Again, the majority of dogmas are not true at all or representing only part of the whole.

We face difficulties from time to time during research. Human IVF, for example, was thought extremely difficult 50 years ago. Now it is easier than IVFs in many animals. Fifty years ago, we did not know the tricks. In other words, nothing is difficult; we just do not know necessary tricks. The late Prof. Robert (Bob) Noyes, MD (1919–2008), who was a pioneer of fertilization study and recruited me to the University of Hawaii, told me a story. At Harvard Medical School during late 1940s, he was trying to fertilize rabbit eggs *in vitro* without success. When he talked about this to Prof. John Rock (gynaecology professor- co-inventor of oral contraceptive), he told Bob ‘See what the rabbit is doing’. Until then, Bob was using ejaculated spermatozoa for insemination. He then thought about how rabbit spermatozoa reach the oviduct where eggs are waiting for spermatozoa. When he used spermatozoa collected from oviduct of mated females (~10 h after coitus), it was an instant success. In a meeting in Boston,

Bob told this story to Drs. M.C. Chang (1908–1991) and C.R. Austin (1914–2004). According to Bob, they did not say anything. At that time Bob was busy in finishing his study of human endometrium (with John Rock), or he did not fully realize the implication of his important finding in the rabbit. Chang and Austin, who were working on animals’ fertilization, must had been doing similar experiments. They soon published papers about sperm capacitation within the female genital tract (Austin, 1951; Chang, 1951). Three lessons can be learned from the above: (i) when you have trouble, look at what Mother Nature is doing, (ii) keep thinking what is important and what is not very important and (iii) publish important findings without delay.

SOME ADVICE

(1) *Do not mind ‘foolish’ questions.* Obviously I am not a genius. I consider myself mediocre, yet in 2003 I was one of 15 persons bestowed with the ‘Hall of Honor’ from the Shriver National Institute of Child Health and Human Development. The only thing I know of myself is that I like asking stupid questions. Nine out of ten questions I made and continue to make were/are stupid or non-sense. Yet, one out of ten proved to be good. The father of modern genetics Thomas (Tom) Hunt Morgan once said: I have made three kinds of experiments in my life. First: stupid experiments. Second: more stupid experiments. Third; worse than the other two. When he first reported a mutation in the fruit fly *Drosophila*, one in the audience (Morgan’s friend) commented ‘Tom, you are using the wrong species’. In those days guinea pig, chicken etc were standard model animals for genetic studies.

(2) *A ‘what’ will blossom in future.* The most important assets in your laboratory are not the most expensive equipment in your laboratory but rather your brain. Computers have already surpassed human’s memory power, but they cannot dream. You can. You can dream without spending a penny. Keep dreaming big. The bigger, the better. Keep asking what is of fundamental importance (what is the essence of the problem). You will be surprised to find that the most important thing has not been explored, or people have overlooked or ignored it. There is a saying. ‘When you see a bandwagon, it is too late to ride on’. What is working today stems from the discovery of >20–40 years ago. What will blossom 20–40 years from now is unexplored, overlooked, ignored or underestimated today.

(3) *Be confident.* New scientific ventures, reproductive technologies in particular, are destined to face ‘ethical’ and ‘religious’ opposition in one form or another. Fear of the unknown is very natural to laymen. It is the responsibility of scientists to let laymen know about facts and implications of new findings and/or technologies. It may take a long time to get public confidence in new technologies. In the early stage of the development of the cardiac pacemaker, for example, many theologians and religious people opposed the use of this instrument, denouncing it because attempts to revive dead (dying) people from God’s hands is wrong. I (Ryuzo Yanagimachi) am still alive today thanks to this marvellous devise. When gynaecologists induced ovulation in infertile women using gonadotropin from farm animals, many people including some medical professionals opposed it, even saying - ‘Do not treat ladies like cattle’. When human IVF was first attempted, it became the subject of moral objection, not only from laymen but also

from some scientific colleagues. Many thought, without any concrete evidence, that assisted-fertilization and - reproduction in any form would quickly propagate infertility factors among the general population. Remember that the pioneers were the ones who could withstand criticism and continued what they believed in.

(4) *Be the first, not the second.* Our paper of mouse cloning in 1998 drew much attention from media perhaps because we, unlike (Wilmut *et al.*, 1997), produced three generations of cloned animals (clone of clone of clone) using adult somatic (cumulus) cells. In the same year, Kato *et al.* (1998) reported the birth of eight cloned cattle using adult somatic (cumulus and oviductal) cells of a single adult, followed by cloning of animals of many other species (for reviews, see Meissner & Jaenisch, 2006; Niemann & Lucas-Hahn, 2012). It was the late Keith Campbell who lead a team that tirelessly attempted to clone sheep using both embryonic and foetal cells (Campbell *et al.*, 1993, 1996). Campbell was convinced that cloning would be possible by using adult somatic cell nuclei. At that time it was generally thought that adult cells are terminally differentiated and had lost totipotency. In science, the difference between the first and the second is enormous. Remember the lunar landing. We all vividly remember who landed on the moon first, not the second or third ones. The same is true for biological and medical sciences. Be the first, not the second.

(5) *Mentor-student relationship and one's life-time project.* Each mentor has his/her own way to work with students and associates. Because I like to make my own experiments, I run small preliminary experiments after reading or learning of something new which might be useful for our studies. Even very light bench work has kept my mind fresh and alert. When students got their heads stuck against a wall, I often could provide them with some constructive advice. Experience was important. It can be used to avoid repeated mistakes. On the other hand, experience often prevented me from thinking or challenging something new. When I said it was impossible, because I was wrong in many cases. Good students carried out the experiments anyway and proved me wrong.

Each of us should keep a life-time project in mind. Instead of one, I had a few projects going side by side. It might be seen unrelated (e.g. in vivo and in vitro studies of fertilization), but each had the same grand goal. When one project struck against a wall, I set it aside for a while. I myself, or more often someone else, cleared the barrier or gave me a hint. Then, I resumed the study. It might be dangerous to use a single approach or have a single project. As long as all have one and the same grand goal, running more than one study simultaneously would be safer and may be more efficient.

(6) *Tips in obtaining research grants.* When we apply for a research grant with our own initiative (e.g. NIH's RO1 grants), a key to succeed is asking an important question, not just filling in details. When you write a grant proposal, it is ideal to be 1–2 years ahead of your publication. If you have good preliminary data almost ready to write papers, you can make a very strong proposal. Of course, you should not say that you have performed all or most of the experiments. Research topics are of critical importance. Let reviewers say 'Oh my heavens! Why did we not think about this'. The funding institution is like a bank. They want to invest in the project for expected return. If it is too risky, they will not give you even a penny.

Your bank is competing with other banks. If your research is very likely to raise the bank's status, it becomes very willing to invest in your project regardless of the amount of money you request.

To obtain a research grant in the USA is very tight these days. Some projects such as stem cell and iPS cell research are fashionable today. It is easy to ride on a bandwagon. Some are happy to be one of a crowd. If I were you, I might get some funds from stem cell or iPS cell research projects (bandwagons) for example. While studying what you promised to do (your bread and butter), collect good preliminary data for the project of your real interest.

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EDITORIAL

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Lessons learned in Andrology: revelations on a road less traveled

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Laureate Professor Aitken's research career began with a PhD in reproductive biology from the School of Veterinary Medicine, University of Cambridge under the supervision of RV Short. Following postdoctoral positions at the Institute of Animal Genetics, University of Edinburgh and the University of Bordeaux, he joined the World Health Organization in Geneva, where he managed two WHO task forces within the Human Reproduction Unit. In 1977, he was appointed to the Medical Research Council's Reproductive Biology Unit, University of Edinburgh, to establish a research group in gamete biology with clinical outreach into male infertility. In 1998 he moved to the University of Newcastle, NSW, as Chair of Biological Sciences and, later, as Director of the ARC Centre of Excellence in Biotechnology and Development. He is currently Pro Vice Chancellor of the Faculty of Health and Medicine. John has published over 500 research articles and his work has been cited >27 000 times. He has received numerous awards including the Simmett prize for reproductive biotechnology and in 2012 was named as NSW Scientist-of-the-year. John is a Fellow of the Royal Society of Edinburgh, the Royal Society of New South Wales and the Australian Academy for Health and Medical Sciences. He is also a Fellow of the Australian Academy of Science and President of the International Society of Andrology.



INTRODUCTION

Like, I suspect, many of the other contributors to this 'Lessons-in-Andrology' series, I did not start out in life hoping to become an andrologist. Indeed, from a personal perspective, even the notion of becoming a scientist was a relatively late revelation. My journey into science, and ultimately andrology, has been almost half a century in the making, involved a significant amount of meandering across two continents and was more the beneficiary of good fortune than any good judgment on my part. Even within the microcosm of reproductive science, andrology would be considered a road less traveled, despite the major relevance of this topic to infertility, the future of fertility regulation and the efficiency of animal production. Nevertheless, notwithstanding our discipline's status as a minority sport, I am forever grateful that the vicissitudes of fate and fortune have steered me into this particular corner of the reproductive landscape. In this article, I shall trace some of the milestones along this unexpected journey through the foothills of reproductive science to

an andrological mountaintop, and consider whether I have picked up any useful advice on my travels that I can offer those whose journey has only just begun.

THE JOURNEY

Cambridge reproductive biology

After a couple of false career starts, I eventually undertook a BSc degree in Zoology at the University of London for no better reason than this was the swinging 60s and London was in full swing. I enjoyed the reproductive component of this degree and at its conclusion decided that I would undertake a Masters degree in Embryology and Mammalian Reproduction at the University College of North Wales, instigated by one of the pioneers of reproductive science, FW Rogers Brambell (famous for discovering the transfer of passive immunity across the yolk sack placenta of the rabbit and for his Chairmanship of the UK Government's 'Brambell Committee' on intensive systems of

livestock husbandry). Toward the end of this degree I wrote a speculative letter to another giant in reproductive science, Dr Roger Short who, at the time, was a Reader in the Department of Veterinary Clinical Studies at the University of Cambridge. Amazingly, Roger wrote back and invited me down to Cambridge for an informal discussion on potential research activities. This was the great turning point of my life. Roger applied for a PhD scholarship from the Medical Research Council (MRC) to study embryonic diapause in the roe deer (*Capreolus capreolus*) and, to my great delight, the application was successful (Aitken, 1974). Suddenly, I found myself catapulted from complete intellectual obscurity to 1970's Cambridge, which, at the time, was the international nerve center for reproductive research. In the mid 1970's Cambridge hosted two major research institutes dedicated to reproductive science – the ARC Institute of Reproductive Physiology and Biochemistry directed by Thaddeus Mann and containing people of the caliber of Bob Moore, Dub Adams, Twink Alan, Chris Polge, Hector Dott and Tim Rowson, and the Babraham Institute of Animal Physiology which hosted such luminaries as Brian Heap and Brian Setchell. The major pre-clinical Departments of the University (Anatomy, Physiology and Biochemistry) also had a strong focus on reproductive science and featured yet more major figures in the field including Bunny Austin, Alan Parkes, Bob Edwards, Martin Johnson, Matt Kaufmann etc. Fellow PhD students were the likes of Gerald Lincoln, Azim Surani and Roger Gosden, all of whom went on to make history in their respective regions of the reproductive landscape. I have very vivid memories of this time, when reproductive science was in its prime and the characters who drove it were larger than life. Roger Short in particular was, and is, the most inspirational mentor that anyone could wish for. He is the most accomplished speaker I have ever heard, has an encyclopedic knowledge of reproductive biology, has a breadth of vision that few can match and, despite the advancing years, continues to provide a constant flourish of new ideas.

Edinburgh reproductive biology

After Cambridge, I secured a position at the University of Edinburgh to conduct research on blastocyst implantation with another colossus of reproductive science, Anne McLaren. Anne had graduated from the University of Oxford and studied under both Peter Medawar and JBS Haldane – she was scientific royalty. My first year in Edinburgh was one of the most challenging in my life. I had changed laboratories, changed animal models and changed *modus operandi* from descriptive studies on feral animals to a more mechanistic approach using the mouse as an animal model. For the first 12 months I just could not get any traction in my research; there was a lot of activity and the wheels were spinning but the ideas were ill-conceived and there was little real progress. Nevertheless, I learned some important techniques and in the second year of my MRC Fellowship suddenly found a rich vein of gold. I had become adept at *in vitro* fertilization and embryo transfer and had acquired some competence in the electrophoretic analysis of proteins. Combining these techniques I launched into a frenetic burst of activity, which saw my publication rate rise dramatically and with it, my spirits.

Following a further postdoctoral fellowship at the University of Bordeaux and a very instructive stint with the World Health Organization's Human Reproduction Unit, where I worked

with Mike Harper, I returned to the University of Edinburgh to take up a position in the newly established MRC Reproductive Biology Unit. I had been recruited to the Unit to work on the biochemistry of embryo implantation. However, after spending several months in gynecology wards hoping that someone would drop the odd milligram endometrial tissue into my stainless steel bowl, I finally came to the realization that if I was to make any headway at all in reproductive medicine, I needed to find a cell type that I could access directly, without depending on the largesse of my clinical colleagues. As a direct response to this need for clinical material I took my first faltering steps into andrology with the encouragement of Roger Short and one of the leading figures in this field, David Mortimer,

It was difficult; we had very rudimentary laboratory facilities and I had no real vision about how we could influence this field. However, after a couple of lean years we moved into a brand new building, The Centre for Reproductive Biology in Chalmers Street, and everything changed. I was joined by Edwina Rudak from Pat Jacobs' laboratory in Hawaii and she introduced me to the zona-free hamster oocyte penetration test, introduced by another scientific hero, Ryuzo Yanagimachi. Yana's endless energy, powers of observation and spirit of inquiry had discovered this heterologous *in vitro* fertilization assay and I focused on developing its clinical application; not so much as a diagnostic tool (it was far too complex a procedure to be used in routine clinical practice) but as a bioassay that would allow us to investigate the molecular mechanisms that regulate sperm function (Aitken *et al.*, 1991). I reasoned that if we understood, at a biochemical level, why the spermatozoa generated by infertile males have lost their competence for fertilization, then we could use this information to gain insights into the etiology of this condition and possibly even develop some rational therapeutic strategies. In this venture I was aided by a team of highly talented research assistants and inspired by some brilliant clinicians and scientific colleagues. Stewart Irvine, now Director of Medicine with the NHS, was outstanding as both a student and, later, as an MRC Clinical Consultant, connecting us to the clinic and ensuring that a translational focus was always center stage. Another inspiring presence within the MRC Unit was Rodney Kelly, a biomedical research scientist whose approach was rooted in fundamental chemistry. This niche at the interface of biology and chemistry was a natural one for me to inhabit and has helped create a unique point of differentiation and focus for our group's research activities down the years. It was this approach that led me to understand that the failures of fertilization we were detecting with the zona-free hamster oocyte penetration test were frequently the result of free radical attack and the induction of peroxidative damage to the sperm plasma membrane (Aitken *et al.*, 1989; Moazamian *et al.*, 2015). This concept is now widely accepted and there are thousands, if not hundreds of thousands, of subfertile males taking antioxidant therapy in the hope that it will improve their chances of conception. One day I hope we shall have secured definitive evidence to support such intervention.

Newcastle reproductive biology

In 1997 I received a random phone call enquiring whether I was interested in a Chair in Biological Sciences at the University Newcastle. Once we had established that this was Newcastle

Australia and not Newcastle-upon-Tyne, I agreed to come out to NSW and site visit the Department, the University and the region. All of these I found so beguiling that uprooting myself from the MRC Unit to take up the Chair of Biological Sciences at the University of Newcastle, NSW, seemed full of exciting possibilities. Although I started out with the ambition of unhitching myself from reproductive science and changing research direction, in the event my new life became an extension of my old life; once again, I returned to andrology and the quest to understand the cell biology of spermatozoa. On this leg of the voyage, I again had the good fortune to work with great colleagues and talented students in one of the most beautiful parts of the world. We established a Priority Research Centre in Reproduction with my colleague Roger Smith and must currently have around 100 people in the group working on a broad spectrum of reproductive issues from conception to parturition. In terms of andrology, I am fortunate to be working with the likes of Brett Nixon, Mark Baker, Zamira Gibb and Geoff De Iulius. We have a very active program on sperm cell biology in a range of species from horses to duck-billed platypi and Mark, in particular, has been instrumental in pioneering the use of mass spectrometry to understand the fundamental biochemistry of these cells. In addition, we have had a lot of fun recently working on the developmental biology of a range of sub-mammalian species including annelid worms, oysters and fish, just as Yana described in his Lessons-in-Andrology article (Yanagimachi, 2014).

LESSONS LEARNED

I have not consciously plotted a path through life but generally just tried to run as fast as I could in any given situation while retaining a capacity to respond to new opportunities as they arose with as much enthusiasm and energy as I could muster. In addition of a high level of commitment I think, on reflection, there may be a few principles that have kept me in good stead during this journey. For me, the most important have been:

Lesson 1: Resilience

A career in science is clearly not for the faint hearted. It is intellectually challenging, extremely competitive and the road is marked by many a deep pothole of disappointment. You may even have to weather an occasional broadside from the lumbering galleons of mediocrity – and have to exercise restraint. You may also receive accurate fire from the flagships of scientific reason – and have to exercise humility. People who excel in research usually have a deep, almost obsessive commitment to their trade and an inner resilience that allows them to ride out the tides of adversity that invariably punctuate the researchers' path.

Lesson 2: Humility

I have been struck by how many previous contributors to this series have, in their different ways, cited humility as a key attribute of an effective researcher. I think it goes hand-in-hand with creativity. At the heart of our business is a need to be creative and act as a constant wellspring of new ideas for our students and collaborators. An inevitable element of this process is that many of these ideas will turn out to be wrong. Having the humility to admit defeat with equanimity is critical – as is having colleagues around you who can point out your stupidity without malice or too much enthusiasm.

Lesson 3: Read, read, read and then read some more

Early in life, I learned the importance of reading and assimilating the scientific literature in order to build an internal landscape of how the reproductive system worked. This epiphany was largely the result of reading Arthur Koestler's 'Act of Creation' which pointed out that insight (the force that through the green fuse drives the flower of discovery) is achieved by the juxtapositioning of disparate pieces of information to create a new synthesis. Successful scientists are forever reading, assimilating and mentally rearranging information in an internal intellectual kaleidoscope, looking for new patterns to illuminate the path ahead. The capacity that modern technology gives us to chase down an idea by accessing vast databases from our desktop computers is staggering and, dear students, should be exploited at every available moment.

Lesson 4: Be versatile

All over the world the gravitational pull of fiscal austerity means that the tide of federal funding for research is constantly on the ebb. With application success rates falling below 10% in many countries, it is essential that scientists diversify their income streams if they are to retain the capacity to run large successful laboratories. In order to achieve this end, they have to be flexible enough to accommodate the needs of Government Departments, philanthropic organizations and industry. Successful engagement with industry is particularly important and requires a high level of professionalism and a capacity to empathize with the goals of your commercial partners.

Lesson 5: Engage intellectually with the leaders in your field

In this highly competitive world, it is important for young researchers to get their work noticed by opinion leaders in the field. I would encourage any early career academic working in andrology to send pre-prints of their papers to leading researchers and engage with them intellectually over the direction their research is taking. I would also encourage students and Fellows to use every chance they get to present their data to national and international meetings – and polish their presentations to the point that they get invited back.

Lesson 6: Stay optimistic

When the Australian artist Margaret Olley was asked why she kept on painting even though, at the time of being interviewed, she was well into her eighties, she responded that every time she put a brushstroke on a virgin canvas, she thought she was about to produce her best-ever artwork. I think that it is this kind of powerful optimism that keeps andrologists motivated, engaged and excited about the future even though some of us have been researching the complexities of the male reproductive system for a lifetime and still struggle to gain a good understanding of the process.

CODA

There are several other principles that have been helpful to me, but many of these precepts have already been covered by others in this series (have fun, aim high, work hard etc.). At this point, I think I have tried your patience long enough. Ultimately, vision, commitment and humility are for me the hallmarks of good science and effective leadership. I wish all those embarking on similar journeys *bon voyage* – and *bon chance*; like me, you might need it.

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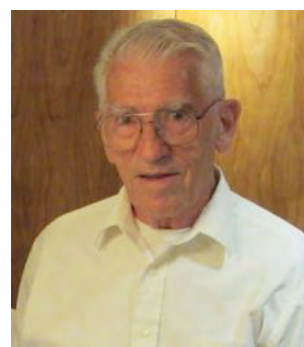
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Lessons learned in andrology: physicians and animal scientists can learn from each other

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Rupert P. Amann sought greater use of superior dairy bulls through artificial insemination; now ~0.4 billion inseminations annually for all species. He completed Ph.D. studies with John Almquist at The Pennsylvania State University, was a postdoctoral fellow in Copenhagen, returned to Penn State where he rose to professor in 1972, was recruited to Colorado State University in 1979, and after 'retirement' in 1995 continued university-based research (as emeritus professor) and directed research for two small businesses. His often pioneering research with animals (15 species) and humans emphasized measuring sperm production, maximizing sperm harvest, endocrine regulation of puberty and testis function, effects of environmental agents on a male, sperm maturation, evaluation of sperm quality and efficient use of spermatozoa. His breadth is evident in 229 publications (11 in last 6 years) cited in 4421 articles by others. His interest in both animal and human andrology enabled wide-ranging presentations to animal scientists, biologists and physicians. He was involved in launching the American Society of Andrology, founding the Society for Study of Reproduction, and served both societies in



numerous roles including council and program chair, meeting host and for ASA as President (1989-90). He was honoured by ASA as Distinguished Andrologist (1995) and for Distinguished Service by both ASA and the SSR. His research contributions, service activities and awards are detailed elsewhere (Anonymous, 1996; Seidel, 2008).

I entered professional life in the golden age of academic environments when universities fostered unfettered exploration of knowledge with: (a) few bureaucratic dictates; and (b) carefully awarded funds to answer important questions, acceptance of risk, wide sharing of thoughts and observations, judicious rather than intervening concern about intellectual property and recognition of true contributions. Today's research climate is very different and, perhaps, keeps young non-clinical investigators from thinking how to improve whole-animal reproduction. Investigators would be well advised to identify real problems, and bring in techniques to find solutions.

This paragraph is for young investigators and starts with overarching advice, namely be honest and 'have fun'. Enjoy seeking out and learning from leaders within and outside your area of interest. In later years, if professional activities become drudgery, abandon them and apply your knowledge in something exciting. Five other messages deserve your consideration. None is new, but the fourth too often is ignored. (1) Do not accept

mediocrity, in yourself or others in your field. (2) Formulate your approaches to address societal problems and get practical solutions, rather than identify a seemingly new and ever-smaller fundable unit. (3) Bring or develop new techniques to help in your quest and do not overlook far-distant applications of your new information. (4) Be explicit in phrasing the 'question' or hypothesis when planning research and be sure the methods will provide meaningful answers and allow valid conclusions. (5) Seek out and cherish a critical thinking and straight-speaking colleague(s) to provide an independent perspective to sharpen your question and clarify a funding application or publication. The remainder of this article describes how these 'messages' evolved or were implemented during my career.

Ideal implementation of (1) probably requires more tact and tolerance than I have demonstrated (Anonymous, 1996; Seidel, 2008).

Applying message (2), my graduate school was selected to enable seeking practical solutions for improving dairy cattle via

artificial insemination (AI). This quest continued for 55 years, down a winding path facilitated by development/adoption of numerous techniques which, together with broad thinking, also provided answers for far-distant applications with other species (message 3). Addressing thoughts embodied in (2) and (3) was why I sought funding for postdoctoral study in Copenhagen to learn application of radioisotopes in studies of andrology. Principles of quantitative autoradiography of isotope-labelled cells, and validation with other techniques, were drilled in by a world leader (Hilde Levi) and still impact andrology (Amann, 2008). A base in Europe also enabled face-to-face discussions with a diversity of biologists and andrologists at a time when intercontinental communication took weeks.

In Europe I learned the benefit of bringing clinicians and investigators together regardless of species to discuss/dissect critical questions and consider what quantitative approach(es) might provide answers. A decade later, I enthusiastically contributed to the nascent ASA as it fostered interactions among andrologists studying domesticated animals, humans and laboratory animals. Unquestionably, ASA-sponsored interactions facilitated development and validation of CASA (implementation of message 3) by researchers, clinicians and commercial developers (Amann & Katz, 2004); current perspective in Amann & Waberski (2014). Also, a discussion with Stuart Howards (University of Virginia Medical School) at an early ASA meeting resulted in a collaboration (messages 2 and 3) in which he collected and froze testes and epididymides from 25 men dying suddenly, and sent them to me at Penn State where we enumerated testicular spermatids and epididymal spermatozoa using techniques validated with bulls, rabbits and rhesus monkeys (Amann & Howards, 1980). The quantitative data forced conclusions that sperm production in men was much less efficient than in any other mammal studied [still true], sperm maturation in the epididymis typically was accomplished in ≤ 2 days, and the cauda epididymis might contain 2–4 day's production of spermatozoa. Amann (2008) provided an update. The concept in message (2) and discussions at an ASA meeting, resulted in provision of data for 20 ejaculates from each of 50 human semen donors by David Karabinus (Genetics & IVF Institute) to enable estimating precision of a single sample for characterizing number of spermatozoa in an individual's semen, and the impact of abstinence interval on total spermatozoa per ejaculate. Confidence intervals around a hypothetical value for a future subject were presented as a function of number of samples evaluated (Amann & Chapman, 2009). Also, it was concluded that a physician should insist on an abstinence interval of 42–60 h so that values were not distorted by the epididymal capacity for spermatozoa (Amann, 2009).

Message (4) should be implemented at all levels of education and professional life. Editors of *Andrology* expressed concern about irreproducibility of many published studies and implored authors to provide sufficient detail to allow replication (Carrell & Rajpert-De Meyts, 2013). They emphasized that peer reviewers and journal editors needed to do a better job. I disagree – this is far too late and addressing problems during grant review also is too late! In preparing this submission, I dug out my notes on the 'pattern of inquiry' from my first weeks of graduate study. A one-half page diagram summarizes what you can read on the internet searching 'elements of the scientific method'. Is such material no longer taught or are the essentials ignored? Identification

of a discrepancy in what is known (i.e. literature) or a question is the starting point, but early on consider if society is likely to recognize 'value' to your potential solution and pay the cost of research. The 'when planning' aspect in take home message (4) also was a major emphasis at Colorado State where faculty and students regularly met to cut-up and re-assembled research proposals before seeking funding, before starting a project or study therein, and again before manuscript submission. The best tangible evidence of critical thinking is: (a) a written question(s) or hypothesis which is explicit, precise and considers the underlying biology; (b) analytical methods linked to elements in the hypothesis/question, locally validated and documented to provide meaningful information; and (c) clear a priori stipulations how measured outcomes will be used to refute or support the hypothesis. Absent (c), the project should not start.

In the planning stage make evident if the objective is finding a statistically significant difference between/among two or more treatments or categories, a biologically meaningful difference or strong evidence for equivalence of two or more groups. Each of these objectives might require a different number of observations. Too many studies (experiments) are designed to be inconclusive for a variety of reasons, including incorrect assumption of 'experimental units' resulting in an underpowered study. For example, when co-incubating spermatozoa and oocytes the experimental unit is drop of medium not oocyte.

Implementation of message (5) requires willingness to listen and participate in sometimes painful exchanges, and to thank your straight-speaking colleague. Inevitably, your project or publication will be improved when you address comments from critical thinking colleagues. My demanding graduate mentor taught me to accept such advice, while steering me to research areas and techniques (message 3) he was unfamiliar with. Critique of a project proposal or draft publication requires cutting through the verbiage and examining the essential why, what and how. As a journal reviewer, too often I read an introduction that focuses on 'why' and fails to provide an explicit 'what'. In this case, it is impossible to determine if the analytical methods, numbers of subjects and statistical methods are appropriate; hence, the results can only be unacceptable and the discussion is 'hot air'.

Andrologists should never lose sight of the end-user of their efforts. Individuals in today's society are interested in reproduction for two reasons: (i) capability to contribute to production of a daughter or son or prevention thereof; and (ii) necessity for provision of sufficient wholesome and economically priced food to eat. For these reasons the field of andrology will not disappear. However, perceptions of need will change. In the 1960s, the push was for 'zero population growth' and increasing food production. Current concerns are insufficient population replacement, population ageing and impact of relocation of temperate-climate zones on production of food for humans and fodder for animals. Linkage of genome and phenotype will enable production of animals or plants appropriate for a climate. Maximizing use of superior males, my research area, will continue to be an important tool in animal agriculture; perhaps a 'finalized technology'. Today, declining fertility is a major concern for physicians and producers of cattle or pigs and owners of older female horses. Subfertility is a phenotypic problem with myriad causes, some genome based. At least in animals, causative factors centre on the female-microenvironment interaction

exacerbated by poor management. Amelioration of the situation for a given couple or group of animals will require differential diagnosis and individualized therapy, enabled by the explosion of valuable methods. What does this portend for andrology? Each investigator might intentionally change his/her comfort zone to target the evolving needs of society and ever stronger competition for funds. Perhaps the five messages provided above can help you contribute to society and engender their financial support.

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Lessons learned in andrology: looking at the spermatozoa in context

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Erma Z. Drobnis began her academic career with a BA degree in mathematics. After a year in the Peace Corps working on a goat meat production project, she continued her work on goats with a master's project on sperm cryopreservation, thus becoming an andrologist. After completing her MS in Animal Science at Cal Poly Pomona, she began doctoral work at the University of California, Davis, initially continuing to work on goat sperm cryopreservation. There she met David F. Katz and was drawn to his work on the biophysics of sperm motility. She spent 13 years with the Overstreet and Katz group, completing her thesis on the mechanics of sperm penetration of the cumulus matrix and zona pellucida with David Katz; postdoctoral work on sperm cryobiology with James W. Overstreet and John H. Crowe; and research as adjunct faculty. For the last 20 plus years she has been director of the clinical andrology laboratory at the University of Missouri, Columbia, conducting research; teaching in the medical school; and assisting Ob/Gyn faculty and residents with statistics. Notable has been her epidemiology work with Shanna H. Swan and her sperm glycobiology work with Gary F. Clark. She has been a member of the American Society of Andrology and the American Society of Reproductive Medicine (formerly the American Fertility Society) for nearly 30 years and was a charter member of the Society for Male Reproduction and Urology.



My career has involved many switchbacks and pivots, but taken together, has given me a unique vision of sperm biology from basic, applied, and clinical standpoints. I feel deeply honored to be asked to share the lessons I have learned in andrology for this series. A task to which I devote considerable time is reviewing papers for a variety of fertility journals. The lessons I present here address some of the knowledge gaps I see frequently in submitted manuscripts.

I became an andrologist because I wanted to do research on goats; I grew up on a suburban ranch in Los Angeles where we raised dairy goats. After completing my bachelor's degree in mathematics, I joined the Peace Corps and worked on a Food and Agriculture Organization of the United Nations goat meat production scheme, assisting with applied research. Back in the states, I looked for a school where I could do a master's degree studying goat production. Edward A. Nelson at Cal Poly Pomona

had a UNAID Collaborative Research Support Programs grant, looking at reproduction in small ruminants. He needed a graduate student to set up a semen cryobank. I was tasked with this project and figuring out how to freeze goat and sheep spermatozoa. There was no one at Cal Poly freezing spermatozoa at that time, and I had never collected spermatozoa from any species in my life, so I learned by visiting a local bull stud and endless hours in the library reading countless papers. My experience in my master's program taught me that it was possible to begin work in a scientific area without direct assistance from experts in the field, which brings me to my first lesson:

THERE IS A RICH LITERATURE ON SPERM BIOLOGY OFTEN OVERLOOKED TODAY

This literature extends back to the early 20th century. Although modern research instrumentation was not available at the time,

there are outstanding papers with key observations that remain relevant to work being conducted today. Some of the great papers are from cell biology, zoology, or animal science and are not always searchable on MEDLINE and PubMed. Early papers are not as compact as those today; hence, they are rich with observations that are omitted from more modern literature. Because these papers are not always available online, we are often reinventing the wheel in andrology. I have learned that while formulating a research question, it is helpful to find high quality review papers and follow the references back to the classic papers, looking for observations relevant to my research question. In addition to those of my advisors, there were a number of excellent reviews that had great impact on my early career (Mann, 1964; Blandau, 1969; Mazur, 1970; Graham, 1978; Watson, 1981; Yanagimachi, 1981; Saacke, 1982; Bedford, 1983; Moore & Bedford, 1983; Mortimer, 1983, 1994; Quinn, 1985; Hunter, 1988).

From working with goat semen specifically, I learned another important lesson that is often overlooked:

SEMINAL PLASMA IS TOXIC TO SPERMATOZOA

While the seminal plasma activates sperm motility and contributes important molecules to the sperm membrane and surface, prolonged incubation in seminal plasma damages spermatozoa in some species. In particular, goat seminal plasma contains high levels of phospholipase A₂, and spermatozoa left in the seminal fluid for more than a few minutes die rapidly. Although human seminal plasma is much less toxic, although toxicity can be significant in some men (Rogers *et al.*, 1983), affecting sperm function rather than changing the motility observed at semen analysis. One observation I made when I first started research with human spermatozoa was that cryosurvival is poor if the spermatozoa remain in whole semen for more than the time required for liquefaction. At UC Davis, we had our research donors collect specimens at home and leave them in a locker where a technician picked them up. These spermatozoa did not survive freezing and thawing; but when I had the donors collect at our facility, the problem resolved. Many seminal plasma constituents act on the female reproductive tract rather than providing a medium supporting the fertilizing spermatozoa (Overstreet, 1983; McGraw *et al.*, 2014).

SPERM CONCENTRATION IS NOT NORMALLY DISTRIBUTED

The academic part of my master's program was a long haul because I was not even a biologist! It required 2 years of undergraduate coursework. Although I had taken probability and statistics as part of my math degree, I had never even done a *t*-test. A course by Melinda J. Burrill on experimental design got me started in biostatistics and later in my career, Steven J. Samuels taught me more about biostatistics, and I continue to improve my knowledge of experimental design and data analysis by reading texts, papers and courses online. This is one of my current roles in my department, where I give lectures on experimental design and assist faculty and residents with their research. But back to andrology:

I occasionally feel like an army of one reminding authors that it is invalid to describe sperm concentration or total sperm counts from groups of men with the mean and standard deviation (or standard error). Sperm concentration is highly skewed,

and must either be transformed to normality, or described and analyzed using non-parametric statistics. For displaying the results, a box plot, the median and inter-quartile range or the median and its 95% confidence interval accurately illustrate these non-normal variables. The difference between means in a study is highly influenced by the outliers having high sperm concentration in each group. When the correct statistical methods are used, they sometimes reveal significant differences that were otherwise obscured.

After completing my master's degree, I went on to the University of California, Davis, where I initially continued my work with goat semen. While learning objective measures of sperm motility, I met David F. Katz. I was immediately drawn to his work on the biophysics of sperm motility, and that became my doctoral work. I remained in the Overstreet and Katz research group for a total of 13 years, (including 2 more years of undergraduate coursework in systemic physiology and cell biology), completing my PhD with David Katz; conducting postdoctoral work on human spermatozoa cryobiology with James W. Overstreet and with John H. Crowe in the zoology department; and finally becoming an adjunct faculty member. While working on sperm motility I learned that:

THE SPERM HEAD IS FLAT AND, LIKE A CILIUM, THE FLAGELLUM BEATS PRIMARILY IN A SINGLE DIRECTION WITHIN THE PLANE OF THE HEAD

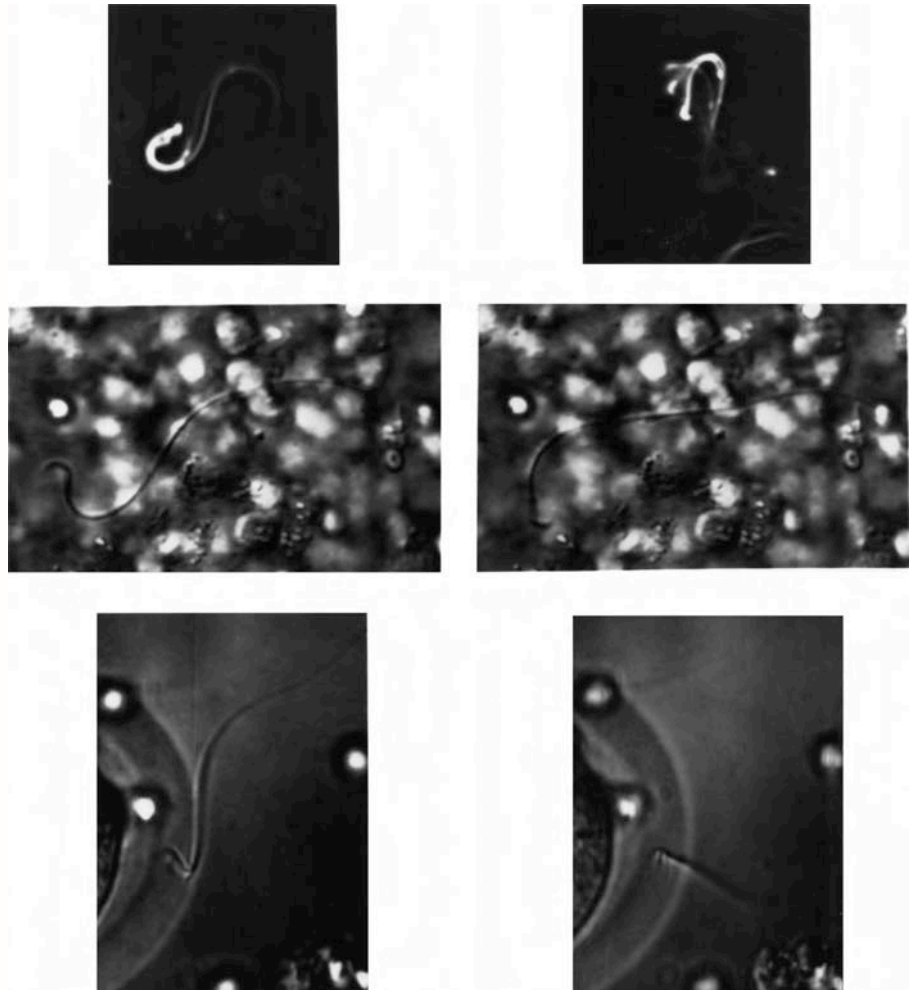
Although the flagellum does not beat in both directions, forward motility is achieved by the spermatozoa rolling along the axis of progression. Once motility is hyperactivated, and the sperm head is embedded in the zona pellucida, the large flagellar bends and straightened flagellum cause the sperm head to rock in the zona material, appearing to cut knife-like through to the perivitelline space (Fig. 1).

A major advantage of working in the Overstreet and Katz group was that the ideas of even the youngest member of the group (e.g., the undergraduate hired to wash glassware), were taken seriously, as was information from every scientific discipline, basic and applied. This resulted in new ideas that challenged old assumptions. The lessons I learned there, and attending Stanley Meizel's weekly journal club, are too numerous to cover here, but the theme is taking a 'sperm's eye view' of sperm function in vivo (Katz *et al.*, 1987). With the advent of the assisted reproductive technologies, the focus has largely shifted away from the rich and complex natural history of the fertilizing spermatozoa on its journey from the testis to the oolemma. Although for basic biology experiments, we must focus on isolated cells and molecules, the most important lesson I learned as an andrologist is always consider the spermatozoon in its biological context:

THE FERTILIZING SPERMATOZOA SPENDS LITTLE IF ANY TIME IN CONTACT WITH SEMINAL PLASMA

The population of spermatozoa capable of achieving fertilization migrate quickly into the fluids of the female reproductive tract; meanwhile, the seminal fluids are diluted by female tract secretions. Human semen (as in other primates, ruminants and rabbits) is deposited in the vagina in close apposition to the cervix, from which spermatozoa migrate into the cervical mucus. In other species (e.g., rodents, dogs, pigs, horses) whole semen is deposited in, or is rapidly drawn into the uterus, from which

Figure 1 Flagellar beats similar to a cilium. The sperm flagellum beats primarily in a single direction within the plane of the head. Upper row: hyperactivated hamster spermatozoa swimming free in culture medium; middle row: hamster spermatozoa penetrating the cumulus cell matrix; lower row: hamster spermatozoa during penetration of the zona pellucida. The latter spermatozoa successfully crossed the zona pellucida and fused with the oolemma. Photographs were taken from the video monitor. Spermatozoa were collected from mated hamsters and 50–200 spermatozoa per oocyte were added to cumulus-oocyte complexes, compressed to 100 μm depth. Videomicroscopy utilized 40 \times Nomarski, interference contrast optics, a shuttered 60 Hz camera, and a 3/4 inch tape recorder (details in Drobnis *et al.*, 1988a,b).



spermatozoa migrate through the tight uterotubal junction (UTJ), gaining access to the oviduct. Looking at human semen after liquefaction in a specimen cup is not observing how spermatozoa behave at any time during their natural history in the female.

THE FERTILIZING SPERMATOZOON IS RARELY SWIMMING FREELY IN VOLUMES OF FLUID

After deposition of semen in the female reproductive tract, fertilization-competent sperm do not remain in the lumina of the tract where sperm are most easily collected for study; rather, the fertilizing population moves in the complex milieu at epithelial surfaces. Although we often use cartoons of the female tract showing fluid-filled tubes, no such structures exist. The lumen of the reproductive tract is minimal, while the epithelia have an enormous surface areas with deep glands, crypts, folds, and ciliated surfaces. The fluid in the small luminal spaces is continually refreshed by secretions, flushing out the spermatozoa less able to maintain refuge in mucins at epithelial surfaces. After deposition in the vagina, spermatozoa with strong motility and appropriate surfaces migrate into the cervical mucus, gaining entry to the uterus by swimming along the surfaces of the cervical epithelial cells. A superb study by Mullins and Saacke (1989) used stereomicroscopic and computer reconstruction on serial sections of the bovine cervix to determine the three dimensional structure of

sperm migration. Down in those folds and crypts are where you will find the most motile spermatozoa, migrating to the uterus. Spermatozoa reach the oviduct assisted by adovarian uterine contractions present during the periovulatory phase. At this stage, spermatozoa migrate through the UTJ and form ligand-specific attachments to isthmic epithelial cells. Susan S. Suarez, who was Jim Overstreet's postdoctoral trainee when I joined the group, has done brilliant work on this association in multiple species (Suarez, 2008; Hung & Suarez, 2010). She has also shown that the UTJ, isthmus and ampulla of the oviduct are mucus filled. In association with the isthmic epithelial cells, sperm motility slows and remains quiescent for up to several days. Once ovulation occurs, some sperm detach from the isthmus, in part due to acquisition of hyperactivated motility, and ascend to the oviductal ampulla.

SPERMATOZOEA MUST RELY ON OTHER CELLS FOR SURVIVAL AND FUNCTION

The spermatozoon is small with minimal cytoplasm and most of its DNA packaged compactly on protamines, unavailable for transcription. Thus, the spermatozoon relies on epithelial cells and their secretions in the male excurrent tract, female reproductive tract, and eventually in the ooplasm to enable its functions. When we remove spermatozoa from their normal niches, we can no longer be sure we are observing the behavior they would display *in vivo*.

IT TAKES VERY FEW GOOD SEMINAL SPERMATOZOA FOR A MAN TO BE FERTILE

A remarkable example showing that very few sperm are required for normal fertility has been reported in some men with hypogonadotropic hypogonadism. When treated appropriately with gonadotropins, spermatogenesis is initiated, and these men can be fertile with much lower total spermatozoa than is considered normal (Burris *et al.*, 1988), as low as 1 million/mL. Clearly these men have a higher proportion of 'good sperm'. It is important to remember that the few spermatozoa capable of attaining fertilization *in vivo* are a small fraction of the large, motley population of seminal spermatozoa that we study. Even after careful sperm selection for IVF, many thousands of motile spermatozoa are inseminated per egg, while only a few are believed to be present at the site of fertilization *in vivo* (Yanagimachi, 2011). In research studies, a measure or treatment effect seen in the evaluated population of spermatozoa may not apply to the spermatozoa competent for fertilization.

THE DIFFERENCES IN SPERM QUALITY ARE SUBTLE

When heterospermic insemination is used to deposit equal numbers of motile spermatozoa from two highly fertile males, one of the males will fertilize the majority of oocytes (e.g., Overstreet & Adams, 1971; Vicente *et al.*, 2004). This method, first used in the 1950's in mice (Edwards, 1955) has been used extensively in food animal species to compare the fertility of males and spermatozoa treatments. It shows that even in fertile males, there are subtle differences in sperm quality that influence reproductive success.

THE FERTILIZING SPERMATOZOON IS NOT ALWAYS VIGOROUSLY MOTILE

In fact, vigorous motility is not always a good sign. Under various conditions *in vitro*, including cooling and warming or freezing and thawing, spermatozoa can display highly active motility and undergo the acrosome reaction due to damage to sperm membranes. Modest increases in intracellular calcium promote both high amplitude flagellar bends and acrosomal exocytosis. While media have millimolar calcium concentrations, intracellular calcium is in the nanomolar range. The spermatozoa remain functional for only minutes after completing the acrosome reaction, so premature acrosome reaction is a bad sign if additional sperm function is required. In contrast, there are times in the sperm's natural history when motility is quiescent, as during transport in the epididymis and when stored in the oviductal isthmus.

In my reading while writing a review with Jim Overstreet on the natural history of mammalian spermatozoa in the female reproductive tract (Drobnis & Overstreet, 1992), I learned another lesson of which some sperm biologists seem unaware:

THE FEMALE REPRODUCTIVE TRACT DOES NOT ENTIRELY FAVOR SPERM MIGRATION

Rather than providing the ideal environment for each spermatozoon to achieve fertilization, the female reproductive tract impedes most spermatozoa, ensuring that only one spermatozoon reaches and fuses with the oolemma of each oocyte. This is accomplished, in part, by restriction of spermatozoa lacking required surface characteristics, attack by immunocompetent

cells, secretion of fluids that flush spermatozoa from the epithelial surfaces, and production of smooth muscle contractions that serve to remove spermatozoa from the female tract. Only a few spermatozoa with appropriate motility and surface characteristics are able to run the gauntlet and reach the oolemma. If the female tract is excessively stringent, or the population of spermatozoa exhibiting the required characteristics is insufficient, fertilization becomes unlikely. Teleologically, it is in the male's interest to produce many spermatozoa and in the female's interest to reduce sperm numbers to exactly one at the site of gamete fusion (Parker, 1984). It cannot be assumed that secretions and cells collected from the lumina of the female reproductive tract will produce environments most favorable to spermatozoa.

Just as I was finishing my doctoral work, the AIDS epidemic had become a major focus. Because men could transmit HIV before serum antibodies were detectable, it was apparent that donor spermatozoa must be quarantined, and the donor re-tested for HIV prior to using his specimens. Although human spermatozoa had been cryopreserved for many years with some success, improved methods were desired to increase the feasibility of universal cryopreservation for donor insemination. The NIH released a request for applications on human sperm cryopreservation, and Jim Overstreet and I were awarded one of these grants. When I re-entered the field of sperm cryopreservation after years in basic science, there was renewed appreciation of the membrane lipid composition in cryosurvival:

THE SPERM PLASMA MEMBRANE HAS IMPORTANT SURFACE DOMAINS THAT ARE DISRUPTED DURING CRYOPRESERVATION

We have known for decades that sperm membranes are organized laterally into domains composed of specific membrane lipids and associated proteins (Fawcett, 1975; Quinn, 1985). From the standpoint of cryobiology, the composition of various domains is crucial as different lipids undergo their phase transition from sol to gel at different temperatures. As spermatozoa are cooled, each lipid undergoes its phase transition and separates laterally into a gel phase region. Packing faults between adjacent gel regions increases the permeability to key substances, notable calcium ions. Membrane proteins, excluded from newly formed gel domains, aggregate and can fail to disperse following warming. These membrane changes cause the phenomenon of 'cold shock', which occurs when spermatozoa (and many other cells) are cooled rapidly above the freezing point (Watson & Morris, 1987).

Working with John H. Crowe, we used Fourier transform infrared spectroscopy (FTIR) to detect shifts in the $-CH_2$ absorbance peaks that accompany the phase transition of membrane lipids. We determined that the temperature at which spermatozoa of different species undergo cold shock cryodamage, as measured by potassium leakage and loss of motility, is related to the temperature at which membrane lipids undergo the lipid phase transition (Drobnis *et al.*, 1993). In humans, the critical temperature is at about 20 °C and differs between men.

Also at this time, a seminar by Roy H. Hammerstedt (Hammerstedt *et al.*, 1990) got me thinking about the sperm glycocalyx:

SPERM MEMBRANES HAVE A THICK GLYCOLALYX THAT MEDIATES SPERM INTERACTIONS WITH OTHER CELLS

The glycocalyx, a combination of complex glycans largely attached to membrane glycoproteins is some 70 nm thick in mammalian spermatozoa, thicker than that of most cells. Glycoproteins are added to and removed from the sperm surface during its natural history, changing how it interacts with epithelial surfaces and the oocyte vestments. Looking at sperm membrane proteins without consideration of their complex glycosylation can be misleading. I realized the importance of the lateral domains and surface glycoconjugates to sperm capacitation, and incorporated this information into a review of that subject (Drobnis, 1992). As I have since learned, working with Gary F. Clark, the important glycosyl residues on the sperm surface are not just the terminal monosaccharides, but are the complex, arboreal structures spermatozoa use to evade immune surveillance and interact with their environment, including the oocyte investments (Clark, 2014).

One of the accomplishments I am most proud of in my career is working with my student, Ted L. Tollner and reproductive primatologist Catherine A. VandeVoort to produce the first offspring from a non-human primate using cryopreserved spermatozoa (Tollner *et al.*, 1990). This was the first species in which I attempted freeze spermatozoa for which cryopreservation techniques had never been developed.

In 1994, I left Davis to become a clinical laboratory andrologist in Obstetrics and Gynecology at the University of Missouri, Columbia. One of the most important lessons I learned in clinical andrology was from a seminar by Rebecca Z. Sokol, and it had a profound impact on how I view care of the infertile couple:

THE MAN IS AN INFERTILITY PATIENT AND WE SHOULD TREAT HIS INFERTILITY

Ideally, the goal in reproductive medicine should be to treat male factor infertility, allowing the male patient to achieve pregnancies by natural intercourse. As a patient, the man should have his own medical advocate to ensure he is getting the treatment he needs for his medical condition. Life-threatening conditions can present as an abnormal semen analysis (Jarow, 1994; Jequier, 2006; Esteves *et al.*, 2011). The male patient may not be best served if he is seen only by a gynecologist and the first therapy considered for his infertility is an assisted reproductive technology.

Due to the financial challenges shared by academic hospitals over the last two decades, I have only intermittently had a laboratory technician. In consequence, I have personally examined countless semen samples during that time, learning in the process:

FAILURE OF SEMEN TO LIQUEFY IS UNRELATED TO SEMEN VISCOSITY

Surprising as it seems, I have reviewed several papers recently in which liquefaction failure was confused with semen viscosity, even when viscosity was the subject of the study. It can be difficult to differentiate these physical properties in the clinical laboratory, particularly because small areas of coagulum can remain once the large gel mass has apparently liquefied. However, there is an easy way to determine if liquefaction is complete: while the

molecular mesh causing hyperviscosity is transparent under phase contrast optics, the coagulum is opaque, and the final stages of liquefaction can be readily observed under the microscope.

GEL DROPLETS IN SEMEN CAN LEAD TO OVERESTIMATION OF THE SPERM COUNT

Although the gel fraction is significant in some species (e.g., pigs and horses), this fraction of human semen is rarely discussed in the literature, even in protocols for semen analysis. Though often absent, the gel droplet fraction can account for over a milliliter of the semen volume and is important for at least two reasons, the gel droplets: (i) exclude spermatozoa, thus leading to overestimation when the total sperm count is calculated; and (ii) have high density and will disrupt gradients used for sperm separation. Gel droplets dissolve over time, but not within the time limits required for accurate determination of motility and preparation for cryopreservation or intrauterine insemination. Determination of the gel droplet volume is easily accomplished by centrifuging the whole semen for 1 min at 200 *g*. The gel volume can then be observed and the supernatant decanted back into the specimen cup for additional processing. For the 187 semen analyses performed in my laboratory in 2014, 37% had gel droplets with a median volume (interquartile range; range) of 0.2 mL (0.1–0.5; 0.1–1.6), and median percentage of gel in the semen volume of 9% (5–14%; 1–35%).

TOTAL SPERM COUNT IS AS IMPORTANT TO EVALUATE AS SPERM CONCENTRATION

In a recent paper, Rupert P. Amann (2009) argued convincingly that the total sperm count and total sperm count per hour of abstinence were better measures of male fertility than sperm concentration. I agree that this is true for men with low to medium semen volume, and the total count should always be included in reports of semen quality. However, in contrast to ruminants, in which the semen volume is low and the sperm concentration is relatively high, in humans, the semen volume varies widely and the concentration of spermatozoa in direct contact with the cervix after coitus is important. In the case of men producing large ejaculates with normal total counts, the fertility may be impaired because much of the semen is not retained near the cervix, and this will be reflected by the low sperm concentration but not by the total sperm count.

It has been a pleasure to write this account of my lifetime journey learning lessons in andrology. This has been a great opportunity as I was forced to revisit my assumptions, shedding a new light on what I have learned in the course of 35 years as an andrologist. I hope that some of these lessons will be useful to younger andrologists following their dreams.

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EDITORIAL

Lessons in Andrology: many paths to success

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D. L. Vogel, M.D., Ph.D. is the Director of the Professional Development Office, Johns Hopkins Medical Institutions. She graduated from Bryn Mawr College, and the Medical Scientist Training Program at the Albert Einstein College of Medicine. Her Ph.D. is in developmental biology, and her clinical subspecialty is endocrinology. She worked at NIH for 25 years, initially as a clinical fellow conducting clinical and basic research. Dr. Vogel managed a grant programme for 13 years, and then became the first Director of an office dedicated to enhancing the professional experience for postdoctoral fellows. She has been at Johns Hopkins since 2007. There, her Office provides courses, workshops and guidance on transitioning to independent careers in science. Dr. Vogel teaches and advises students, fellows and early-career faculty in the Schools of Medicine, Public Health and Nursing. She has organized many workshops, published research and administrative papers and book chapters, and has received awards from NIH, the US Public Health Service, professional societies and community groups. A member of ASA since 1983, Dr. Vogel is a Past President of the Society (2012–2013) and Chair of Women in Andrology (1994–1996). She has served on the Executive Council and several committees. These include Awards, Student Affairs, Nominating (Chair), Constitution and Bylaws (Chair), Membership and Trainee Affairs.



Hello, I'm Donna, and I'm an andrologist. I say this not because we're in a 12-step recovery programme. I say this not even because of the constant need to define the term. No, I say this to declare my ongoing self-identification as a scientist, specifically, one with a professional interest in the biology and health of the male. The lesson of this article is that there are many paths to success in a career in science.

Since early childhood, I knew I wanted to be a scientist, with an image out of an old horror movie: solo operator, wild-eyed, sparks flying, test tubes bubbling. By the time I reached medical/graduate school, it was chronologically the early seventies yet still politically the sixties, so, of course, I wanted to save the world. With reproductive biology as my chosen route, the cocktail party line was, 'I want to find the perfect male contraceptive'. Even though I was intent on a research career, every time the choice came up whether to do another year of clinical training, I kept saying yes. The result was 3 years of residency in Internal Medicine. So, part 1 of

the lesson is, don't close any doors. Always keep your options open.

I came to the National Institutes of Health for subspecialty training, allowing me to combine a clinical endocrinology fellowship with a research postdoc. By good fortune, my husband-to-be was also accepted to a fellowship at NIH in the same year. We married the autumn before moving to Bethesda, and went on to have two sons. Thus, part 2 of the lesson, expect your preconceptions about your personal life to change. At the National Institute of Child Health and Human Development, I trained with Richard Sherins. I saw an astonishing array of patients with infertility and other reproductive disorders, while developing a degree of independence in my research on pituitary gonadotropins.

Time passed. Having become an ageing postdoc, I began to look at mainstream jobs in academic medicine, and quickly realized that I didn't want to live on a roller coaster. Some people thrive on the ups and downs, but I needed some

stability. Part 3 of the lesson, then, is pay attention to your personal values – they are important and not to be dismissed. But what to do? There was no such thing as career development. So, I started to talk to people, many of them in the ASA. It was networking, we just weren't using the word yet. Conversations led to more conversations, and eventually to my first job out of my postdoc. I became the Program Officer for Reproductive Medicine – still in NICHD, but on the extramural (grantmaking) side. I stayed in my field, just working from another perspective. People always asked if I missed the laboratory, and honestly, I didn't. In Extramural, you have the opportunity to make a much larger impact than you do as a hands-on researcher. I sometimes felt like I had a laboratory with 600 people in it. Of my many jobs, this was the one I've had the longest, so far. Part 4, and it's still true, is, there is no such thing as talking to too many people. If you are an introvert, or otherwise networking-averse, learn the skills, practice them regularly and you will be in a much stronger position to steer your own voyage of career exploration.

Along the way, in addition to my own portfolio of research grants, I was given responsibility for training and career development in my Branch – all the Ts, Fs and Ks. Working with students, fellows and junior faculty, I quickly realized, was the part of the job I enjoyed the most. Around this time, it occurred to many organizations that 'we have to do something about postdocs' but nobody seemed to know what that was. After 13 years as a Program Officer, I had the opportunity to be part of that 'something' as the first Director of a new office for intramural postdocs in the National Cancer Institute. But I almost didn't apply for the job. I couldn't tell from the Vacancy Announcement what they wanted. It turned out, they didn't know it yet, but they were looking for me. Who better to run your postdoc office than someone who knows a lot about early-career grants? That makes Part 5 of the lesson, apply to jobs that don't sound

exactly like you, because you might actually be the best candidate.

During several years at NCI, we initiated a number of worthwhile programmes, some of which are still ongoing. I left the federal government in 2005, worked at a foundation briefly, then (again) through pure networking, found my current position. I head the Professional Development Office on the East Baltimore campus of Johns Hopkins, serving students, fellows and junior faculty at the Schools of Medicine, Public Health and Nursing. We offer courses, workshops, other career-related events and individual advising. I am now in what has turned out to be my dream job. And I never saw it coming. If you had asked me 8 or 10 years ago, what is the top priority for your next career move, I would have said 'an easy commute'. I used to walk to work. Now I have a half-hour walk, then take two trains and a bus. Part 6 ? Know that your professional priorities can – and likely will – change.

To all of the student, trainee and early-career andrologists reading this, I encourage you to be active in your Society. Yes, you should pay your dues and read your *Andrology* journal. But do more. Submit manuscripts, be a reviewer, present at the meeting, join a committee, run for office. For over 30 years, I have been active in the ASA. I've contributed where able, to help the Society and our field. Despite the fact that I have neither done an experiment nor touched a patient in decades, the ASA saw fit to accord me international visibility and a leadership role. To come full circle: whether by a conventional or an unconventional route, if you stay open to the possibilities and embrace change, you can achieve success in your own career in science.

Editorial Note: After 25 years at the National Institutes of Health and 8 years at Johns Hopkins, the author retired in April. She remains active in ASA, particularly as a career resource for trainees and early career investigators. She continues to identify as a scientist.

EDITORIAL

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Lessons learned in Andrology: Yves Clermont, an interview by Lonnie D. Russell

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INTRODUCTION

Dr. Yves Clermont (Fig. 1) is famous for putting order into the life history of mammalian germ cells as they evolve from spermatogonia to spermatozoa. He accomplished this by defining specific cellular associations in cross-sections of seminiferous tubules referred to as stages of the cycle of the seminiferous epithelium in many species, including humans. He and Dr. C. P. Leblond were credited with the very first description of stem cells (Clermont & Leblond, 1953) and actually coining the term for the first time, cells that are today instrumental in many facets of modern day cell and molecular biology. Dr. Clermont has also touched on many different facets of germ cell differentiation (spermatogenesis), such as the flagellar cytoskeleton and Sertoli cell participation. He is also famous for his description of the germ cell Golgi apparatus in 3-dimensions and that of many other cell types in other organs and coined the term Golgi ribbon. He had an extraordinary love for teaching that reached thousands of undergraduate and medical, dental and graduate students and was awarded the prestigious William Osler Teaching Award. As a skilled artist (Fig. 2), he rendered blackboard drawings during his histology lectures, which were indeed spectacular. His style and passion for his work were complemented by a remarkable sense of good humor.

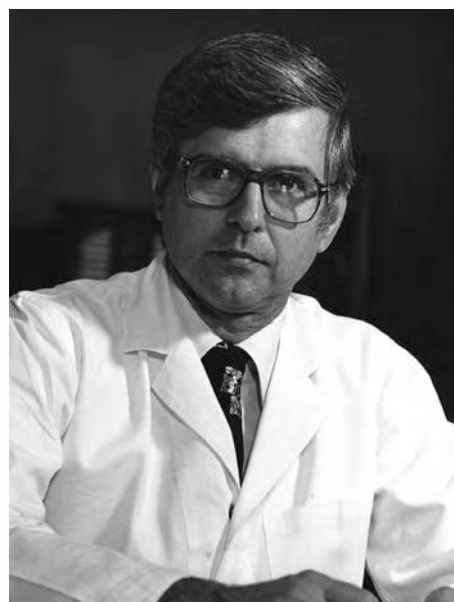
He was born on August 14, 1926 and passed away on October 10, 2014. Lonnie Russell, who had completed a postdoctoral fellowship under the supervision of Dr. Clermont from 1973 to 1975, interviewed his mentor shortly after a symposium held in his honor at the Spermatology Symposium held in Montréal, Québec, Canada in September of 1998. Dr. Russell passed away unexpectedly in 2001 and the original tape recording was discovered in his office. The following is an edited transcript of this interview. The recorded interview will be made available on the McGill University website.

THE INTERVIEW

Russell: Where were you born?

Clermont: Montréal

Figure 1 Dr. Yves Clermont in 1988, Professor in the Department of Anatomy, McGill University, Montreal, Quebec, Canada.



Russell: What do you remember most about your childhood?

Clermont: I remember many wonderful things. I had a fantastic and pleasant life all through my youth. I was hardworking at school, of course, having all sorts of activities. They were very exciting years – especially my teen years were super.

Russell: On the note of education, would you describe your parents as giving you a push for education? Or, did you feel it inside yourself?

Clermont: My parents didn't have the opportunity to go to school very long, but both of them felt that it would be good for us, my two brothers, my sister and I, to pursue our studies through the university level. My two brothers

are lawyers. My sister is an artist. I just went to the University. It was my parents' idea that, to be well-developed, we had to complete our training at universities. They are responsible for this. They didn't encourage us to follow my father and work in the fur trade.

Russell: Did you enter graduate school shortly after completing your Bachelor's degree?

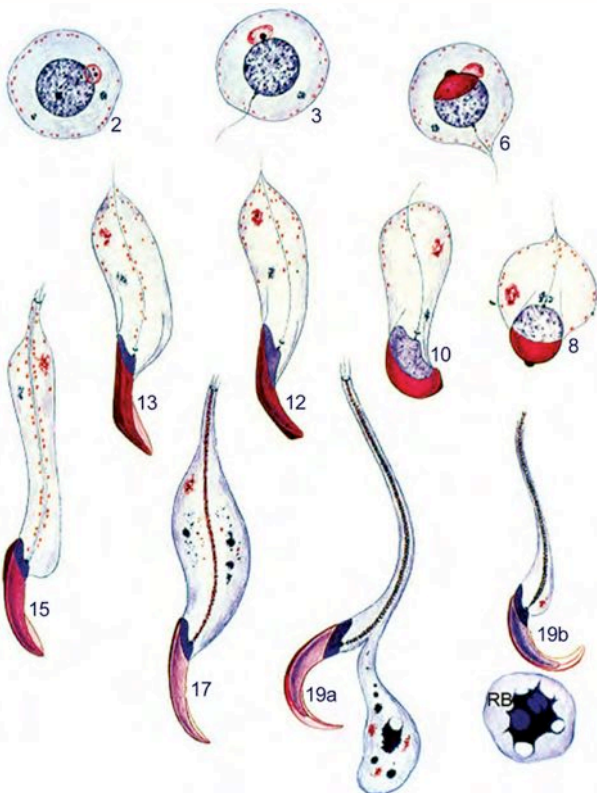
Clermont: I was a student at the University of Montreal in biology. I was having a general training in biology and taking courses in a wide range of disciplines such as bacteriology, biochemistry, and zoology. At the time, the number of openings in graduate studies was minimal, and they were in areas that didn't excite me too much. While I was completing my BSc in biology, I was concerned about what I would do afterward. I was asked by one of the professors in biology at the University of Montreal to go and work on a summer project. It happened that Leblond was involved in that project. The goal of the project was to try to explain whether salmon molting was caused by the influence of the thyroid gland. So, I went to work in the Laurentians (mountains north of Montreal) the year before I graduated. The only job I was doing was to

take care of the fish, to clean the basins and to inject the fish with thyroid hormone. So, it was a very mundane type of activity. The person in charge of the project worked directly under the supervision of Leblond. So I didn't have direct contact with Leblond. But at the end of the summer, the end of August 1948, he said in passing, casually, that 'if you are interested to do graduate studies in histology you may come to see me.' That was it. After that it was absolutely evident to me that I had no choice. I had to come to work with him at McGill. That was appealing to me, I had done a little bit of histology at the university and had found it absolutely dull, presumably because the teacher was not stimulating. But, I don't know why, I liked to look through the microscope at organisms of all kinds, including histological sections. It rang a bell so to speak and I said now I know what I will do next. That was summer 1948. Then, September arrived, I completed my BSc degree in May 1949. Instead of planning on a summer vacation, I decided to go see Dr. Leblond.

At the time, I didn't know a word of English. I knew how to read English, but had never had an opportunity to speak it. I remember that I came to the Anatomy Department at McGill University and I had to write my introductory sentence. 'May I see Dr. Leblond, please?' because the secretaries were only English speaking. He accepted me, but contrary with what he said at the meeting the previous summer, he wasn't sure of keeping me as a graduate student. So, he took me because I was coming from the University of Montreal and he wasn't sure of my background. He said, 'I will take you conditionally.' I still have the letters from the graduate faculty saying that I was accepted – first, if I had my degree and second, if I was satisfying the requirements of Dr. Leblond. As soon as I graduated in May, I came to work - I didn't wait until September. He very quickly showed me these slides that he had on periodic acid Schiff stained sections showing carbohydrates. So, I worked during that summer, and it is then that I worked out the classification of steps of spermiogenesis and of the stages of the cycle of spermatogenesis. When Leblond saw that, he felt that I was probably good enough to pursue my graduate studies and changed my status from conditional to permanent. Then, things were moving very well and very quickly. We were accumulating observations of all kinds. He felt that I should not spend time writing a Master's thesis, which was at the time a requirement. I moved straight to the PhD. In the meantime, instead of writing a thesis, we wrote our first article dated 1952, but we took 2 years to write it. So the time that we spent writing the first manuscript was enormous. But, the final product was there (Leblond & Clermont, 1952a). Because I went straight for the PhD, I finished it in just 4 years, in 1953.

Russell: In speaking with Dr. Leblond, he indicated that the initiative for this project, other than showing you the slides, was yours, and the classification of

Figure 2 Dr. Clermont was an artist and illustrated nearly every major observation that he published, including the acrosomic changes that defined the stages of spermatogenesis. The photograph shown here is one of his color drawings, which illustrated PAS staining of the Golgi apparatus and the acrosomic system in rat spermatids. These illustrations of spermiogenesis were used in his first manuscript (Leblond & Clermont, 1952a) and laid the foundation for his PhD dissertation.



spermatogenesis was derived by you. In those days, it must have been the custom that the Senior professor was the first author.

Clermont: Yes, that's correct. At the time what sort of experiences did I have in writing a solid scientific article? This was the big part of his training, because he had experience, and he knew how to organize an article for publication, make illustrations, and organize tables. Of course, his input was enormous. I was working on this tissue, with so much excitement and things developed very well. In those days the research director was usually putting his name first. But that was accepted by everyone.

Russell: That has never bothered you, then?

Clermont: Never. Dr. Leblond was very honest about all the publications we had together – very correct, all the time, in my opinion. There is no problem.

Russell: After the first couple of publications with Leblond, you did several others with him as well?

Clermont: Oh yes, before I finished my PhD I had five or six publications (Leblond & Clermont, 1952a,b; Clermont & Leblond, 1953; Clermont, 1954; Clermont & Benoit, 1955; Clermont & Haguenu, 1955; Clermont et al., 1955a,b). One written in French on the hamster (Clermont, 1954). We worked well together all along. He was very demanding, because he was telling us all the time that 'perfection is the enemy of the good'. But, he was, himself, a real perfectionist in writing these papers. Most of his publications are very well thought through – every line, every word is perfectly in place. This is something that I learned from him. You have to realize that this classification of spermatogenesis that we devised was performed very simply for one reason. It was to find a tool, an instrument to investigate the renewal of the spermatogonial population. I thought of this classification after what, a maximum of 6 months of work or less. This orientation to study the spermatogonial population encouraged me to go in that direction - that was my first objective. It was a very exciting period because I could see data accumulating on the spermatogonial population at various stages of the cycle. An exciting story that was far more precise and accurate than those that had been circulating at the time. We had no idea of the duration of the process at the beginning, but we had some landmarks. From quantitating spermatogonial population we could see, for example, exactly when the spermatogonia were dividing, and whether the divisions were synchronized or at random. We clarified that right from the beginning. Then we injected colchicine to block cells in mitosis and we immediately saw these peaks of mitosis. That was quite exciting. My thesis was directed at understanding the behavior of the spermatogonial population in the rat, in the monkey and in one or two other species. The staging of spermatogenesis was

a fallout of something I needed for my thesis; it has been useful for my own work and for the work of others. The idea of the existence of the cycle, was well known by everybody who was working on the testis; it had been well-described by Regaud at the beginning of the century (Regaud, 1901), in particular, and many others. My objective was to find a reproducible method of identifying the stages of the cycle of spermatogenesis - that is all. Interestingly enough, this classification has become better known than the renewal of spermatogonia.

Russell: And would you describe yourself as more driven by Leblond's drive or self-motivated at this time?

Clermont: I profited tremendously from the presence of Dr. Leblond, of course, but it was not his drive that stimulated me. It was just to see him being passionate about research. Drive and passion are two different things. Drive is hard work – people are working because they have to work. Leblond was always excited, even euphoric! When he was coming over, because I was having an office right next to his, each time I showed him something new or something special, he said, 'Oh boy, this is so exciting'. But, I was equally excited. He did not have to push me.

Russell: You mentioned the topic of spermatogonial renewal. As you know, there is another theory proposed by Huckins and Oakberg. The data can be translated in two different ways of looking at spermatogonial renewal. Where do you sit now with your own theory and those of others?

Clermont: Having worked on whole-mount of seminiferous tubules with Bustos-Obregon (Clermont & Bustos-Obregon, 1968), having accumulated a mass of quantitative data with Louis Hermo (Clermont & Hermo, 1975), Martin Dym (Dym & Clermont, 1970) and other students, and using radioautography, I developed the conviction that there are two classes of stem cells - and this has not changed. Whether others agree with that, I now couldn't care less. I still believe that what we have done was well-documented, it was evident, it does not mean that it will not change, but if you ask my opinion now, I am as convinced about the various modalities of cell proliferation and renewal than I was 25 years ago. Now, understand that I have stopped working on these things. You cannot spend all your life on one thing, and I was not trained to use other techniques such as the isolation of spermatogonia. I did not have the tools or the expertise to use these methods. But the evidence I had, indicated to me that I was on the right track. Maybe I am prejudiced, but I was never convinced that my opponents, and I have at least two or three, were right. Because, it was not evident what they were telling me. It never overcame the quality of the mapping and what this mapping was saying in normal or in irradiated animals. I still have tons of data that I have never published – I

did not have time – on X-irradiation on the spermatogonial population. I still have that at home, and it simply confirms our views, my views and the views of my colleagues. So you see, this is my attitude. Now, if you tell me that in certain conditions, the spermatogonial renewal takes place differently, if they have the facts to support this, I will have to accept it. Don't forget that my career is practically over and I don't care if somebody shows something different – on the contrary, I would be happy to see somebody move ahead with some solid facts. For 10 years, I was practically alone working on these topics, so I was not prejudiced one way or the other. And I was alone with my students or colleagues. I had accumulated a mass of facts that was supporting my theory; no, it is not a theory, it is a suggestion, So that is my attitude, even though I was not sure that my 'suggestion' was correct, when I was seeing other studies, I wanted to be absolutely convinced that they had the facts to support their view.

Russell: After a period you obtained a faculty position at McGill. . .

Clermont: Yes, very quickly.

Russell: You have found yourself working more independently with time. But you might want to address the issue of autonomy.

Clermont: Yes, of course. I think this is very interesting. It is very positive too, because as soon as I finished my PhD, I stayed here for a year and wrote a few articles on the renewal of spermatogonia, the very first one on that topic. I started to work on the wave of the seminiferous epithelium. I did all sorts of studies on the development of the testis, with Bernard Perey, this work I did as a graduate student and published only later. There were so many interesting things. I was doing pretty much all of this by myself. Then I went for a year of post-doctoral training and in those days post-doctoral training was very nice, especially when you were going to Europe. I enjoyed my year tremendously, but I used it to learn the techniques of electron microscopy. That was in 1954–55. The first Porter-Blum microtomes were developed, the first RCA microscopes were being produced, so it was a field that was opening up. I went in the lab at the Cancer Institute in Villejuif (Paris, France), and worked with Wilhelm Bernhard and learned the methodology of electron microscopy. Then I came back to the Department and in my mind, I was not thinking of going anywhere else, because when I left for my post-doc, Dr. Leblond told me 'If you want to come back, you may come back.' I said, 'I am coming back.' So it is nothing complicated. And this is the interesting thing. I continued to work, more or less in contact with Dr. Leblond. We published a number of articles on the spermatogonial population of the monkey. We worked on the isolation of the carbohydrates from the acrosome of the guinea pig – we did all sorts of things,

quite interesting.

There is a point that should be underlined, which is exceptional in a sense. Considering that a man of the caliber of Dr. Leblond, a very strong, dynamic person, there were two possibilities for our relationship. Either he gave me my full independence, or I would go under his thumb and therefore, would not have stayed here very long. Dr. Leblond in the most elegant way, told me 'now, you are on your own.' . . . That was quite interesting, because, as you know in the European style the 'patron is the patron' and for life. But, from then on he was always interested in what I was doing; he was always making suggestions and corrections of the manuscripts, but never imposed himself on my research orientation. This is really close to a miracle, when you consider the character of the man. I should like to mention that my relationship with Dr. Leblond is exceptional. . . . He would have liked to have considered me as a son. But no I said 'no, I am not your son, I am your friend,' which is a different story. And we continued, in this manner throughout these 50 years.

Russell: I don't like to focus on numbers of papers, but about how many do you have?

Clermont: Close to 150.

Russell: If you look back on those papers, which ones make you the most proud?

Clermont: There are, unfortunately, too many. So it is difficult to say. But of course, these first articles on the cycle of seminiferous epithelium of spermiogenesis; I was very happy with those at the time. And then I was very excited by the one on spermatogonia renewal in the rat. Another one was on the spermatogonial population of man; that was a really challenging one. I was the only author on that one. It was a very interesting experience, because I was starting from the work of Branca (Branca, 1926). He had given the description of spermatogenesis, and he asked the right questions, but he couldn't give the right answers. I enjoyed working on this by myself, mapping spermatogonial population and deriving some conclusions. Even if the conclusions were not 100% solid, at least we moved ahead by one or two steps. This was good; it was very nice. And the cycle of seminiferous epithelium in human I worked a lot on that. The other things I was quite pleased with were the results we obtained on the duration of spermatogenesis, both in the rat and in the human. The radioautography technique developed by Dr. Leblond that I used to calculate the duration of spermatogenesis in the rat was extremely precise, far more precise than any other studies. The human testis is more difficult to study, but we still managed to get the duration of the cycle in the human, and an estimate of duration of spermatogenesis in the human. This was thanks to the collaboration with Carl Heller from Seattle. That article appeared in

Science (Heller & Clermont, 1963),... So, these were good moments, at the beginning. The development of the testis was quite interesting with Bernard Perey; the wave concept we came up with was quite something (Perey et al., 1961). You know I could speak for hours on the publications. I was just thinking about you, and the fun we had with that tubulobulbar complex; remember? You didn't believe in it at the beginning, you had hesitations.

Russell: You didn't believe in it at the beginning.

Clermont: Oh well, I always never believe anything at the beginning, but you understand that that was an acute, solid interesting study that you confirmed in other species. When there was something new, I was always excited. What else have I done? We then moved into the study of testis with the electron microscope. There are studies which I found very interesting, not well-recognized by others, such as the formation of the cytoskeleton in the tail of the rat spermatozoa with Margaret Irons (Irons & Clermont, 1982) or the changes in the head components of the spermatozoa with Mike Lalli (Lalli & Clermont, 1981). These studies were quite fascinating because that is when we really developed the notion of a perinuclear theca. I started to work with Dr. Rambourg on 3-dimensional microscopy (Rambourg et al., 1974). All these studies with Rambourg were fascinating. Can you imagine - seeing 3-dimensional images of organelle is always impressive. Don't forget that I am essentially a morphologist - I love structures, I love to understand and see things in three dimensions. So this is why it was quite exciting. More recently, when Richard Oko came and I sort of indicated to him that one way to go was to analyze the cytoskeletal components of spermatozoa with biochemical techniques and immunocytochemistry (Oko & Clermont, 1991) and now he is moving into the molecular biology aspects of it. This excites me very much.

Russell: Well, moving a little bit to your philosophy. What would you say makes a good paper? What are the qualities that make it good?

Clermont: This is where I want to explain to you the view that I have on research. I don't want to make generalizations because I am not competent to do that. It is from my experience as a cytologist, histologist and morphologist. I am not trained as a biochemist or as a molecular biologist or geneticist, I think that what I will tell you applies to everybody. I think that what makes a good paper first is the quality of the facts that are presented. The facts, not theory, the facts. So what did this paper demonstrate? Is it a fact or nebulous theory? You know as well as I do that in morphology it is very straightforward. When you discover a new structure like the tubularbulbar complex, you don't question it, it is there and it is there forever, right? Your job is to present clearly, with proper documentation the existence of what you see –

this is simple. I think, in molecular and cell biology it should be the same. But the problem is that the facts are much more difficult to demonstrate with messy or complicated techniques. So I think that most of the problems that we have at present are that the papers are too nebulous, loaded with poor interpretations, masked by plenty of theories and models, most of them not being fully documented. So that is why I am very critical about many publications because I think that they are poorly documented. The facts are not clear and are not convincing. I have to demonstrate things in a convincing matter, whether it is a physiological process or a molecular process or anything else. I give a lot of importance to the quality of the facts presented and much less attention to the theories or the interpretations. This is a disease of modern cell biology. You see, the people are just moving, they have to present a new model, they have to present a new story and they think that this is Science... If you look and read things, you discover by yourself that the half-life of a theory is always extremely short. There is no half-life to a fact. We have to make interpretations at times, this is obvious, and this is what I did with spermatogonial renewal. But, the interpretations that you make should stick to the reality. The other quality is that the work has to be understandable and clear. Most of the molecular biology papers are extremely difficult to approach because the technical part is enormous and it is always very difficult to interpret. The text should be crystal clear. If you write for yourself, why publish? If you write for an audience, it has to be readable, understandable by everybody. Fawcett was an excellent writer. But nowadays, it is more and more problematical to see readable text, because it is too sophisticated. I still believe that it is not because a study is sophisticated that it should be presented in an obscure manner. On the contrary, if the work is highly sophisticated, the text should be even clearer and absolutely unquestionable. This is my approach. What makes a good paper? – clarity, quality of the data, solidity of the facts.

Russell: Going back to history for just a second, you mentioned, Don Fawcett's name. I remember when I was here that I felt some competition between your lab and his.

Clermont: There was never a clear-cut competition between us. He was a senior person, don't forget that he was of the age of Dr. Leblond and I always admired the beauty of his electron micrographs and of the quality of his work. This fellow was writing so elegantly, everything was crystal clear. I still think that his textbook of histology is the best. I really enjoyed, and of course, he was the first one to really describe the microanatomy of spermatozoa. This was quite exciting, it was sort of an ideal for me that we were trying to match. But the way that he was approaching this problem was not equivalent to mine. For example, Don never cared about the spermatogonial population or the Golgi

apparatus or stages. I remember one time he said that there was no such thing as a perforatorium, that the rat was an exception. But now it is obvious that everybody identified a perinuclear theca. I tell you that I always had great consideration and respect for his work. It was sort of complementary. Maybe I had been a pain in his neck on occasion because I was coming with this or that, but my approach was a little different, don't you think?

Russell: *Going back to papers and the importance of papers and the impact of papers, there is a group in Philadelphia that is called the ISI and that rates papers with a citation index. You did mention a minute ago that some of your papers have not been picked up, but I think that overall that is not the case. But, is citation index the best we have for looking at contributions?*

Clermont: *Absolutely not. I don't think that this is a way of measuring. I have two articles that are citation classics and Leblond had three or something like that, but that does not represent our work.*

Russell: *One is the kinetics of the development (Clermont, 1972).*

Clermont: *and the other is on the stages of the cycle (Leblond & Clermont, 1952a), and many others were well-quoted. The Physiological Review article in 1972 on the cycle was very well-quoted. Anyway, I think that to be well-cited may be pleasing to the ego of some people, it happens. Don't forget the citation index is frequently related to a technique which is extensively utilized by thousands of people. So, what is the value of this? It is a technique. You have some things like the discovery of the DNA helix which are highly cited, but that is normal. So why put a number on that? And to evaluate people first on the frequency of citation and secondly, giving a value to the citation in certain journals and a lower value to other journals, this I find totally ridiculous. This is just a means of providing security to administrators. It means that they don't have to think, they don't have to judge, they just take a number in a book and that is it. This is not very healthy.*

Russell: *So, if you don't use a citation formula like what is currently being used, what are you left with for evaluation.*

Clermont: *You are left with your own intuition, not more than that. When you listen to someone, you see if he is interested by what he is doing, if he is competent. And I give a lot of weight to the personality of the person. He has to be able to deal with students, to deal with his colleagues and these things that cannot be measured. There are a lot of factors which have to be considered and evaluation cannot be automated. Do you understand my point? I could see using citation index as one point, but it is as if you were telling me this fellow wrote 1052 articles – but these could be repetitive, it could be this, it could be that, it means nothing to me. But, if you tell me that so and so is a*

good investigator, that he did something original, that counts. Originality is not evaluated by the citation index. There are all sorts of factors that must be taken into account, and I think that it is very difficult to hire good people and to evaluate them. Sometimes you hire people you think are good and it turns out to be a catastrophe after 3 months; sometimes they work out very well. I have followed the career of many graduates from this Department and very few finally stay in academia. If you want to hire a fellow in a research institute where people just do research – that is another thing, but I was always involved in an academic milieu and therefore, we had to look at other qualifications than just writing articles. So it depends on the situation.

Russell: *And your most memorable student?*

Clermont: *Most memorable student; well I never thought along these lines. There are some who I appreciated because they were very efficient, original, but I appreciated practically everybody that worked with me. There are some who gave me a lot of headaches at times. I had a lot of experiences, imagine, I probably had 30 students and some I had to tell them that they had to leave. So that was difficult. And they had to leave, why? Because, I was convinced that I could not train them properly. They could train themselves, so after their Master's, I was asking them to leave. In general, I always had good relations with my students. Some of them were not easy, but this is life. If you were to ask me who was the most interesting collaborator, I would tell you immediately who that is: Dr. Rambourg - and this for his vast variety of qualities. This fellow is exceptional, very peculiar character, but for some reason we worked together in a most efficient manner. This fellow works by himself, in France. He is a person who has a vast spectrum of interests, and not only in science. What a character. He used to come here twice a year for 3 weeks and we would work together. We were fighting each other like dogs at times, but we always managed to work well, very well together, in fact,. For a period of 25 years, we published possibly something like 30–35 articles together – always difficult to write. He is a fascinating person. He has interest in languages, he has interest in philosophy, he has interest in music. It has been a very enriching experience each time he came here. You know that I am retired, and he will be retiring soon. We will keep in touch, but it means that the relationship will change. So, I am helping him, he is helping me. He is really a genius, but not easy, you know. I don't know how, but I manage to work well with him. We were complementary to each other. I was SLOW, he was FAST.*

Russell: *Is there anything else you would like to add?*

Clermont: *... The way I approach things is in pieces that are complementary in order to build up a whole picture. It took all my life, first on the seminiferous epithelium,*

then on the Golgi apparatus. . . I need to tell you one more thing. There is a tendency to magnify the value of science and of scientists, to make them like gods, in that modern world of technology. When you think about it, science is something which is not far from a trade, it is not that fantastic. It is like my father who was trying to do a good job with furs. When I say that about Father, there is all the perfectionist approach that he had and the quality of his dedication. I think that when you are an artisan, you are somebody who loves what he is doing. And what he is doing is not necessarily extraordinary. . . So this is my view on science. I don't think that the scientist or even medical people can ever pronounce themselves on all the problems that we meet in our lives. The reason of our existence, where we are going, this and that – that is my view. I am not triumphant about my career as a scientist, I am very close to the ground.

Russell: What about the future?

Clermont: I am not a prophet, so this is very simple. I can't tell you what is the future, I can tell you what was the past, but the future is a mystery. You never know how things will develop. Obviously there are new technologies. Whether it is in research or teaching, obviously the methodologies will change. There will be very extensive use of computers. There will be modification in the approaches taken, because the new generations are changing too. When they come to us they have different backgrounds, so we have to live with that. As to the future of anatomical sciences, that will be modified, evidently. But I think, it has to be modified very carefully, because we may go into the ditch. You understand, that may happen. You know, treating people without knowing their anatomy is a bit of a problem. Now there is something in teaching that will never change, I think. I think education will never be replaced by instruments. The personal contact will always be essential at one point or another in education. Transmission of knowledge is just one aspect of education, of information. There is a lot more than that in education. You know this as a parent, it is the same thing in the academic field. Sometimes I have said something to somebody that helped them tremendously. I never realized that, but it was through a personal contact, and most of all a person-to-person relationship, not between the student and that machine. The computer, right there – it is the poor student who is in front of the computer, this is not human. But I still think, because I know and you know, that my personal experience with Dr. Leblond and others influenced me, always, and we live

with that. This is human nature. So these are my views.

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In Memoriam

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**Tributes published in the Journal
to honor Andrologists who have
passed away**

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Foreword

The death of Pierre Soupart in June 1981 was a great loss to his many friends and colleagues world-wide, as well as to the progress of fertilization research. Pierre's pioneering contributions to the study of fertilization in animals and in humans have left an indelible mark on this major area of biological research. In order to commemorate his life and work, this special issue of the *Journal of Andrology* has been prepared and is dedicated to him.

* We wish to thank Dr. Andrzej Bartke, Editor of the *Journal of Andrology*, for his advice and enthusiastic support.

Each of the papers in this issue relates to the topic of mammalian fertilization. The interest of the contributors in submitting papers specifically for this special issue, and the willingness of the many reviewers of those papers to devote their time, are in themselves indicative of the esteem in which Pierre was held. We hope that this issue will be a fitting and lasting tribute to the memory of a fine scientist and human being.

STANLEY MEIZEL
BARRY D. BAVISTER
Co-Editors*

Announcement

Pierre Soupart Memorial Issue

Dr. Pierre Soupart was one of the leaders in the study of mammalian fertilization. He was a member of the American Society of Andrology and was to give a "State of the Art" lecture at the 1981 annual meeting. He was unable to do so because of the illness that claimed his life shortly thereafter. To honor his memory, the Journal of Andrology is planning to publish a special issue containing papers on mammalian fertilization. Drs. S. Meizel and B. Bavister will be the editors of this issue which will consist primarily of invited papers. Investigators who would like to have their research papers included in the Pierre Soupart memorial issue of the Journal of Andrology should submit the manuscripts to the editorial office of the Journal no later than May 1, 1982. The format for the papers and the process for review will be the same as described in the Instructions to Authors, the only additional requirement being that the manuscripts deal with mammalian fertilization. Should the number of papers submitted in response to this notice exceed the available space, it may be necessary to schedule some of the accepted manuscripts for publication in one of the regular issues of the Journal.

Pierre Soupart 1923–1981

Pierre Soupart left us one afternoon last spring. His death was not unexpected. Those of us who were close to him witnessed his long and courageous fight, first against heart disease and, finally, against cancer. Yet, we were shocked by his untimely death at the age of 57, and his absence will be felt for a long time.

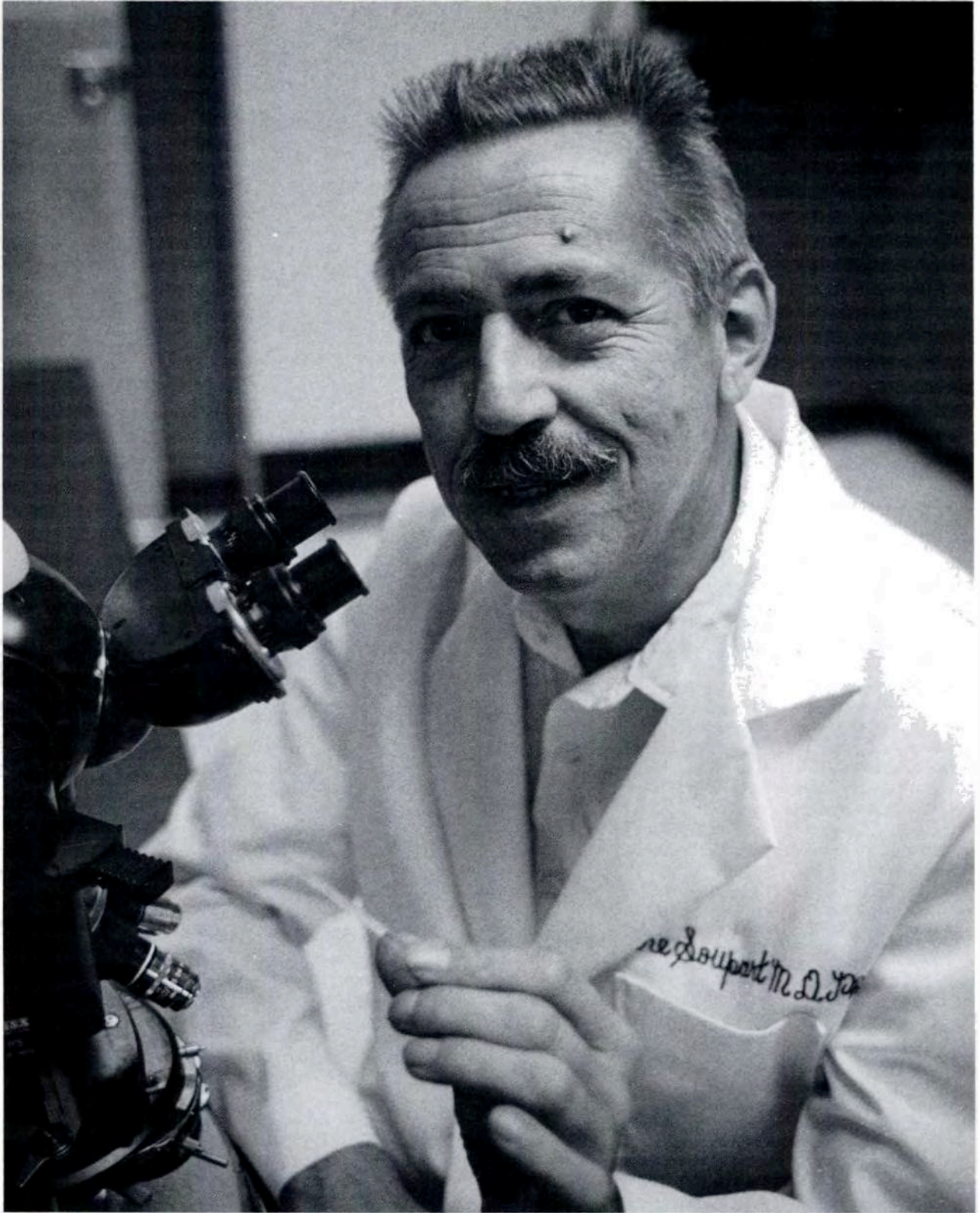
Pierre Soupart was born in Morlanwelz in Hainaut, Belgium in 1923. He obtained his M.D. degree in 1949 from the Medical School of the Université Libre de Bruxelles. His interest fixed on biochemistry and he spent a year of postdoctoral training in this field at the Rockefeller University working with Professor Stanford Moore. Upon his return to Belgium, he joined the faculty of the Department of Biochemistry at the Medical School of the Université Libre de Bruxelles and became Agrégé de l'Enseignement Supérieur in 1959. His alma mater recognized his scientific achievements by awarding him the title of Membre permanent du Corps Professoral in 1974 and of Professor Agrégé à titre définitif in 1975. In 1962 he came to this country and became a member of the Department of Obstetrics and Gynecology of Vanderbilt University Medical School, where he remained until his death on June 10, 1981.

While in Belgium, Pierre Soupart worked on the problems of aminoaciduria in pregnancy and his research culminated with the publication of a monograph published by *Acta Medica Belgica*. Upon his arrival at Vanderbilt, his interests turned to the study of the mechanism of sperm capacitation, which led him to studies of fertilization, and it is in this area that he made his major impact on the field of reproductive biology. In 1972, working at the Tripler General Hospital in Honolulu, Hawaii, in collaboration with Dr. Larry Morgenstern, Pierre Soupart was the first to provide convincing evidence that human eggs could be fertilized *in vitro*. I remember vividly the day when he burst into my office holding excitingly the electron micrograph showing clearly the fertilizing sperm tail in the egg vitellus. It was very sad that, because of a moratorium imposed by the federal government on research on the human embryo, he was not able to continue his pioneering studies while work was progressing quickly in other countries. Some might have been discouraged, but Pierre Soupart used every avenue at his disposal to convince and educate the public on the need for research in this area. As Visiting Professor and Guest Lecturer, in the year before his death, he presented 27 seminars or lectures on this

subject in Europe and the United States, more than one per fortnight. His passionate efforts were rewarded when, as a Visiting Professor at Monash University in Melbourne, Australia, he participated actively in the work of the Australian team. He had the satisfaction of learning a few weeks before his death that a child had been born as a result of one of the several successful fertilizations achieved during his stay there. He was deeply concerned both by the human problems felt by the infertile couple and by the ethical problems connected with *in vitro* fertilization. He left us his thoughts in one of his last articles, "Present and Possible Future Research in the Use of Human Embryos," published in the symposium on "The Concept of Person and Its Implications for the Use of the Fetus in Biomedicine."

For his friends, Pierre left another legacy: his remarkable courage and lucidity during the last months of his life. He received the diagnosis of his fatal illness in January 1981 while working, and without breaking stride. He spoke of his illness quite matter-of-factly; we, although immensely saddened by the prognosis, were obliged to model our attitudes after his. He continued working as before, as if nothing had changed. Even when he at last was confined to his house, he continued working with collaborators who visited him regularly. A month before his death, we had a joyful, if bittersweet, picnic reunion at his house with his colleagues from Vanderbilt and many friends, some coming from great distances. Even though he was very tired, he spent the afternoon in animated discussion with all, speaking of his and others' research and giving horticultural advice to all who could use it, for flower raising was a second passion with him. His conversation during this last public moment epitomized Pierre Soupart as a scientist, as a friend, as a man with boundless curiosity and enthusiasm, and it will remain an undying memory for all those privileged to have experienced it. And, of course, we saw Pierre as the family man he was, surrounded by the loving and attentive care of his wife Simone, his three daughters Evelyne, Antoinette, and Pascale, and enjoying his small grandson, of whom he was immensely proud.

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Memorial Tribute to Griff T. Ross, M.D., Ph.D.

EUGENIA ROSEMBERG

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On July 1, 1985, we lost a dear friend: Griff T. Ross, who lived neither in the past nor in the future but, who let each day's work and interest in the work of others absorb all of his energies. Throughout his life, he dedicated his whole being to any and all personal and professional tasks he ever undertook. His dedication was a gift that made his life extremely rich, not only for what he received, but for what he gave to his family, his friends, and fellow scientists around the world.

Born in Texas on July 17, 1920, Griff's heart was as open as the land of his native state. He received a bachelor's degree from the Stephen F. Austin State Teachers College in 1939, and attended graduate school at the University of Texas in Austin, before earning in 1945, a Medical Degree at the University of Texas, Medical Branch, at Galveston.

Griff practiced medicine from 1946 to 1953 in his home town, Mount Enterprise, and often referred to those days with great sentimentality as his "country doctor" days. His mind however, was full of inquiry that only science could satisfy. Therefore, after completing a tour of duty as a Medical Officer with the Air Force from 1953 to 1955, he took a fellowship in Medicine at the Mayo Foundation in Rochester, Minnesota, from 1955 to 1960. In 1961, he earned a Ph.D. degree from the Mayo Graduate School of Medicine, University of Minnesota, Graduate School.

It has been said that success is nothing but good ideas coupled with hard work. This combination is what made Griff's life so productive, as ideas were translated into action, and no one task was ever small

From the Medical Research Institute of Worcester, Inc., Worcester, Massachusetts

for him. This is best exemplified in his 21 years (1960-1981) at the National Institutes of Health, in Bethesda, where he served in nearly two dozen clinical research and administrative capacities, and where his record of accomplishments cannot be forgotten easily. For his dedication and leadership, he was bestowed the Superior Service Honor Award by the Department of Health Education and Welfare in 1970, and again in 1975. From 1963 to 1977 he was Assistant Clinical Professor of Medicine at Georgetown University in Washington, D.C., receiving the Honorary Degree of Doctor in Science from Georgetown University in 1980.

In 1981, Griff returned to Texas, to the University of Texas (UT) Medical School at Houston, where he served from 1981 to 1983 as Associate Dean for Clinical Affairs and Professor, in the Department of Medicine, Division of General Medicine and Endocrinology. In 1983, was named Associate Dean for Patient Services, before being named Director of the Division of Reproductive Sciences in the Department of Obstetrics and Gynecology and Special Assistant to the President, for relations with the University of Texas, Tyler.

Although upon his return fate did not allow him much time to enjoy his beloved Texas, his impact at the University of Texas was considerable, since all who were associated with him learned not only the science of medicine, but also the art of dealing with associates and patients. In recognition of these qualities, the Griff T. Ross Health Care Professorship in Humanities and Technology was established in 1984 at the School of Public Health, University of Texas Health Science Center at Houston.

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His scientific legacy is recorded in more than 250 publications, which provide the measure of his influence in endocrinology, most importantly in reproductive endocrinology.

Griff was the prime force behind the development of technology that allowed for the accurate and specific measurement by bioassays and radioimmunoassays of protein hormones, in particular of glycoprotein hormones. His paper describing the method for preparation of specific antisera with small doses of antigen, as well as others in the radioimmunoassay field, have been designated as Citation Classics by the Science Citation Index. I believe I am accurate in saying that Griff provided not only the basic understanding of the chemistry, biology, and immunology of hCG, but, in the process, inspired a flare of scientific activity that has yet to abate.

His exposition of the hormonal regulation of the human menstrual cycle at the Laurentian Hormone Conference in 1971 was followed by countless studies related to the understanding of the hormonal regulation of the hypothalamic-pituitary-ovarian axis, culminating in the detailed analysis of ovarian function, in particular of follicular development and func-

tion. These classic studies will inspire scientists for years to come.

For his accomplishments, Griff received numerous professional honors and awards. He was particularly proud of two: the Koch Award of the Endocrine Society, and the Carl C. Hartman Award of the Society for the Study of Reproduction, the highest awards bestowed by these organizations.

How can one individual receive the recognition given to Griff T. Ross? The answer is simple. It lies in his extraordinary scientific production, and in his ability to inspire the quest for inquiry in others.

There can be no solace to his children: Jane and her husband Gary, Terry and his wife Janet, and to his wife Ailene (Pinky), the charming and courageous lady who kept it all together. Sadly, there have been no medals for great wives of great scientists. We will miss Griff's guiding hand, his encouragement and friendly advice, but most of all we will miss the truly unique and remarkable man that he was. Quoting La Rochefoucauld "absence lessens half-hearted passions, and increases great ones, as the wind puts out the candle and yet stirs up the fire." Griff, your candle is out, but your fire shall burn.

Workshop on Testicular Tumors

A workshop on testicular tumors will be held on August 16-19, 1986, at Rigshospitalet, Copenhagen, Denmark. The programme will include lectures and free communications on the following topics: Morphology and function of the germ cell, cell lines, chromosome markers and oncogenes, histochemistry and monoclonal antibodies, carcinoma *in situ*, screening, prognostic factors, treatment, toxicity, and fertility. Introductory lecturers include: De Wolf, Holstein, Andrews, Peckham, Einhorn, Bertelsen, Safirstein, Salomon, Scardino. Maximal number of participants: approximately 150. Organizers: Mikael Rorth, Finsen Institute, Copenhagen; and Niels E. Skakkebaek, Hvidovre Hospital, Copenhagen. For further information, please write to:

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In Memoriam—Larry L. Ewing



Larry L. Ewing

Larry L. Ewing, Professor at Johns Hopkins University, died of cardiac insufficiency on August 13, 1990, at the age of 54, near his home in Monkton, Maryland.

Larry was born in Valley, Nebraska, where he was educated in the public schools. His parents operated a dairy farm in the bottomland between the Platte and Elkhorn Rivers. This environment

nurtured an early interest in the land and animals, and fostered a life-long fascination with biology.

He graduated from the University of Nebraska—Lincoln in 1958 and completed a Ph.D. degree, four years later, at the University of Illinois—Champaign, under Professor Noland L. VanDemark. Both student and professor were intrigued by the prospect of investigating the metabolic requirements of specific cell types within the testis. Their strategy required an isolated—perfused tissue preparation in which arterial inflow could be controlled and the venous effluent could be isolated for direct estimates of substrate uptake or product formation. Larry developed an *in vitro*-perfused testis preparation for laboratory animals and used it throughout his career to examine how the structural and biosynthetic properties of the Leydig cell are integrated.

Within days after finishing his dissertation, Larry joined the faculty of Oklahoma State University in Stillwater. He was appointed an Assistant Professor in the Department of Physiology and Pharmacology and advanced to full professor in seven years. At Oklahoma State University, 1962–1972, he offered courses in systems physiology to undergraduate, veterinary medical, and graduate students, and directed the theses of six Ph.D. and five Master's students. The graduate course he offered in reproductive physiology was one of his special interests. This offering was among the most popular graduate courses in the biologic sciences. Many of the students who took this course were attracted to his laboratory. Students and colleagues of all investigative persuasions sought him out for advice, especially during the turmoil and unrest of the late 1960s and early 1970s.

Interspersed with these faculty commitments, he ar-

ranged two sabbatical periods. In 1965, with Professor K. B. Eik-Nes in the Department of Biochemistry at the University of Utah, he trained in steroid biochemistry. In 1968, with Guy Williams-Ashman in the Department of Pharmacology and Experimental Therapeutics at the Johns Hopkins University School of Medicine, he studied the role of protein kinases in germ cell differentiation. He considered these experiences special epochs in his career because they challenged him to ask more critical questions about cell performance in the testis.

In 1972, Henry Mosley recruited Larry Ewing to the Department of Population Dynamics, School of Hygiene and Public Health, at Johns Hopkins University, where he served as Professor and Head of the Division of Reproductive Biology until 1984. He participated in all aspects of academic life at this institution. He taught medical and graduate students, trained postdoctoral fellows, and served on key committees within the School of Hygiene and the University.

He met these commitments with enthusiasm, but the laboratory was his special domain. In collaboration with fellows and his colleague, Barry R. Zirkin, he engaged in a series of experiments that relied on the *in vitro*-perfused testis or cultured Leydig cells to study the trophic effects of luteinizing hormone and other regulatory peptides on the behavior of intracellular organelles and their role in androgen biosynthesis.

Included among the most important work were estimates of the formation of steroid biosynthetic intermediates between pregnenolone and testosterone. Inhibitors were used to selectively arrest the catalytic activity of each enzyme in the biosynthetic pathway leading to testosterone formation. Testosterone secretion was shown to depend on interstitial stores of binding proteins, such as albumin, and an autoregulatory short-loop feedback.

Procedures were developed for maintaining physiologic but unchanging concentrations of gonadal steroids in blood via subdermal implants. Naturally occurring steroids were used to selectively alter pituitary—testicular performance in many different paradigms, including contraceptive strategies for men.

Species-specific differences in the capacity of Leydig cells to produce testosterone were shown to depend upon the mass of the smooth endoplasmic reticulum. The close integration between smooth endoplasmic re-

ticulum mass and steroidogenesis arises, in part, from the lipophilic nature of sterol/steroid substrates and the location of the requisite enzymes in the hydrophobic domains of cytoplasmic organelle membranes. The Ewing laboratory showed that the plasma membrane of the Leydig cell serves as a reservoir for cholesterol destined for testosterone production. Cholesterol is transferred between the plasma membrane and the cytochrome P₄₅₀ enzymes by sterol carrier protein 2. The carrier protein bridges the aqueous barrier between the cytosol and mitochondrial membranes to provide cholesterol for pregnolone formation. New approaches were developed to isolate and maintain Leydig cells in culture, permitting in vitro studies of the cellular regulation of androgen synthesis and secretion after stimulation with luteinizing hormone.

Three of the last manuscripts prepared before his death are published in this volume of the *Journal of Andrology*. The results offer new insights for the coordinated interaction of peroxisomes and the smooth endoplasmic reticulum in steroidogenesis.

Within the Hopkins community, Larry advised many investigators and made his expertise available for estimating steroids and their enzymatic transformations. An 18-year collaborative effort with Donald S. Coffey and the fellows and faculty of the Brady Urological Institute typifies how he shared his imaginative energy. This productive interaction provided new insights about the contribution of the testis to the benign enlargement of the prostate gland, a process of profound morbidity in aging men.

One of his greatest satisfactions came from interacting with colleagues in the reproductive science community in Baltimore. Soon after he came to Hopkins, he, the late Dr. Cornelia P. Channing, and Dr. Charles A. Barracough launched the Maryland-Hopkins Lecture in Reproductive Biology, an annual gathering he relished attending with his fellows.

Larry Ewing's contributions to the scientific community were diverse. Some of the most significant include his service to the Society for the Study of Reproduction and the American Society of Andrology, organizations in which he held elective offices, including the presidency of both. He was a long-term member of the organizing committee for the Testis Workshop, and he chaired the 1988 workshop on cell signaling in Baltimore. He also served as Editor-in-Chief of *Biology of Reproduction*, edited numerous books, was appointed to peer review panels of the National Institutes of Health (NIH) and National Science Foundation, and served on the editorial boards of many endocrine-related journals, including the *Journal of Andrology*.

His commitment to public service arose in part from a special interest in people. Many have appreciated his undivided attention and willingness to share his expertise to answer a question or suggest a new strategy to solve a problem. The judicious boost he provided to a young person's career stands as a hallmark of his character. The frequent open houses that he and his spouse, Aggie, held in their home for visiting scientists illustrate the collegial interactions he fostered among fellows, faculty colleagues, and visiting investigators.

Outside the laboratory, Larry unleashed clever pranks. While scores were never overt, prospective targets of this mischief were always alert for tactical strikes that could be set in motion at the most propitious moment. He competed with colleagues in several sports, including basketball. Matches were played in college gymnasiums across the United States. His interest in intercollegiate athletics was keen and conceptual. Regardless of the game, he was quick to explain the strategy of critical plays and players. He frequently mused that the only committee assignment he coveted was a term as faculty representative to his institution's intercollegiate athletic conference.

The profile of the commitments he made for the fall of 1990 underscores the leadership he provided at Hopkins and nationally. He directed an NIH Training Program in male reproduction, served as associate director of the Population Center, was President-elect of the Faculty Assembly of the School of Hygiene and Public Health, and chaired the School's appointments and promotion committee. The laboratory group included one pre- and four postdoctoral fellows and two research assistants, all supported through five concurrent NIH awards. Plans for public service included participating on a task force for the Environmental Protection Agency and chairing the Program Committee for the 1992 Annual Meeting of the American Society of Andrology in Bethesda.

Survivors in his immediate family include his wife, Agnes, and four sons: C. Michael, Matthew, Mark and Morgan. The Larry L. Ewing Memorial Fund has been established to commemorate his service to Hopkins and the scientific community. Contributions can be made to The Ewing Fund, Room 1604, School of Hygiene and Public Health, 615 N. Wolfe Street, Baltimore, Maryland 21205.

Friends, fellows, and collaborators will remember him as a scientist and colleague who gave much of himself to spur others to achieve more than they thought they could accomplish alone. Amazing grace.

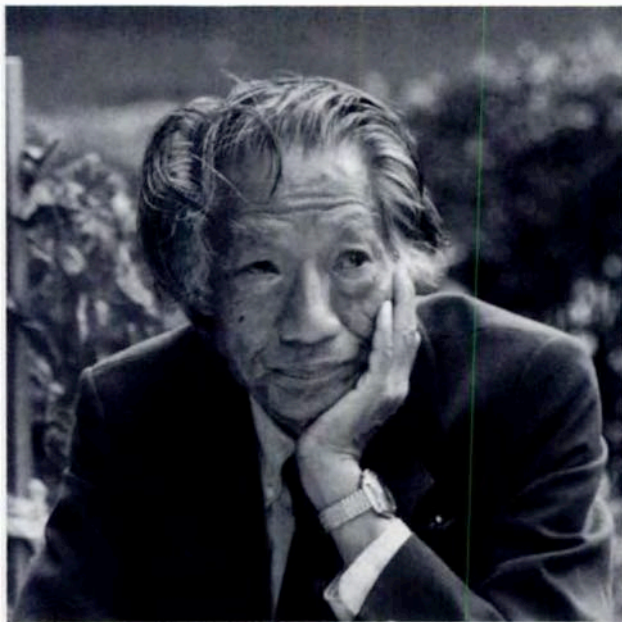
Claude Desjardins and Guy Williams-Ashman

Min Chueh Chang

Experimentalist for Whom Perseverance, Cognitive Planning, and the Favoring Winds of Chance Paid Off

ROY O. GREEP

J Androl 1992;13:587-589.



Min Chueh Chang

I deeply appreciate being invited to pay homage to the memory of a long-time friend and delightful fellow, Dr. Min Chueh Chang, with whom I shared a special fascination as well as many mutual interests.* It was always a pleasure to meet and talk with him, for he could mix science and a jovial wit in a manner unlike any other person I have

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*This article, with minor changes, is a copy of the remarks I made as principal speaker of the Memorial Program for Min Chueh Chang at the Worcester Foundation for Experimental Biology, Shrewsbury, Massachusetts, October 12, 1991. My remarks deal mainly with Chang the scientist. Other speakers who added vignettes on Chang's colorful and engaging personality were Thore Pederson, J. Michael Bedford, Mahlon Hoagland, Eric Lamming, Eliahu Caspi, and Oscar Heckter.

known.† Our chemistry seemed always to bring a sparkle to his eyes. I found it unnatural to address him by his last name, but there really was little choice since he himself never used his given names. I also think he preferred to be addressed as "Chang," for this is the appellation by which he was widely known, loved, and respected by a worldwide community of reproductive physiologists.

In the field of reproductive science, Chang must be regarded as one of the giants of his time. His contributions to our understanding of the early events in the process of reproduction among the mammals are truly monumental but, beyond that, the fruits of his labors over the past half-century have brought concrete benefits to human health and family welfare and have liberated women from the age-old burden of unwanted pregnancies and excessive childbearing.

I will touch on these matters in further detail, but first it should be noted that Chang's attainment of international recognition for his accomplishments in science came through nothing short of maximal effort. As a yardstick of his commitment, one need only contemplate the effort expended in producing more than 350 publications, including several landmark papers (Chang, 1947, 1951, 1957, 1959, 1968, 1983). It will be readily admitted by most scientists that such effort comes at the expense of time with the family, some curtailment of cultural pursuits, and time for reading and reflection on broader issues.

In research, Chang's primary interest from start to finish was in the free-living eggs and sperm of mammals and their fateful union in a process called fertilization. I specify the limitation of Chang's studies to mammals for good reason. Intensive investigations of eggs and sperm in nonmammals such as the starfish, sea urchins, fish, and frogs had been underway for a century or more, primarily because they are so readily and abundantly available. Moreover, in all these

†Chang and I were both made Honorary Fellows of the American Society of Andrology at a banquet in Worcester in 1976. I remember the evening well, as it was there that I learned to be wary of matching light-hearted comments with Chang, a master of witty repartee.

nonmammalian forms, fertilization takes place outside the body, whereas in mammals fertilization occurs inside the body and can be studied only with difficulty. Chang chose the daunting task of enlightening the world on fertilization in mammals. He also chose, as the poet says, "the path least trodden." Clearly, Chang had the advantage of pioneering a virgin field. In the early 1940s, when he was just starting out, only 18 papers were published in his field over a 3-year period. This was soon to become an avalanche.

Chang was also fortunate in his choice of places to carry out his studies. At Cambridge University in England he could not have been more propitiously situated, since this was the world center for work on fertilization. Here he was in the company of greats such as Sir John Hammond and Arthur Walton of the university's Animal Research Station, F. H. A. Marshall of the Department of Physiology, and his lifelong friend, coworker, and competitor, C. R. Austin of the Department of Animal Embryology. Again, at Worcester, his situation with Gregory Pincus was an opportunity that probably could not have been equaled anywhere else in the world. Along the way, Chang's prolific productivity was further abetted by the effective collaboration of approximately 100 talented Research Fellows. They were attracted to his laboratory for the launching of their own distinguished careers in the same field.

In the context of all that is implied or alluded to by the statement that boy meets girl, in biology this translates in simplest terms to union of egg and sperm. This was Chang's primary concern throughout his professional career. His elucidation of the intricate physiologic mechanisms that bear on the promotion or inhibition of fertilization won him world-wide fame and the gratitude of millions who have benefited from the results of his research. It is to this that I now turn.

Capacitation

Chang's first major triumph in research involved the fertilizing capacity of sperm (Chang and Walton, 1940). In a series of ongoing studies of circumstances associated with the fertilization of rabbit ova during the late 1940s, Chang was intrigued by what appeared to be a waiting period on the part of sperm before they were capable of penetrating and thus fertilizing eggs. The difficulty in getting conclusive evidence on this matter seemed next to insurmountable, but Chang was, by his own admission, a patient and persevering type. This outstanding characteristic stood him in good stead because obtaining the answer to this elusive phenomenon would have tried the patience of Job. Finally, in 1951, after 6 years of continuous investigation, Chang had conclusive evidence that sperm deposited in the female reproductive tract must undergo changes of unknown nature over a minimal period of time before they are capable of

fertilizing ova. After all this toil, what followed would have weakened the resolve of the mighty, but not Chang.

A short time before publication of his paper there appeared in print a report of identical findings by Chang's close friend and archrival C. R. Austin (1951), who later (Austin, 1952) named this delaying action "capacitation." Most of the follow-up studies were done by Chang and his students, who found that capacitation could also be achieved in body fluids from other than the female reproductive tract, including fluids of male origin (Chang, 1957). They also identified many of the metabolic changes that occur during capacitation, such as increased oxygen consumption and carbohydrate breakdown. However, I must mention that in 1957, after another 6 years of experimentation, Chang found that capacitated sperm could be decapacitated by exposure to male seminal plasma. Chang (1984) also found that decapacitated sperm could then be recapacitated if placed back in the female reproductive tract.

In Vitro Fertilization

All of these studies were preliminary to, and paved the way for, Chang's crowning achievement in 1959, the in vitro fertilization of rabbit ova. This came after a long succession of unsuccessful attempts by many other investigators. As early as 1934, Pincus and Enzmann claimed to have obtained living young from rabbit eggs fertilized in vitro and returned to the doe. The potential extensions of this work stirred undue notice in the public press and question arose as to whether the young came from eggs fertilized in vitro or from naturally fertilized eggs that had escaped detection by the authors. In 1954, Thibault's group in Paris succeeded in demonstrating that rabbit eggs fertilized in vitro could undergo normal early embryonic development in culture media (Dauzier et al, 1954). In 1959, Chang took what was to become another giant step for mankind by demonstrating that eggs from a black female rabbit that were fertilized in vitro by capacitated sperm from a black male and then transferred to a white foster mother led to the birth to a litter of all black young. This evidence for fertilization in vitro was incontrovertible, and opened the way for Steptoe and Edwards in England to accomplish the in vitro fertilization of human eggs in 1978 by similarly capacitated sperm, resulting in the birth of Louise Brown. She was the first of what is now thousands of so-called "test tube babies" born to infertile women—thanks to Chang.

The Birth Control Pill

In 1951 Chang was fortuitously caught up in what was to become a revolutionizing development in contraception. He happened to be the right man in the right place at the right time—the favoring winds of chance. It all started with a memorable visit to the Worcester Foundation by Margaret Sanger, the unstoppable family planning activist, and Mrs.

Stanley McCormick,‡ a highly motivated and informed philanthropist. Their meeting with Pincus and Chang was prophetic beyond their most fervent hopes. Money combined with expertise, ingenuity, and some audacity can work wonders, and did (for the full story, see Greep, 1984).

From much foregoing basic research by others on the hormonal control of reproduction, it was known that one of the ovarian hormones, progesterone, blocked ovulation in rabbits, but only when administered by subcutaneous injection. Obviously, the need was for an orally active drug that would do the same. Pincus immediately set about to acquire from pharmaceutical firms chemical compounds similar in structure to progesterone. Chang took on the task of testing each of 170 compounds by the oral route for inhibition of ovulation in rabbits and four other relevant activities in rats, mice, and guinea pigs. This task could easily have taken a lifetime to complete. Chang, by dint of Herculean effort, completed the tests in less than 5 years. Along the way, there must have been many moments of despair since he actually wound up with only two really promising substances, one from the Searle Company (Norethynodrel), and one from Syntex (Norethisterone) in Mexico. Promising, yes, but only in laboratory animals.

The next obvious step was to carry this project on to the clinical level. At this point, Pincus turned to his long-time friend and eminent clinician, Dr. John Rock. The resulting clinical field trials in Puerto Rico and Haiti proved beyond a doubt that oral contraception was a safe and highly effective means of birth control in the human female. Chang sometimes figured in the series of clinical reports on these field trials, but not to the extent that seemed deserving. Certainly there was no intent to downplay his role in this remarkable development, and with the passage of time Chang came into his rightful dues as a codeveloper of the birth control pill. It is much to Chang's credit that he never wavered in his admiration and respect for his benefactor, Gregory Pincus. These sentiments I am pleased to say were entirely mutual.

Scientists are much like major league baseball players in moving from one organization to another on their way up the ladder of success. Some move more than others, depending on their performance and productivity. The better they play the less they move, and the superstars generally

‡Mrs. Stanley McCormick was heiress to a fortune built on sales of the McCormick Deering reaper, a horse-drawn machine that put aside the scythe, made large-scale production of wheat possible, and in turn yielded to the modern-day, self-propelled combine. It was want of understanding and treatment of her late husband's illness that turned Mrs. McCormick's philanthropic interests to medical science. Her contributions to the work of Pincus and Chang on contraception totalled about 2 million dollars. In the early decades of this century, Margaret Sanger was a pioneering and often-jailed activist on behalf of the emancipation of women and improved means of birth control. Her crusade was led largely for the impoverished and poorly educated women in New York City who were being burdened, often to the point of early death, by excessive childbearing.

stay put. A good batter will occasionally hit a home run and score. Topping all else, the great ones will hit a few grand slams. Even the best will strike out now and then, or hit a blooper to the infield. On completing an outstanding career in the game, a chosen few will be honored by election to the Hall of Fame.

Chang, born and educated in China, moved to the United Kingdom in 1939 for specialty training, thence in 1945 to the Worcester Foundation, where he remained for the duration of his life. A superstar, he too produced a number of accomplishments of the home run variety and received the plaudits of his peers. He also chalked up three grand slams with the discovery of sperm capacitation, *in vitro* fertilization, and as codeveloper of the oral contraceptive pill. Despite Chang's prolific productivity, in the course of coming to the plate with manuscript in hand 350 times, it was inevitable that there would be some strikeouts, some bloopers, and some differences of opinion with umpiring editors. Also, Chang, like many ball players, was not above squabbling with management over how things were being managed.

In his later years and as a result of his monumental contributions to reproductive biology, Chang was elected to science's Hall of Fame, the National Academy of Science. Today, among a large international body of scientists studying the reproductive process, the name Chang is synonymous with the Worcester Foundation, on which he bestowed honor, prestige, and world renown. He will be missed and will be long remembered.

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In Memoriam

Alpay Kelâmi (1936–1992): His Contributions to Andrology

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Operative andrologists and urologists lost an irreplaceable friend and noted scholar with the death of Professor Alpay Kelâmi in March 1992. Born in 1936 in

Nicosia, Cyprus, Professor Kelâmi became a citizen of the Federal Republic of Germany in 1968. After completing his secondary education in Istanbul, Turkey, he studied medicine at the Universities of Heidelberg, Freiburg, and Hamburg. He received his Doctor of Medicine degree from the Free University of Berlin. His internship and urologic residency were completed at the Patterson General Hospital in New Jersey.

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Professor Kelâmi returned to the Free University of Berlin in 1965 and qualified as University Lecturer in April, 1971 with his thesis, "Alloplastics in Urology," which described applications of alloplastic materials for virtually every genitourinary organ. In September 1971 he became a tenured full Professor of Urology at the Free University of Berlin and maintained that rank until 1989, when failing health necessitated his becoming Professor Emeritus. During 1974, he spent his sabbatical leave with Dr. Willet Whitmore, Jr., at the Memorial Sloan-Kettering Cancer Center of New York.

Alpay Kelâmi was truly a citizen of the world. He was a "thinking surgeon" and had many novel ideas in genital tract surgery. He was an excellent linguist, travelled extensively, and promulgated his ideas with enthusiasm. He was fluent in English, German, and Turkish, and spoke Spanish and French adequately. This short paper attempts to summarize his scientific work.

Professor Kelâmi's andrologic and urologic innovations were numerous. His earliest research was in the use of lyophilized human dura mater as a substitute for bladder or urethra. This work did not prove to be useful in clinical practice, but the use of the dura as a substitute for the penile tunica albuginea was of more benefit. Its experimental use (Kelâmi et al, 1975) was followed shortly by its use in man (Kelâmi, 1977a) and subsequently by a report of the management of patients with Peyronie's disease (Kelâmi, 1980a). He had treated 22 patients by plaque excision and dural substitution but recommended that those patients over the age of 50 years should have a penile prosthesis. He always used the Small-Carrion prosthesis, and in 1977 he described its implantation through the infrapubic incision (Kelâmi, 1977b). This was at a time when most people still were using a perineal incision and before the penoscrotal incision had become popular. Kelâmi enthused the benefits of the infrapubic incision for all andrologic surgery (Kelâmi, 1978b,c). Although not used so extensively by other surgeons, we think that it represents a valuable approach to perform either vasovasostomy or vasoepididymostomy (Belker, 1988). The incision is suitable for use with local anesthesia (Kelâmi, 1989).

His innovative experimental results with an alloplastic spermatocele (Kelâmi, et al, 1976) were followed by use of the device for men in whom no reconstructive procedure was possible (Kelâmi, 1978a) and by a successful human delivery resulting from use of the device (Kelâmi, 1981a). It is of interest that, unknown to Kelâmi, another group in Germany also was developing an artificial spermatocele (Wagenknecht et al, 1975). The pregnancy rate with spermatozoa aspirated from these reservoirs unfortunately was not high and in a collected series Belker et al (1986) reported that the implantation of 130 alloplastic

spermatoceles in 91 patients resulted in only seven pregnancies, four of which ended with live deliveries. Kelâmi had only one delivery in his personal series of 27 patients (Kelâmi, 1992) and Wagenknecht (1991) also had little success. The spermatoceles often failed because frequently only immotile sperm were found at operation, and also postoperative aspirations of the reservoirs contained motile sperm for only short times in most patients. However, there are occasional exceptions. One of us (J.P.P.) saw one patient with a reservoir containing motile sperm 6 years after implantation. It was due to the lack of success with reservoirs that one of us (Pryor et al, 1984) switched in 1983 to operative sperm retrieval and in vitro fertilization for those men in whom reconstruction was not possible.

Professor Kelâmi published a technique for performing an epididymovasostomy (Ozdiler & Kelâmi, 1980) whereby an attempt was made to anastomose a single epididymal tubule to the cut end of the vas deferens using a stent to maintain patency. Tubulovasostomy subsequently become the standard technique for treating epididymal obstruction after the widespread availability of the operating microscope allowed the possibility of making a direct surgical anastomosis.

Alpay Kelâmi's publications and presentations were numerous. He was coeditor of 2 books, wrote 26 book chapters, and had 141 publications in European and American journals. He gave 384 presentations at national and international meetings, and either organized or assisted in the organization of 84 national and international meetings. It is apparent from his early publications that Kelâmi was interested in the whole field of surgical andrology. This interest was emphasized in his monograph "Atlas of Operative Andrology" (Kelâmi, 1980b). The book was beautifully illustrated as a result of the close and long-standing cooperation between the author and the artist Wolfgang Nieblich. He was the first to use Small-Carrion prostheses without incision or excision of the plaque for the treatment of Peyronie's disease.

His scientific output in the 1980s was reduced as a result of his ill health, but he published a series of articles dealing with his modification of the Nesbit technique for the correction of congenital deformities of the erect penis (Kelâmi, 1981b, 1985, 1987). He classified penile deformities and described the technique of autophotography in the evaluation of penile curvature (Kelâmi, 1983).

Ultrasound was used to assess the plaque in Peyronie's disease (Friedrich and Kelâmi, 1983), and this work led to a description of the urethral manipulation syndrome (Kelâmi, 1984). This condition resulted from urethral scarring caused by repeated instrumentation and caused the patient to have a ventral penile curvature during erection. No ultrasound abnormality was seen in the penis in

the original patients, whose curvatures resolved spontaneously. Subsequently, ventral fibrosis and failure of the glans to engorge during erection were noted and reconstructive surgery was recommended. The syndrome later was reported by Yachia (1989), Merkle (1990), and Asfar and Sozduyer (1992).

In 1972 Alpay was the initiator and cofounder of the Symposium of Experimental Urology that met biannually in Germany. This organization was integrated in 1976 into the German Urological Association. In 1982 he cofounded the Andrology Colloquium of Berlin, an interdisciplinary organization that meets several times a year. Now it is known as the Berlin Andrological Society, and Alpay was its president during 1991–1992. He was a founding member of the European and Mediterranean Society of Andrology Science in 1989.

At the 10th World Congress of Fertility and Sterility in Madrid in 1980, Alpay and one of us (J.P.P.) decided that it was time to organize a meeting primarily for urologists who were interested in andrology. The first of these annual "symposions" was held in Berlin in 1982. The subject of that meeting was Peyronie's disease ("Induratio Penis Plastica"), and the contributions were published as a monograph (Kelâmi and Pryor, 1983). These annual symposions alternately met in Berlin and London. The proceedings of the second meeting on "Maldescensus Testis" was published as a monograph (Kelâmi and Pryor, 1984). The initial meetings were for 1 day, but later meetings were expanded into 2 or 3 days. After Kelâmi's premature retirement from the Klinikum Steglitz, Free University of Berlin because of ill health, the 1992 meeting was hosted in Istanbul by his friend, Professor Sedat Tellaloglu, rather than in Berlin as would have been customary. Alpay died just a few days before that meeting. The 1993 meeting in London was held in memory of Alpay, and some of the reports from that meeting form the basis of this edition of the Journal.

At each of the five International Symposions of Operative Andrology held in Berlin, and at the 1992 meeting in Istanbul, Alpay personally supervised the publication of a catalog containing the works of artists and andrologists on the subject of art pertaining to andrology. During several of those meetings, the participants were entertained with musical or ballet performances that had andrologic themes. The publications and performances conveyed both Alpay's enthusiasm and his humor. The science at those meetings always was stimulating, while the artistic and social events were elaborate and extremely enjoyable.

His wife, Serin, was intensely supportive of Alpay's numerous professional activities. She accompanied him to meetings throughout the world. Their shared interests in travel and in the historical aspects of andrology resulted

in a partnership they both cherished. Serin played an integral role in helping Alpay with the numerous details that made the meetings they hosted such outstanding events both professionally and socially.

His last publication (Kelâmi, 1992) was a masterful examination of the definition and development of the field of andrology, an overview of the field as it presently exists in various countries, and a stimulating vision of its future that reflected his experience in, and love for, andrology.

Professor Kelâmi was an intense, innovative professional who celebrated life. Despite his failing health, he returned a telephone call from one of us (A.M.B.) just a few years ago at 4:00 in the morning Berlin time. He stated at that time that he was sorry to return the call so late, but he just had returned home and received the message on his answering machine. When asked if it was wise for a man with his health problem to be out so late, he replied, "No, but this was a very special occasion. This was the first time when andrologists from East and West Berlin have been able to meet together freely without the need for special arrangements that previously had been necessary because of the presence of the Berlin Wall!" He enjoyed fine wine, outstanding cuisine, history, the arts, and especially delighted in interpersonal relationships. Alpay will be terribly missed and long remembered by his many friends and colleagues throughout the world.

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Memorial



Dr. Dolores "Pat" Patanelli

Dr. Dolores "Pat" Patanelli passed away earlier this year. During her career she made important and lasting contributions to the field of andrology in the areas of basic and contraceptive research, and she played a unique role in facilitating the exchange of scientific information in our discipline. Her graduate work was conducted under guidance of Dr. Warren O. Nelson, Medical Director of the Population Council; it concerned inhibition and recovery of spermatogenesis. She was invited to present her results at the prestigious Laurentian Hormone Conference and to contribute a chapter to the 1968 volume of the proceedings of this conference, *Recent Progress in Hormone Research*, one of the most quoted and influential periodicals in the field of endocrinology. Between 1963 and 1972, Dr. Patanelli was a research fellow at the Merck Institute for Therapeutic Research. She worked on anti-androgens, male antifertility agents, benign prostatic hypertrophy, and acne, among other subjects. In 1972 she accepted the position of Research Physiologist at the Center for Population Research, Contraceptive Development Branch, National Institute of Child Health and Human Development (NICHD), that she held until her retirement in 1992. At NICHD, she was involved in numerous projects concerning identification, development, and testing of novel

means of fertility control, and she made particularly important contributions to the development of barrier methods. During the same period, she assumed an important role in organization of the Testis Workshops and showed special interest in facilitating the access of young investigators to these important meetings. Her help was particularly valuable when the Testis Workshop ceased to be a National Institutes of Health-sponsored event and became a freestanding conference (the North American Testis Workshop, which now meets every other year in conjunction with the American Society for Andrology [ASA] meetings). Her dedication to the goals of the Workshop, her patience, and her organizational talents helped greatly in making this difficult transition as smooth as possible and allowing the Workshop to establish itself in its new identity.

Pat Patanelli will be missed by many colleagues and friends, and it seems fitting for the ASA to pay a tribute to her contributions on the pages of our journal. Those interested in honoring her memory by making a gift to a cause she supported can make contributions to the Trainee Travel Fund of the American Society of Andrology.

Andrzej Bartke, Ph.D.

Memorial

Dr. Thomas S.K. Chang 1948–1996

On April 13, 1996, our friend and colleague, Thomas Chang, Associate Professor in the Department of Urology at The Johns Hopkins School of Medicine, suddenly passed away.

Tom was born in Hawaii in 1948, received his B.A. in chemistry at the University of Hawaii in 1970, and there carried out his Ph.D. thesis studies on epididymal sulfhydryl oxidase with his mentor, Bruce Morton. He received his Ph.D. in 1976, having identified a novel sulfhydryl oxidase in the epididymis that formed disulfide bonds in sperm proteins through the catalysis of a flavoprotein. This was the start of what would be Tom's lifelong love of sperm physiology and biochemistry.

In 1977, Tom came to The Johns Hopkins School of Hygiene and Public Health to carry out postdoctoral studies with Barry Zirkin, studying the roles of proteases and thiol reduction on sperm decondensation and morphology. In 1981, Tom joined the faculty of the Department of Urology of The Johns Hopkins School of Medicine as Assistant Professor, and soon thereafter initiated studies on male infertility in relationship to sperm physiology and endocrinology. Tom was a pioneer in developing and adapting quantitative methods to assess male infertility, while also contributing substantially to our understanding of how sperm progressive motility is induced and enhanced.

Most recently, Tom collaborated in pioneering studies on the formation of nitric oxide in relation to penile erection and epididymal function. In particular, he had begun to elucidate the effects of denervation on epididymal structure and function, showing that epididymal innervation was essential for normal development after fertilization. Additionally, he had just completed a major five-year study on long-term administration of testosterone and estradiol to dogs to suppress the development of benign prostatic hyperplasia.

In addition to his research commitments, Tom was actively involved in local and national leadership roles. He was a member of the Executive Committee of the ASA,



and previously served as Chair of the ASA's Liaison Committee and Member of the Awards and Membership Committees. Most notably, he also was involved in studying and maintaining national standards for assisted reproductive technologies.

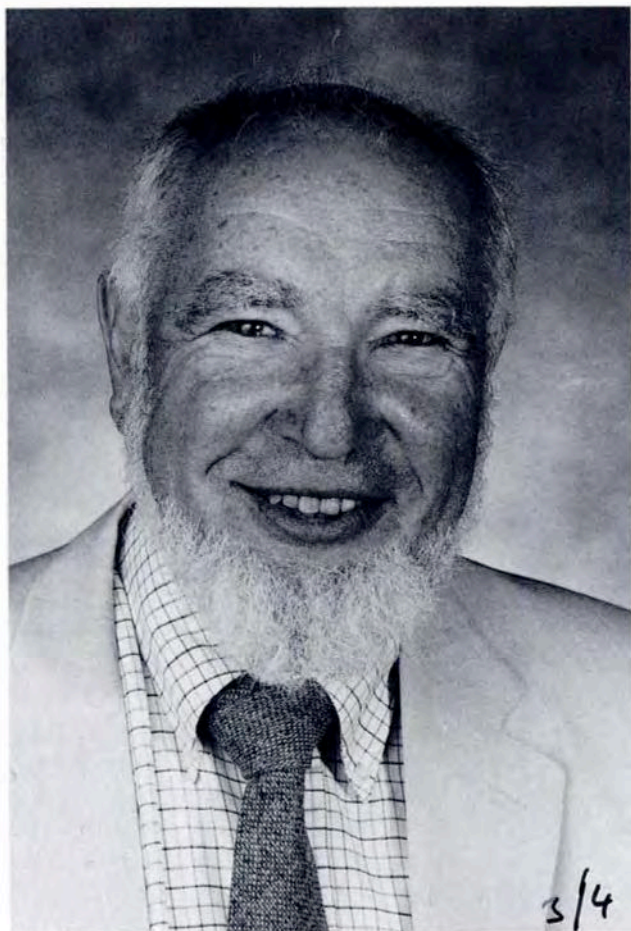
It is difficult to think about Tom without remembering his gentle smile, always helpful hand, dedication to science, and willingness to pass his knowledge on to young people with beautiful lectures and helpful discussions. He gave freely of his time to everyone, and always was optimistic and encouraging in his support of students. His friendship and loyalty were unconditional.

Tom also was totally dedicated to his family. He is survived by his wife, Rosemary, and his sons Alex, a high school student, and Eric, a freshman at Princeton University.

We have known few persons who so successfully combined the qualities of a fine scientist and great human with the ease and gentleness of Tom Chang. He was a wonderful person, an exemplary role model for all of us.

Donald S. Coffey, Ph.D.
Barry R. Zirkin, Ph.D.

Memorial



Dr. Irving B. Fritz
1927–1996

Dr. Irving B. Fritz, a pioneer in the study of germ cell–Sertoli cell interactions and a major intellectual influence in the field of reproduction, died of cancer on January 30, 1996.

Irving chose to enter into studies in the field of reproduction after a successful career studying the role of carnitine in fat utilization and energy production. He entered the University of Richmond at 16 years of age and received a DDS degree from the Medical College of Virginia when he was 21 and a PhD from the University of Chicago at age 24. At the University of Copenhagen, while he was doing postdoctoral work, he did the initial studies on the role of carnitine in lipid metabolism. He eventually took a faculty position at the University of Michigan, where he extended his pioneering studies on carnitine and carnitine-acyl transferases. His achievements put him at the top of his field, but curiosity and fate led him away. He became chairman of the C. H. Best Institute at Toronto in 1968, succeeding

the only previous chairman, Dr. Charles H. Best, and he decided to turn his research efforts to the field of male reproduction. This choice was based on his vision of the importance of the future study of cell–cell interactions and was not made lightly.

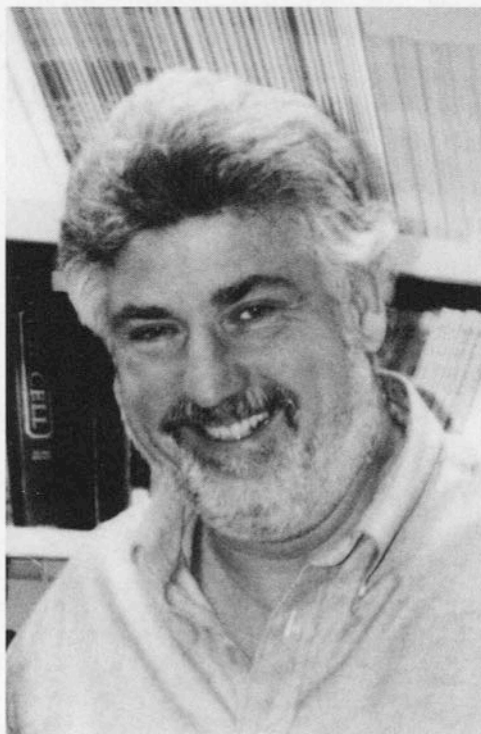
His initial work was concerned with Sertoli cell culture, the action of follicle-stimulating hormone on cultured Sertoli cells, and the secretion of androgen-binding protein. Work over the next several years expanded these initial studies, and the Toronto group, which at that time included Irving's long-time collaborators, Drs. Jennifer Dorrington and Pierre Tung, made major contributions in these areas. After 1980, work from his laboratory focused on the interaction of the different cell types in the testis including studies on synthesis and the roles of plasminogen activator, clusterin, and extracellular matrix. Again, these studies have influenced the way we currently view cell–cell interactions in the testis.

Irving continually challenged our ideas and our conclusions. He was outspoken about unfounded and trivial science. He had enormous vitality and enthusiasm for discussions about science or the finer aspects of life. He was knowledgeable about a wide range of subjects, and in conversation, presentations, and publications, he challenged us to examine our findings in the context of the whole of life. Irving believed in and strove for the unrestricted exchange of scientific information. His broad views allowed him to relate the findings about spermatogenesis to oogenesis and other physiological events. Some of his review articles that have articulated these relationships will remain pertinent for many years to come.

In 1980, Irving received the Gairdner Foundation International Award, the highest scientific award in Canada, for his work on the role of carnitine in the regulation of fatty acid metabolism. In 1984, the University of Toronto appointed him a University Professor, the highest academic rank at that institution. From 1991 until his death, he was a Senior Research Fellow and section leader of the cell interactions unit at the AFRC Institute of Animal Physiology and Genetics Research, Cambridge Research Station, Cambridge, UK. It was in this position that his two research careers coalesced as he worked on the role of carnitine in cell–cell interactions in the testis.

Irving's death came only 2 weeks before his 69th birthday, which would have been February 11, 1996. He would surely have wanted us to celebrate his life, and we shall. However, his leadership, vision, and intellectual intensity will be greatly missed.

Michael D. Griswold, PhD



Lonnie D. Russell

Memorial

Lonnie Russell died in July of 2001. By the time of his death Lonnie had made many important contributions to our basic knowledge of testicular physiology and function. Lonnie was a morphologist and was unapologetic about it. In the 1980s morphology and/or anatomy fell out of scientific fashion. It was difficult for a morphologist to obtain funding, and anatomy departments changed their names in order to compete with the rapidly moving fields of cell and molecular biology. Lonnie continued to produce important papers based on morphology. I still remember my excitement when reading his three manuscripts that provided a 3-dimensional view of the Sertoli cell and its interaction with germ cells. The reconstructed model of the Sertoli cell that arose from this work with its numerous crypts and cupped areas that held germ cells was as beautiful as it was informative (*Am J Anat.* 1983; 167:143–161). In 1984, Lonnie received the Young Andrologist Award from ASA. While Lonnie remained a morphologist to the end, he had a remarkable grasp of molecular biology and even co-authored and published a book entitled *Molecular Biology Made Simple and Fun*.

In the early 1990s Lonnie approached me about co-

editing a book, *The Sertoli Cell*. I think he chose me because my approach and background in biochemistry and molecular biology complemented his background. We worked closely together for over a year and during this time I came to appreciate the depth and breadth of Lonnie's knowledge and contributions. I also came to appreciate Lonnie's zest for life that also complemented my more conservative nature. It was over a few beers that Lonnie authored the rather unusual and controversial preface to this book. My role was to censor parts that I knew would really get us in trouble. After a few more beers we decided we would finish the preface by including our high school graduation pictures. The book has been a success and Lonnie and I became close friends and colleagues.

While the field had left morphology and Lonnie behind in the 1980s, it came back to him in the 1990s. Studies on the testis are complicated by the intricate morphology and it has been the morphologists that pioneered and laid the foundation of the field. The creation of gene knockout mice that were male sterile left many molecular biologists looking for someone to interpret their results at the morphological level, and Lonnie entered into many important

collaborations. In 1994, Ralph Brinster published the first report of germ cell transplantation and began an important and mutually beneficial collaboration with Lonnie. Lonnie provided the morphological analysis for experiments that showed the ultrastructure of the transplanted cells and reported that in xenogeneic transplants (rat into mouse) it was the germ cells that governed the length of the cycle of the seminiferous epithelium. Lonnie became the spokesperson for this important technology at national and international symposia and acquired an interest in spermatogenic stem cells. In discussions with Lonnie, I came to realize the importance of this technology for approaching basic questions about testicular function and we were jointly successful in obtaining funding for some of these projects. At the time of his death we were working together on germ cell transplantation and we had just published a paper showing that germ cells from a testicular feminized mutant mouse would undergo spermatogenesis when transplanted into a normal recipient. This work showed that the requirement for androgen receptor in spermatogenesis resides in the somatic cells.

A quick check of the science citation index (now Web of Science, 1990 to current) confirmed my notion that Lonnie's work has made a major impact on research in testis morphology, function, and molecular biology. During this period, Lonnie's papers were liberally cited, perhaps more so than any other basic scientist in this field. Lonnie loved science, lively challenging discussions, and socializing. Scientific meetings will be a little less exciting without Lonnie. While we have lost an important scientist, and I have lost a friend and colleague, Lonnie would want us to celebrate his life and his contributions to science.

Michael D. Griswold
Washington State University



Memorial

On December 19, 2002, the American Society of Andrology and the Polish Andrology Society lost one of their ardent proponents and advocates at the age of 56. Grzegorz A. Szymczyński, MD, was for many years an active member of ASA and played a pivotal role in establishing the Andrology Society in his native country. Being trained as a gynecologist/urologist, he was devoted to popularizing andrology among the urologists, gynecologists, psychiatrists, and other medical specialists.

Despite serious shortages in financial support, and due to sheer perseverance, Gzregorz succeeded to initiate publication of *Progress in Andrology*, a widely respected journal in Europe. At the time of his sudden and untimely death, volume 4 of the journal was coming off the press. It contained the proceedings of an international conference, *Andrology Today*, which he organized in Byd-

goszcz, Poland, in June 2000. When we participated in this conference, little did we realize that this would be the last time we would see Grzegorz alive and bubbling with enthusiasm.

Gzregorz was born and educated in Poland; however, his interests in andrology and his insatiable quest for knowledge took him well beyond the borders of his native country. He spent a considerable amount of time in the United States working with such esteemed andrologists as Sherman Silber, Arnold Belker, and Emil Steinberger.

Many will cherish Gzregorz's dedication and numerous contributions to the field of andrology. Those who were privileged to know him personally will miss his enthusiasm, loyalty, and good-natured humor. Andrology will miss an ardent supporter.

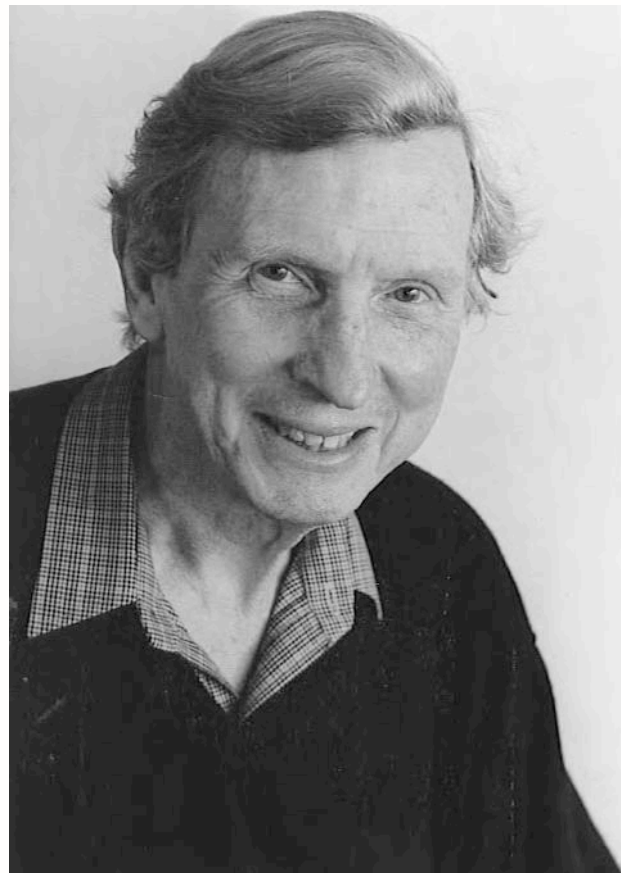
Emil and Anna Steinberger

Memorial

Geoff Waites' premature death robs the Andrology community of an exceptional leader. Geoff was a kindly, wise patron, a valued colleague, and loved friend of so many of us. At 76, he had a full life as a scientist and manager, yet his restless energies never slowed and he still had enough ideas, enthusiasms, and projects to fill another decade. So, we are greatly diminished by his loss.

Geoff completed his PhD 50 years ago. His research produced fundamental concepts, such as the spermatic cord as a countercurrent heat exchanger maintaining testicular temperature, the blood-testis barrier, the role of the epididymis in maturation of sperm function; and he discovered the first prototype posttesticular male contraceptive. As a past master, Geoff deeply respected good science but even more loved the hard-working scientists who created it. Above all, he reveled in the opportunity to harness the best science for enhancing people's lives. During his 11 years as Manager of WHO's Male Task Force, with Ebo Nieschlag as his Chairman, he directed its golden age securing proof of principle for hormonal male contraception—a monumental undertaking—as well as organizing multicenter clinical trials in China and Indonesia, creating the WHO Semen Manual, and running practical Andrology Workshops all over the world. His last paper was a wide-ranging history of the WHO Male Task Force. When male contraception comes to its overdue fruition, it will owe a great debt to his quiet persistence and effective guidance. Kind and gentle in all his dealings, Geoff was nevertheless impatient for progress. To the world of science, he brought organizational insight, while to the world of scientific project management, he brought the intelligence and creativity of an outstanding scientist. Both were immeasurably enriched and in both he placed people at the heart of matters. Whatever he did, measuring his achievement by what went before and after, he was truly great.

Geoff had a life-long commitment to his students and colleagues, always staying in touch and being proud of their progress. He understood the value of tact and timely encouragement, virtues he practiced rather than preached. He led by example, with faith in the soft power of persuasion. Above all, Geoff's scientific and personal integrity and dignified humility shone like a beacon, infused with wit and wisdom. Now we will miss him, his wry and priceless humor, his love of puncturing pomposity,



Geoff Malcolm Hasting Waites (1928–2005)

and his valuing of fairness and progress. Never again will we get to see that wonderful sight of an angular figure, in a crumpled camel-colored suit, loping toward you with a cheeky grin that barely held back some funny story, eager to seize you by the arm for his latest enthusiasm, and to sweep you away with his love of life, his joy in science, and his abiding mission to leave the world a better place, especially for those whose lot in life was unfair, unjust or just plain unlucky.

Geoff Waites was a pioneer of Andrology and committed internationalist. He traveled a lot, not just because he delighted in meeting different people and unfamiliar cultures, but because he loved bringing Andrology expertise to all corners of the globe. Although shunning the tributes, he would have liked that the ISA honors him with a talk on the science of Andrology in a global framework, for that is his legacy.

Personal Remembrances

From Trevor G. Cooper and Ching-Hei Yeung

Ching-Hei and I met Geoff at Reading University, England, where he was our PhD supervisor.

Trained as a physiologist, Geoff's early work was on nerves and vasomotor responses, and he retained this interest in vascular physiology in his future research on the male reproductive tract. Working in Australia with the problems of summer infertility in rams, he showed the importance of apocrine sweat glands of the scrotum (a *Nature* paper) and that countercurrent heat exchange in the spermatic cord acts to cool incoming arterial blood to the testis. He followed this up by demonstrating that the damaging effects of scrotal heating on semen quality were due to unequal changes in testicular blood flow and metabolism. His work with Brian Setchell reflected their common interest in measurement of blood flow and vascular permeability, and they were the first to demonstrate significant variations in different regions of the epididymis (another *Nature* paper) before the morphological differences in endothelia were known. His expertise at cannulation led to most important discoveries on the composition of intratubular testicular fluid and the study of immature spermatozoa just shed from the germinal epithelium (yet another *Nature* paper) first in rams and subsequently in rats and monkeys by Geoff and in other species by others. This ability to collect, in this way, uncontaminated samples of testicular spermatozoa, sometimes over days from a conscious animal, enabled the nature of sperm maturation to be defined by comparing these spermatozoa metabolically and biochemically with those from the cauda epididymidis. Studies on the effects of heat on testicular fluid and sperm production and metabolism followed in a series of classic papers. When combined with cannulation of testicular lymphatics, the way was open to demonstrate that a blood-testis barrier existed limiting the ingress of circulating compounds, again initially shown in rams but subsequently demonstrated in rats (my (T.G.C.) PhD thesis) and later in other species. Ultrastructural techniques were soon employed in other labs to locate the anatomical sites of the barrier. Testicular fluid proved to be similar in many species but far different from fluid leaving the epididymis, and the consequences of this for the maturing spermatozoa are still being studied. One aspect, osmolality, is our current research interest.

Geoff's lab was a crossroads for international scientists, many from the Indian subcontinent, who worked on research on male contraceptives (Gossypol, *Trypterigium wilfordii*). The action of testicular toxicants fired Geoff's interest in the entry of these compounds into the testis now that both testicular fluid and sperm could be col-

lected. The inhibition of sperm glycolysis by alpha-chlorohydrin prompted the synthesis of other chlorinated compounds at Reading, which were tested for their action on sperm metabolism and male fertility. The requirement for potential posttesticular contraceptives to access epididymal spermatozoa brought Ching-Hei to Geoff's lab from Hong Kong, where she had developed, with Patrick Wong, an epididymal cannulation procedure. Ching-Hei's PhD thesis and my postdoctoral work with Geoff utilized this technique to characterize the blood-epididymis barrier in rats. Geoff's introducing us to "functional sterility" proved an important concept for us both, as it has consumed a major part of our research lives since leaving his lab.

When asked to mention Geoff's role as a teacher, both Ching-Hei and I had to stop and think about it. The difficulty lay in his teaching method: knowledge was imparted subliminally, not imposed, as we sat together at the bench pulling catheters and cannulating any orifice available. There was always a cheerful rapport in the lab, and we both remember carefree days lived in true camaraderie, delighting in the same ridiculous sense of humor. Much admiration has been aired about Geoff's integrity, wisdom, and sense of humor, but what we remember him for mostly is his warmth and kindness, his willingness to listen and encourage, and his readiness to help young scientists, particularly those in developing countries. Outside academia, this interest was extended to children from the developing world, and nowhere was this more evident than in his work with Concern Ethiopia and the building of schools (the first bearing his wife Doreen's name) in that country.

We shall miss him a lot because he was more than a scientific adviser, but also a close personal friend, in whose lab we met, and in whose home we could relax when times got tough.

From Brian P. Setchell

The death of Geoffrey Waites in May 2005 has deprived the world of one of a most able and experienced scientific andrologist. Geoffrey did his first degree, a BSc, at Birmingham, then did a Part II in Physiology at Cambridge. As he had a Cambridge degree, he was permitted to do his Cambridge PhD at the Institute of Animal Physiology at Babraham just outside Cambridge, with the first Director Ivan de Burgh Daly, on the nerve supply to the heart of the sheep. Geoffrey came to Australia in 1958 to the CSIRO Division of Animal Physiology, Prospect, a suburb of Sydney, to work with George Moule, a veterinarian who had noticed that rams in Queensland became infertile during the summer heat. Geoff and George collaborated for several years and published several papers together, two of which (Waites and Moule, 1960, *JRF* 1, 223; and 1961, *JRF* 2, 213) were important in establishing that the

spermatic cord in the ram acted as a countercurrent heat exchanger and also eliminated the pulse from the arterial blood. I did my PhD at the Veterinary School at Cambridge at about the same time as Geoff, and although I visited Babraham several times, as far as we could determine, Geoff and I never actually met during that time.

When I returned to Australia at the end of 1957, a mutual friend from Babraham, Alan Pierce, later Chief of CSIRO Animal Health, suggested that we meet when Geoff came to Sydney. Our long-lasting collaboration on the physiology of the testis and epididymis began under somewhat unusual circumstances. At the time we met in Sydney, I was interested in the possibility that the sheep had a different catecholamine response to hypoglycemia, which might have influenced their clinical response. When I read a paper that claimed that the temperature of the denervated ears of rabbits could be used as a bioassay system for adrenaline, and as I found that Geoff had described a surgical method for removing the superior cervical ganglion of sheep (1957, *J Physiol* 135, 52), we started a project on the catecholamine response of sheep to hypoglycemia, the results of which were written up in our first joint paper (1962, *J Physiol* 164, 200).

In this study, we also denervated the hearts of two sheep, again using Geoff's knowledge of the relevant anatomy obtained during his PhD (1957, *J Physiol* 139, 417, and 135, 58). During this time, we discovered that we shared an interest in cricket, and arranged several matches between the Prospect team and a team from the laboratory where I was based, which included a NSW state player and his younger brother, who later played for Australia. Geoff was a very fine batsman and also a good fast bowler, but he had some uneasy moments facing this very tall 17 year old, who, a few years later, was bowling for Australia in Test matches.

Then in 1962, I applied for and got a research job at CSIRO Prospect and Geoff and I began a collaboration to develop techniques for measuring blood flow and metabolism in the testis and epididymis (1964, *J Physiol* 171, 411; 1964, *Nature* 203, 317). As well as demonstrating important regional variation in the epididymis, we found interesting effects in the testis, during changes in temperature (1964, *JRF* 8, 339) and nutritional status (1965 *JRF* 9, 149). During these blood-flow studies, we noticed that the values obtained with two different indicators (iodoantipyrine and rubidium) were quite different in the testis and brain, but similar in all other tissues we examined. This observation led to the concept of the blood-testis barrier, analogous to the blood-brain barrier, which was further developed when Geoff and I, with Sepp Voglmayr, established a technique for chronic collection of fluid from the rete testis of rams (1966, *Nature* 210, 861) and found that this fluid was quite different in com-

position from blood plasma or testicular lymph (1967, *JRF* 14, 87).

The situation at Prospect when I joined the staff there and for the first few years was a scientific paradise. Facilities were excellent and money seemed to be no problem. In fact, Geoff and I were invited to apply for the funds for an automatic gamma counter by a representative of the Ford Foundation, so that we could avoid sitting up to 2 or 3 AM counting the isotope levels in pieces of testis and other tissues, using a manual counter, but the Chief of the Division refused us permission to do so, saying that if the project was worth doing, CSIRO would buy the necessary equipment, and they did.

In 1965, Geoff had the opportunity to work at Jouyen-Josas near Paris with Robert Ortavant, which developed his love of France and things French, and when he returned to Australia, he was appointed Associate Professor of Physiology at Sydney University. At Geoff's suggestion, I spent 1967 at Babraham working with Jim Linnell, who had been a close friend of his during his Babraham days. My collaboration with Geoff in Sydney continued until 1969, when both of us independently, and without the other knowing, accepted positions in the United Kingdom, Geoff as Professor at Reading and me as a Research Officer at Babraham. We left Sydney within days of one another, Geoff and his family going east and us going west, by boat. We continued our collaboration in the United Kingdom for some years, some experimental, but mostly writing together, and one of Geoff's PhD students (Steven Main) worked with me for several years at Babraham as a post doc funded by NIH.

Geoff was a very fine sportsman and a wonderful raconteur. His stories were mostly based on his own experiences. For example, he told a story of a young research student, when the current technique for measuring blood pressure involved a fluid catheter connected to a reservoir topped by a fine rubber diaphragm. The best rubber for this purpose was the rubber from a condom and, on one occasion, the young, rather naive student was sent by a senior colleague to purchase a condom. When asked whether he wanted plain or teat-ended, he replied that it did not matter as they cut off the end before they used them, somewhat to the surprise of the assistant in the pharmacy.

The other story I remember well involved two cleaners at Prospect, who came in after office hours, by which time most of the scientific staff had usually gone home. Geoff was sitting at his desk behind the door on this occasion writing up the results of the day's long experiment, which had produced a certain amount of mess in his lab. As the two cleaners came level with his open door, he heard one of them exclaim "Oh Jesus Christ." The other said: "Shush, he's behind the door," which Geoff claimed gave him divine status.

When he was at Jouy, he was invited to join Charles Thibaut, the then director, for lunch with a rather crass Australian who was visiting the lab and who shall remain nameless. They were served a lovely bottle of Loire Rose wine. Thibaut had perfect English, but when the Australian visitor asked if we in Australia made rose wine by mixing equal parts of red and white wine, all Thibaut could say was “jamais” (never), the only time Geoff had known Thibaut’s English ever to desert him.

I had less contact with Geoff during his later work at

WHO, but he certainly made, during that time, an important contribution to international andrology. His connections with China helped bring andrology in that country into the mainstream of the discipline, and he fulfilled an important role as Chairman of the Advisory Board of the *Asian Journal of Andrology* up to the time of his death.

Geoff was the best colleague and most entertaining companion I have ever known, and I will miss his friendship more than I can ever say.

In Memoriam: Dr Charles Philippe Leblond, MD, PhD,

On April 10, 2007, Dr Charles Philippe Leblond passed away peacefully at his residence in Montreal surrounded by his family. Dr Leblond was the most prominent member of the Department of Anatomy and Cell Biology of McGill University.

He began his scientific career in France studying the distribution of vitamin C in various tissues of laboratory animals. He also learned to use newly discovered radioactive isotopes, in particular radioiodine, which he found concentrated in the thyroid gland. After a brief stay in Canada in 1941, he went back to France to return to the Department of Anatomy of McGill University in 1946. In collaboration with Dr Bélanger, he developed the technique of radioautography, which permits the exact localization of radioactive molecules in tissues and cells. Radioautography was extensively used by Dr Leblond in his laboratory at McGill and by researchers around the world to investigate and clarify a variety of biological processes. This procedure continues to be used today by molecular biologists to detect RNA molecules *in situ* and to study the localization of genes and DNA sequences.

Dr Leblond used radioautography to introduce radioactive precursors of DNA and thus to study the renewal and fate of cells of several basic tissues. He demonstrated for the first time that most cells and tissues in the adult body undergo continued renewal. Using mathematical models and modern methods of quantitation, Dr Leblond and his colleagues estimated with remarkable accuracy the turnover and mitotic rates of numerous cell types. He and his colleagues made fascinating discoveries that resulted in the introduction of “time dimension” to cells and tissues, opening the doors to the understanding of the cell cycle and to the identification of stem cells. In fact, Dr Leblond and his colleagues devised several methods for isotopic labeling of the nuclei of cells in the process of division. The labeled cells could then be identified for as long as they survived in the living tissues. Exploiting this approach, Dr Leblond and his colleagues made the first measurements of cell renewal in most tissues of the body. He found that the rate of renewal was remarkably high in



the epithelial lining of the stomach and intestine, where the cells completed their life cycle within a few days.

In collaboration with Dr Yves Clermont, he also studied the complex changes that occur in the Golgi apparatus and acrosomic system during the transformation of spermatids into spermatozoa in the rat, mouse, hamster, and guinea pig. These changes were used to divide the cycle of the seminiferous epithelium of the rat into 14 stages whose duration was later estimated to be 12 days for the whole cycle. This classification served as a classic model for the study of the cycle of the seminiferous epithelium in other mammalian species, including the human. The 2 original papers by Leblond and Clermont (Leblond CP, Clermont Y. Spermogenesis of rat, mouse, hamster and guinea pig as revealed by the “periodic acid-fuchsin sulphurous acid technique.” *Am J Anat.* 1952;90:167–216; Leblond CP, Clermont Y. Definition of the stages of the cycle of the seminiferous

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epithelium of the rat. *Ann N Y Acad Sci.* 1952;55:548–573) constitute milestones in andrology, and perhaps they are the most frequently cited papers in the field of male reproduction.

During the mid 1960s, Dr Leblond and his colleagues achieved the refinement of radioautography and its application to electron microscopy to exploit the high resolution of this technique. Dr Leblond was able to analyze intracellular pathways followed by radiolabeled amino acids and carbohydrates. Again, he was one of the first to identify the role of different compartments and subcompartments of the cell involved in the biosynthesis and secretion of glycoproteins.

Throughout his illustrious career, Dr Leblond initiated numerous other projects involving immunocytochemistry both at the light and electron microscope levels, which led to elegant results and important discoveries. These contributions resulted in the publication of 430 scientific papers, many of them still frequently cited. In addition to his passion as a researcher, Dr Leblond served as the head of the Department of Anatomy of McGill University for more than 25 years. During that time he developed one of the best international research centers in cell biology, and he was the mentor of many prominent colleagues.

Throughout his long and distinguished career, Dr Leblond's contributions to modern medical science have been outstanding and recognized by numerous distinc-

tions and awards. Dr Leblond was a Fellow from the Royal Society of London, the Royal Society of Canada, and the American Academy of Arts and Sciences. He received honorary doctorates from Acadia University (1972), McGill University (1982), l'Université de Montréal (1985), York University (1986), and l'Université de Sherbrooke (1988). He was also an officer of the Order of Canada and Officier de L'Ordre National du Québec.

Dr Leblond was a distinguished colleague in every sense of the word. He was one of those individuals who could not pass unnoticed, becoming an emblematic icon for McGill University. Visitors and colleagues from around the globe always asked if he was still coming to the department and if they could pay a visit to him. Until recently, before his health started to decline, he was attending the departmental seminar series and often asked insightful questions. Dr Leblond was a person of genuine finesse and originality and a role model for many graduate students. Dr Leblond has touched the life of many colleagues, former students, and post-doctoral fellows and will be forever remembered with gratitude, admiration, and respect.

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Canada*

In Memoriam: Matthew P. Hardy, PhD, ■

With great warmth and profound sadness we remember Dr Matthew P. Hardy, who died unexpectedly on Sunday, November 4, after completing the New York Marathon. In Matt's quiet, unassuming way, he had become one of the preeminent reproductive biologists in the country, one who deservedly enjoyed a national and international reputation. He was also a longtime and loyal member of the American Society of Andrology, where he contributed mightily of his time and talent.

Matt received his PhD in Biology at the University of Virginia in 1985. He then went on to conduct postdoctoral work with Larry Ewing at Hopkins' School of Hygiene and Public Health, from 1985 to 1990. When Matt completed his postdoctoral, he left Baltimore for New York City for the position of Staff Scientist at the Population Council. He was promoted rapidly through



Photo credit: Karen Tweedy-Holmes, Population Council.

the ranks at the Population Council, becoming a Scientist (equivalent to Associate Professor) in 1997, and then Senior Scientist (equivalent to Professor) about 3 years later. He also held joint appointments at The Rockefeller University and at Weill Cornell Medical College.

Matt became internationally recognized for his innovative, groundbreaking studies on the origin and development of Leydig cells in the mammalian testis. In a series of what have become classic papers, he conducted analyses of the development of the adult population of Leydig cells from Leydig cell precursors, demonstrating the sequence of events that occur to form the adult population, and the mechanisms by which the sequence is regulated. Along the way, he made the counterintuitive observation that androgen itself is involved in the differentiation of Leydig cell precursors, a critical and now well-accepted observation. He also elucidated in detail the role of lutenizing hormone (LH) in both the short-term and long-term regulation of Leydig cells. Over time, the studies involved morphological, physiological, biochemical, and molecular methodologies, a hallmark of Matt's scientific style; he always did whatever was necessary to answer questions, not restricting himself to what was comfortable.

While continuing to work on Leydig cell development, and most recently on Leydig stem cells, Matt studied developmental changes in LH and androgen receptor expression, the differential expression and regulation of steroidogenic enzymes, Leydig cell proliferation and its regulation, the role of paracrine factors (primarily growth factors) in Leydig function, aging and stress effects on Leydig cells, mechanisms through which reproductive toxicants impact testicular function and puberty, and the role of neonatal hypothyroidism on Leydig cell numbers and function. In all, Matt authored over 70 peer-reviewed publications, coauthored a very well-known and highly cited book (*The Leydig Cell*), and published about 35 chapters. His creativity and high level of productivity contributed to his being named the 2000 Young Andrologist by the American Society of Andrology.

Matt exhibited a unique ability to understand the clinical implications of many of his observations and played a pivotal role in the development of future clinician-scientists. He routinely contributed to medical studies at Cornell, documenting that even men with small testes maintained their quantitative complement of Leydig cells, compared with normal men.

Matt lived his belief in contributing to science in its broadest sense, including service to scientific societies. He chaired ASA's Bylaws Committee (1995–1997), was elected to the ASA Executive Council (1998–2001), and cochaired the Membership Committee (2001–2002). His quiet, capable leadership as Chair of the Testis Workshop Executive Committee (2005–2007) has facilitated the rewarding relationship between the Testis Workshop and ASA. Having served on our editorial board (1998–2001), Matt was selected to become Co-Editor-In-Chief of the *Journal of Andrology* (2002–2007). Together with Peter Schlegel, he significantly enhanced the reputation and scope of our journal. Throughout all these activities, he brought a clarity of vision and a sense of ethics rarely seen in our community. It was fitting, then, that he was to be recognized with the ASA Distinguished Service Award at the upcoming 2008 ASA Annual Meeting.

Matt's service activities extended beyond the ASA. He was Chair of the Bylaws Committee of SSR (1998–2000) and a member of the editorial boards of *Archives of Andrology*, *Biology of Reproduction*, *Endocrinology*, and *Molecular and Cellular Endocrinology*. At the time of his death, he was serving as a member of the Cellular, Molecular and Integrative Reproduction Study Section (CMIR), among his other study section activities.

On a personal level, virtually anyone would describe Matt in the following way: If one did not like and respect Matt, then they must not like people or respect anyone! Matt was a wonderful human being, one who was kind, helpful to anyone (he never recognized a "pecking order"), willing to give without expecting anything in return. His decency and civility were evident regardless of the circumstances. He possessed the rarest of qualities: He was a person who did not wait to be asked when there was need, but rather volunteered. He was a wonderful, patient teacher and fine mentor. He was highly principled, strong, consistent, and ever thoughtful of others. He served without making noise, without calling attention to himself. He had become an outstanding scientific leader who knew how to make hard decisions and to enlist others. He shared his science and his dreams with his lifelong partner, Dianne. He will be sorely missed by his father, brother, sister, wife, and his many friends.

Barry R. Zirkin
Peter N. Schlegel
Bernard Robaire
Sally D. Perreault (Darney)

Memorial: Emil Steinberger, MD, FACE,

It is with great sadness that I inform you that Dr Emil Steinberger died October 12, 2008. Dr Steinberger was the first president of the American Society of Andrology (ASA) and played an important role in the initiation and development of the ASA. Our field has lost a true Renaissance man, talented in many areas beyond those of reproductive biology and medicine.

Dr Steinberger attended medical school in Germany and then came to the United States, where he graduated with an MD from the State University of Iowa College of Medicine in 1955. In fact, he would have been the first person to be awarded an MD, PhD degree from the University of Iowa, but the Dean insisted that he could not receive 2 degrees at once! He refused to stay for an additional semester, although he completed all requirements for a PhD degree. Nevertheless, this basic science training greatly contributed to his depth of understanding and appreciation of the complexity of male reproductive biology. Dr Steinberger then moved to Wayne State University Medical School for specialty training, followed by a position as a senior medical research officer for the National Naval Medical Center. He served as chairman of the Department of Endocrinology and Human Reproduction at Albert Einstein Medical Center from 1965 to 1971. In 1971 he moved to Houston, Texas, to assume the position of chairman of the Department of Reproductive Medicine and Reproductive Biology at the newly created University of Texas Medical School at Houston. This department was a remarkable blending of the talents of clinical endocrinologists, steroid chemists, biochemists, and cell biologists, all with research interests focused in male reproductive biology. Together with his associates Keith Smith, MD, and Louis Rodriguez-Rigau, MD, Dr Steinberger clinically evaluated each of the infertile partners, because these andrologists recognized that the complexities of successful reproduction reflected the reproductive potential of the couple together rather than just the problems of the female partner. In 1983, Dr Steinberger was honored with the Ashbel Smith Professorship. Together with Drs Smith and Rodriguez, he then established the Texas Institute of Reproductive Medicine and Endocrinology in 1983.

Much of his career focused on the hormonal control of spermatogenesis. His studies of spermatogenesis



began in the mid-1950s when he worked together with the famed Dr Warren O. Nelson. His early research set the stage for work that continues in many andrology laboratories today, and included studies of the gonadotoxicity of alkylating agents; *in vitro* penetration of cervical mucus by sperm; human sperm cryopreservation; effects of heat, ischemia, and cryptorchidism on spermatogenesis; and the controls of the hypothalamic-pituitary-gonadal axis. In the mid-1970s he published a paper on the frequency distribution of sperm counts of fertile and infertile males, noting that sperm counts, except at the extreme low end of the scale (in the absence of other deficiencies), were not major factors in a couple's infertility, and thereby set the stage for the development of sperm function testing. Other clinical work focused on the endocrine manipulation of hyperandrogenic women and those with other causes of ovulatory dysfunction. With his wife, Dr Anna Steinberger, testicular organ culture and *in vitro* spermatogenesis were established. Together they reported on the presence of a follicle-stimulating hormone (FSH)-inhibiting protein secreted by Sertoli cells that acted on the pituitary. Today we know that this protein is inhibin. Work in his department focused on androgen and FSH regulation of spermatogenesis and Sertoli cell function, Leydig cell steroidogenesis, sexual behavior, and other aspects of reproductive biology. Dr Steinberger was honored for these achievements by the ASA as the recipient of the Distinguished Andrologist Award in 1987.

In his later years, Dr Steinberger became an author and published 2 books on his life before, during, and

after the Holocaust. The first, *Between the Devil and the Deep Blue Sea*, tells of his experiences as a young boy growing up before, during, and after the Second World War. It is an amazing story that chronicles his family's flight from Poland, escape from extermination camps, and imprisonment in a Soviet labor camp. After the war, he attended medical school prior to moving to the United States. His second book, *The Promised Land: Woes of an Immigrant*, relates his experiences beginning with his arrival in the United States with just \$20 in his pocket. There is much to be learned from his story of perseverance to overcome great obstacles in life, a man who ultimately became a leader in our field—a leader who will be missed by all who knew and loved him.

Emil Steinberger was passionate about andrology and medicine, hard-working, demanding, innovative in his research, challenging to his students, and devoted to his family. However, he also lived life to the fullest—enjoying his family and friends, sailing, travel, and writing.

He enthusiastically embraced life and showed unflinching loyalty and support to his family and trainees. Even after learning of his illness, the Steinbergers traveled to the far reaches of the world—retracing their flight throughout Eastern Europe and Central Asia during World War II; traveling to South America, Asia, and Australia; and visiting with their many friends and colleagues. Every moment of life was precious and enjoyed. His loving wife Anna, his 2 daughters and grandson, his sister, his family and friends, and his colleagues and students will all miss him. His contributions to the field of andrology are legendary. He will remain a role model of the ultimate physician-scientist/andrologist and the first president of the ASA. He leaves us his memory to cherish with the implicit reminder that with integrity, love, loyalty, determination, and drive we can all accomplish the impossible if we, like him, pursue our dreams of excellence.

Dolores J. Lamb

Memorial

Dr C. Alvin Paulsen, a founding member of the American Society of Andrology (ASA) and an Emeritus Professor of Medicine at the University of Washington, died on December 18, 2008, at age 84. Dr Paulsen was internationally well known and admired for his work in clinical, teaching, and investigative male reproductive endocrinology and biology. Dr Paulsen was a dedicated physician, an inspiring teacher, an innovative clinical scientist, a lifelong friend and mentor to many, and a loving husband, father, and grandfather.

Dr Paulsen was born and raised in Portland, Oregon. He attended the University of Oregon as an undergraduate and for medical school, interrupted by time in the US Navy in World War II. At Oregon, he did work in male reproductive endocrinology with Dr Carl Heller, his early career mentor, including a presentation as a student to the Endocrine Society and a publication. He went on to a busy internship and residency at Detroit Receiving Hospital (where he worked with another recently deceased *Andrology* pioneer, Dr Emil Steinberger) and continued at Wayne State as an Endocrinology Fellow with Dr William Maddock. In 1958, he moved to Seattle, where Dr Heller then worked, and Dr Paulsen started his lifelong academic career at the University of Washington, rising to Professor in 1970. Dr Paulsen was the long-term Chief of Endocrinology at the US Public Health Service Hospital in Seattle, which served as a training mecca for approximately 44 Endocrinology Fellows over the years.

Dr Paulsen was an active physician throughout his career, maintaining a group of patients who considered him to be their primary physician. This fascinating and loyal patient group was one of the first things that attracted trainees to his program. Dr Paulsen's wife, Wanda, was an active partner in this regard, contributing her nursing and administrative work to his Saturday clinics, as well as to his research work. He was also a first-rate teacher both at the bedside, modeling excellent patient care skills, as well as in his lectures, well illustrated with carefully prepared patient and laboratory pictures and data.

As an investigator, Dr Paulsen was courageous and original, elucidating areas that were understudied, such as Klinefelter Syndrome, a very common condition that was poorly understood. His work in Kallmann Syn-



Dr C. Alvin and Wanda Paulsen

drome was an excellent example of using the assessment and treatment of patients as a means of understanding key aspects of genetics, physiology, and pathophysiology. He also studied male infertility and male contraception, 2 inadequately addressed areas of wide societal interest and importance. His work was careful, methodologically accurate, clearly reported, and repeatable. He was a very early adapter of many technological advances for the study of human beings, including chromosomal analysis, radioimmunoassays of hormones, and improved techniques for biopsies and seminal fluid analysis. He selected outstanding technical staff who were very loyal to him, in some cases dedicating their entire careers to working with him.

Dr Paulsen was an international leader in his discipline. He published widely (over 150 contributions) in the scientific literature and provided the excellent chapter on the testes for the original and widely influential *Textbook of Endocrinology*, edited by Robert H. Williams, the first Chairman of the Department of Medicine at the University of Washington. He served on editorial boards, including the *Journal of Andrology* and the *Journal of Clinical Endocrinology and Metabolism*, and advisory groups for the National Institutes of Health, the National Pituitary Agency, the US Food and Drug Administration, the United Nations Family Planning Program, and the US Agency for International Development. He played a particularly influential role in the World Health Organization programs in male fertility and its control. Dr Paulsen was a founding member of ASA and his service was recognized by his election to the Presidency in 1979 and his receipt of the Distinguished Andrologist Award in 1989. He was also the Society's first Serono Award Lecturer in 1980 and its first Distinguished Service Awardee in 1994. He also

served as President of the Fertility Society (1980), now the American Society for Reproductive Medicine. Dr Paulsen "retired" in 1992 and as an Emeritus Professor remained active in academic programs until limited by his health in recent years.

Dr Paulsen was preceded in death by Wanda, his dear wife of nearly 60 years, who passed away only a few months before he did. He is survived by his 5 children, Chuck and Peter Paulsen, Sydney Bersante, Judy Hayes, and Linda Jones and their families, including 8 grandchildren and 1 great-grandchild.

It is said that the great teacher never dies but lives on in his students. The hundreds of students and residents, and particularly the 44 fellows who trained under Dr Paulsen, are testimony to this truth. The fellows have gone on to train hundreds more physicians and scientists, generating a living legacy of Dr Paulsen's very fruitful life. All of us, as well as the countless patients, families, colleagues, friends, and others who interacted with him are grateful and recognize with respect and admiration the continuing effect he exerts on their lives.

Richard J. Sherins, MD

Memorial

How many scientists can say that their work has impacted our planet in a positive and measurable way? Dr JoGayle Howard could. She was instrumental in helping save some of the world's most charismatic species through basic and applied research and training young professionals. It is with great sadness that we report that Dr JoGayle Howard died March 5, 2011, after a prolonged battle with cancer. Dr Howard served as the theriogenologist at the Smithsonian Conservation Biology Institute, National Zoological Park, in Washington, DC. Dr Howard was a leader and inspiration for scientists within the American Society for Andrology and the zoo and wildlife community. She was an active member of the American Society of Andrology and served as a member of the Executive Council (1993–1996); Vice-President, Women in Andrology Committee (1999–2000); and President, Women in Andrology Committee (2000–2001). Dr Howard also delivered the Buckeye Lecture in 1997.

Dr Howard received her DVM from Texas A&M University in 1980 and her PhD from the University of Maryland in 1989. Dr Howard's career at the National Zoo started in 1980, when, as a freshly graduated veterinarian, she did a postgraduate internship in comparative reproduction under the supervision of Drs David Wildt and Mitchell Bush. During those early years, Dr Howard developed approaches and conducted fertility examinations on a host of wildlife species ranging from bats to elephants while traveling the world extensively, working both in the field in Africa and in zoos and breeding centers.

Dr Howard's basic research resulted in the publication of more than 100 peer-reviewed papers, 20 book chapters, and numerous reports. She was a recipient of a prestigious Special Emphasis Research Career Award from the National Institutes of Health. In recognition of her many accomplishments, she was recognized for Research Achievement (US Fish & Wildlife Service), as a Featured Conservation Scientist (British Airways Exhibit at Millennium Dome, London), and with the Ulysses S. Seal Conservation Award, the Distinguished Research and Scientist Award (American Association of Zoo Veterinarians), and the Recovery Champion Award for her leadership in helping save the black-footed ferret (US Fish & Wildlife Service). Dr Howard was active in



Dr JoGayle Howard
Photo credit: Nashville Zoo, Tennessee.

the Conservation Breeding Specialist Group of the IUCN–World Conservation Union, the Felid Taxon Advisory Group, and numerous Species Survival Plans of the Association of Zoos and Aquariums. She also held adjunct appointments at both the University of Maryland and George Mason University. She extensively lectured to university, conference, and lay audiences worldwide.

Dr Howard's research focused on fertility, infertility, and the role of reproductive technologies for promoting reproduction in wildlife. She was instrumental in developing novel approaches for propagating genetically valuable animals, especially using artificial insemina-

tion. Her basic research interests largely focused on understanding reproductive mechanisms in never-before-studied species and the phenomenon of teratospermia. Her specific contributions to the field of andrology are summarized as:

- Developing technologies for semen and sperm analysis in diverse species, including the African elephant, rhinoceros, antelopes, felids, and the black-footed ferret both in captivity and in the wild.
- Demonstrating a link between a loss in genetic diversity and an increased incidence of abnormal sperm, especially in felids and specifically in the cheetah, Florida panther, and clouded leopard.
- Characterizing cellular and molecular mechanisms involved in spermatogenesis, spermiogenesis, and sperm structure and function in felids.
- Demonstrating the negative impact of poor sperm morphology on low cryo-survival.
- Establishing the link between poor nutrition and the incidence of oligospermia or teratospermia in felids.
- Developing field-friendly sperm cryopreservation techniques for numerous species, including the cheetah, clouded leopard, elephant, antelope, black-footed ferret, and giant panda.
- Demonstrating the transmissibility of feline immunodeficiency virus via semen (applicable to assisted reproductive techniques) and also developing processing techniques to minimize viral load.

Dr Howard was a champion for numerous species on the brink of extinction. Her contributions to wildlife conservation are summarized as:

- *Recovering species that were on the edge of being lost forever.* Especially relevant were her contributions to saving the black-footed ferret that at one time was declared to be extinct, until a small remnant population was found in Montana in the early 1980s. Zoos were called to assist, and, under Dr Howard's oversight, the National Zoo's ferret breeding program flourished with the birth of more than 500 kits, including 150 via artificial insemination. Most recently, she produced black-footed ferret kits from sperm frozen more than 20 years ago. She also initiated a multidisciplinary program to conduct a biomedical survey of wild black-footed ferrets to assess health, disease, reproduction, immunology, and genetics of reintroduced populations in the North American grasslands ecosystem. This program resulted in the successful reintroduction of the species in 6 US western states, Canada, and Mexico.
- *Understanding the reproductive biology of species that were dramatically affected by small population size and lost gene diversity.* The population of Florida

panthers collapsed to fewer than 50 individuals in the 1980s because of habitat fragmentation in south Florida. Dr Howard tromped through the swamps with her colleagues to assess the reproductive status of Florida panthers, discovering an extraordinary high incidence (>90%) of morphologically abnormal spermatozoa in this critically endangered subspecies, as well as other physiological defects, including cryptorchidism. These findings helped the US Fish & Wildlife Service to implement a radical interbreeding strategy using the genetically distinct pumas from Texas to restore genetic vigor.

- *Applying reproductive technologies to enhance zoo populations.* Dr Howard was part of a team that, for the first time, collected, cryopreserved, and imported sperm from free-ranging cheetahs in Africa (Namibia) for producing offspring in the United States by artificial insemination. The overall benefits of this work included vastly expanded knowledge of cheetah biology and genetics, and improved the ability to maintain a reproductively viable population through a combination of science and reproductive management.
- *Enhancing reproductive efficiency in captive populations of an iconic species.* Dr Howard was a key member of a multi-institutional team that worked side by side with Chinese colleagues to understand the biology of giant pandas for the purposes of unlocking the mysteries of poor reproduction. With Chinese colleagues, she developed new protocols for sperm cryopreservation and artificial insemination, often by training young Chinese professionals in the range country or her laboratory at the National Zoo. Dr Howard also is credited with successfully inseminating the female giant panda Mei Xiang at the National Zoo, producing the famous cub Tai Shan in 2005.
- *Championing for species conservation in range countries.* The clouded leopard is a beautiful yet secretive cat living in southeastern Asia. When the breeding program in US zoos was failing, Dr Howard established the Thailand Clouded Leopard Consortium that was devoted to breeding this endangered species in the range country of Thailand. She and her team have produced more than 50 cubs while simultaneously raising funds to support conservation projects both in the field and in captivity. A subset of 6 of these cubs has been imported into the United States to rejuvenate the American zoo breeding program, with another 8 offspring already produced.

The final component of Dr Howard's passion for andrology, reproductive science, and conservation involved training a next generation of biologists. She

was an outstanding mentor with high ethical standards and relentless focus on ensuring highest-quality scientific output. She was a constant source of inspiration for numerous young students and professionals. Forty-six undergraduates, 7 graduate students, 10 postdoctoral fellows, and 12 visiting scientists (from Russia, Thailand, South Africa, Namibia, and China) benefited from her mentorship and now carry on her legacy. Dr Howard also conducted numerous training courses in wildlife reproduction, male fertility assessment, gamete cryopreservation, nutrition, and veterinary medicine, including in Malaysia, Thailand, and China.

Dr JoGayle Howard was unique in having not only touched the lives of hundreds of people, but actually saving a species and contributing to the recovery of many others. We all have lost not only a superb scientist and advocate for our profession but also a champion for wildlife conservation. Dr Howard will forever be remembered with respect, love, and gratitude.

*Budhan Pukazhenthil, written on behalf of
her family at the Smithsonian Conservation Biology Institute
National Zoological Park
Front Royal, Virginia*

Memorial

On Monday, May 14, 2012, Dr Claude Gagnon passed away after a long fight against Parkinson disease. Claude was one of the outstanding and most respected reproductive biologists worldwide. His fundamental contributions to our understanding of sperm biology will withstand the test of time, and his service to the scientific community will serve as a beacon for coming generations.

Claude earned his PhD degree in biochemistry at the Université de Montréal in 1974 at a remarkably young age. He first went to Basel University, Switzerland, to do postdoctoral studies with Dr Hans Thoenen from 1974 to 1976, and then to the Laboratory of Clinical Sciences, National Institute of Mental Health, Bethesda, Maryland, with Dr Julius Axelrod, from 1976 to 1978. He was appointed as an assistant professor in the Département de Pharmacologie, Faculté de Médecine, Université Laval, in Québec City in 1978 and was promoted to associate professor in 1983.

In 1984 Claude was recruited as an associate professor by the Urology Division of the Surgery Department of McGill University to build the Urology Research Laboratory at the Royal Victoria Hospital, and in 1993, under his leadership, this lab was extended to the Montreal General Hospital; both hospitals are part of the McGill University Health Centre. During the 20 years he served as director of these laboratories, Claude made numerous world-class contributions in different areas of reproductive sciences (andrology, surgery, and prostate cancer) in close collaboration with clinical urologists.

For his outstanding contributions, Claude received numerous honors, including Scientist Awards in 1983 and 1988 from the Medical Research Council of Canada, the Young Investigator Award from the Club de Recherches Cliniques du Québec in 1987 (given to an independent investigator within the first 10 years of his academic career), Chercheur-Boursier de mérite exceptionnel (Exceptional Merit Scholarship) from the Fonds de la Recherche en Santé du Québec (1988–1993), and the Award of Excellence from the Canadian Fertility and Andrology Society in 2003.



Dr Claude Gagnon

As a biochemist, Claude first made significant contributions to our understanding of the role of protein carboxymethylation in secretion, but during the past 3 decades his passion for research focused on sperm physiology: he wanted to understand the molecular mechanisms involved in sperm motility, flagellar movements (using human spermatozoa and *Chlamydomonas* models), and sperm fertilizing ability. In the 1990s, his lab pioneered the concept that reactive oxygen species (ROS) play a physiological role in sperm activation. This was a groundbreaking achievement because, at that time, ROS action was considered to be strictly detrimental to sperm function. Claude and his team dug deeper and deeper into the signaling pathways that enable the spermatozoon

to fertilize an egg; his goal was to understand the causes of male infertility in order to find a treatment for that condition.

Claude contributed to the operation of many societies and played a leadership role in the organization of many congresses. He was the president of the Canadian Fertility and Andrology Society (1996) and the organizer of the International Symposium on Spermatology (1998). For that particular event, he demonstrated remarkable talents as an organizer and fund-raiser to assure the great success of the scientific meeting. Claude also rendered major service to the American Society of Andrology, both as an elected member of Executive Council and chair of the Industrial Liaison Committee, and was a loyal member of the Society for the Study of Reproduction.

Claude had a gift for finding excellent collaborators and keeping lasting relationships with them. He established fruitful joint research projects with scientists all over the world. He could always find the right people and obtain grants to support these activities. Numerous graduate students, postdoctoral fellows, and clinicians were trained under his supervision; many of them have gone on to establish themselves as independent investigators in the area of reproductive biology and fertility research. All of his trainees warmly remember Claude for his guidance and his ability to motivate their progress. Claude exemplified for them everyday life as a scientist and a researcher. Uppermost in the mind of those who worked with him are Claude's sharp intelligence, his moments of major enthusiasm, and his

ability to analyze and discuss results, as well as his ingenuity in proposing "way-out" hypotheses. One of Claude's common sayings was, "Speculation is the only inexpensive thing in research." There were also the extreme moments associated with grant applications and the euphoria of getting them—his lab was continuously funded from the time he opened his lab in 1978 until 2011.

Claude had a love for life and a superb sense of humor; his friends and trainees share wonderful memories of going on fishing trips and of numerous parties (birthdays, Christmas, and any good news of accepted articles, prizes, and even sunny days).

Claude was an outstanding scientist and worldwide leader in his field; he had a talent for visualizing things that others would not have considered important. He was a dedicated teacher and mentor. In addition to his mother, wife, sons, grandchildren, and family members, he will be sorely missed by everyone who had the privilege to work, train, or simply discuss science with him, because he had the ability to make people feel like friends.

*Cristian O'Flaherty
Eve de Lamirande
Pierre Leclerc
Linda Lefievre
Bernard Robaire*

Published simultaneously in both *Biology of Reproduction*
and *Journal of Andrology*

ASA Endowments

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ASA Endowments

Endowment Fund	Created	Award or Activity
1. General	~1980	<i>None</i>
2. Life Membership	1983	<i>Sustaining</i>
3. Trainee Awards	1983	<i>Trainee Merit Awards</i>
4. ASA Education	2004	<i>Yearly Educational Lecture</i>
5. Eugenia Rosemberg	2005	<i>Distinguished Andrologist</i>
6. Past-Presidents	2008	<i>Distinguished Service</i>
7. Emil Steinberger	2009	<i>Emil Steinberger Lecture</i>
8. Matt Hardy	2013	<i>Young Andrologist</i>
9. Andrology Journal	2014	<i>Andrology Award</i>
10. Chang and Russell Education & Trainee Experience (CREATE)	2014	<i>Russell & Chang Trainee Awards</i>



Announcement of the Eugenia Rosemberg Endowment Fund



Eugenia Rosemberg, MD
April 25, 1918 (Buenos Aires, Argentina) to April 16, 2004 (Worcester, Mass)

Eugenia Rosemberg was a charter member of the American Society of Andrology (ASA) and Program Chair for the First Annual Meeting on March 31 to April 2, 1976 in Worcester, Mass. She was also an important scientist responsible for the beginnings of the American Society of Andrology. Dr Rosemberg served as a member of the Executive Council from 1976–1980 and was the first chair of the Publications Committee (1975–1980). As such, she was instrumental in the negotiations and formation of the *Journal of Andrology*. In 1982, Dr Rosemberg was the recipient of the Distinguished Andrologist Award, the highest honor given by the ASA to a member with lifetime achievements in the field of Andrology.

Originally, her family—active in radio and television communications—escaped Russia for Argentina. Dr Rosemberg's education began in Argentina where she received her Bachelor's of Arts from the Liceo Nacional de Senioritas in Buenos Aires in 1936. This was followed with Medical School at the University of Buenos Aires, graduating in 1944. She remained at the university as Anatomy Instructor (1940–1946), Pediatric Instructor, and Associate Professor (1946–1948). Dr Rosemberg left Argentina in 1948, coming to Johns Hopkins University under the auspices of the Mead Johnson Fellowship and the Society for Pediatric Research. She subsequently stayed on in the Endocrinology Department at the Harriet Lane Home, Johns Hopkins University under the direction of Lawson Wilkins. In 1951, she joined the Endocrinology Section of the National Institute for Arthritis and Metabolic Diseases,

National Institutes of Health (NIH) as a research fellow. Two years later, she joined the staff at the Worcester Foundation for Experimental Biology in Shrewsbury, Mass. Dr Rosemberg returned to NIH in 1970 as Chief of the Contraceptive Development Branch.

Dr Rosemberg was an active member of many scientific societies, including: American Association for the Advancement of Science, American Fertility Society, American Heart Association, American Medical Women's Association, the Argentine Endocrine Society, the Argentine Pediatric Society, and the Argentine Sterility Society. While a scientist at the Medical Research Institute of Worcester, she was one of the leaders that made the American Society of Andrology so successful. Not only was she an active founding member of the American Society of Andrology, but also she was instrumental in securing funding for our meetings and symposia for the first meeting on March 31, 1976.

For those of us who were present and active at the initiation of our Society, it is clear that her persuasive energy in promoting the first Annual Meeting in 1976 in Worcester was critical in creating a viable Society. She marshaled space, obtained financial support from industry, invited world-class speakers, and gathered key charter members from multiple disciplines resulting in a large attendance, all by the sheer dynamism and infectious enthusiasm for which she was known. This was a woman who was strong to begin with and achieved recognition at a time when women were not recognized. She had a great talent for contacting friends throughout the world and arranging numerous meetings. Many ASA members remember her not only for her scientific expertise but her flair as a person.

Upon her death, Dr Rosemberg bequeathed a substantial sum of money to the American Society of Andrology with a written request that it be “used to establish an annual award to be presented at the time of the Annual Meeting of the American Society of Andrology in consideration of the candidate’s original contributions to the field of Andrology.” Subsequently, the Eugenia Rosemberg Endowment Fund was established and, with ASA Council approval, the investment income will be used in perpetuity to sponsor the annual ASA Distinguished Andrologist Award. The first sponsored award will be given at the 2006 Annual Meeting in Chicago to Dr Norman Hecht. We thank Eugenia Rosemberg for her vision, dedication, and generosity to the American Society of Andrology.

Acknowledgment

Special thanks to C. A. Paulsen.

Archives Committee, ASA

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Jean Fourcroy, Chair

Rex Hess

Steve Schrader

Richard Sherins

Carol Sloan

Anna Steinberger

Development Committee, ASA

Glenn Cunningham

Ron Lewis

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2014-15 Annual Fund

Two Woodfield Lake, 1100 E Woodfield Road, Ste 350, Schaumburg, IL 60173
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- Endowment Funds (permanent)
- Matthew Hardy Endowment
 - Russell/Chang Russell Endowment for Trainee Experience (CREATE)
 - Trainee Awards Endowment
 - Andrology Journal Fund
 - Emil Steinberger Endowment
 - Eugenia Rosemberg
 - General Endowment
 - Education Endowment
 - Past Presidents Endowment

- Asset Funds (not permanent)
- Anna Steinberger Female Trainee Award
 - Unrestricted gifts to support ASA operations

Special Instructions:

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ASA Trainees & Diversity

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INTRODUCTION

Trainee Affairs Committee

The American Society of Andrology has recognized the importance of trainees throughout its 40-year history, and ASA Council has consistently supported initiatives that benefit trainees. Many of the society's trainee traditions have focused at the ASA trainee mixer during which time, trainees and mentors interact socially, trainee-designed merchandise (T-shirts, mugs, and sometimes other andrology-themed products) are sold, the next trainee representative is elected and the trainee travel awards are given. These travel awards include the Chang and the Russell Trainee Travel awards, which are given respectively to the ultimate and penultimate ranked abstracts, as adjudicated by the Trainee Affairs Committee. These and the NIH travel awards are notable in that the trainee members adjudicate equally with more experienced members to rank these abstracts. Every member has an equal vote. This is an example of how the Trainee Affairs Committee has prioritized engaging trainees and created opportunities for trainees to assume new responsibilities, become active in the society and to eventually become the future leaders of Andrology.

This book marks the ASA's 40th anniversary year and preserves the history and traditions of the society. This book creates a time to reflect on the past, and an opportunity to ponder the future. Traditions are important, but extinction occurs without evolution. The society continues to find ways to empower trainees. A recent by-laws change gave trainees a vote, in addition to a long-held voice, at ASA Council. In this 40th anniversary year, the inaugural trainee-directed symposium was held through a trainee-led program organizing committee that crafted an innovative and relevant program and invited all the speakers. This initiative was in response to trainee wishes to hold such an event, in addition to the Mentoring luncheon that is co-sponsored

by the Trainee Affairs Committee with the Diversity Committee. In future years, the trainee-directed symposium will be supported within the main scientific program, as a reminder that the program, and the society, needs to remain relevant to trainees since trainees are ultimately the future of our society.

Rex Hess and the Archives Committee are to be applauded for assembling such a wonderful testament to the history and traditions of the ASA. On a personal note, photographs of the 2005 Trainee Mixer reminded me of carefree times as an ASA trainee attending my first ASA meeting. This society has been a wonderful training ground for me, and I would encourage any young trainee to become actively involved.

*Peter Liu MBBS (Hons I), PhD, FRACP
Co-Chair, Trainee Affairs Committee*

*Sophie La Salle, Ph.D.
Co-Chair, Trainee Affairs Committee*

ASA MENTORING LUNCHEONS

2015

“Finding your path in Andrology”
Speaker: Susan Rothman PhD

2014

“Combining Administrative, Teaching and Clinical Responsibilities”
Speaker: William Bremner MD

2013

“Diversity in Andrology: Why/How/What/Who?”
Speaker: George Gerton PhD

2012

My First Real Job: What is It Like to Be an Early Stage Professional”
Speaker: Distinguished Panel

2011

“Diversity and Sustaining Career Success in Andrology”
Speaker: Donna L. Vogel, MD, PhD

2010

“So You Want To Write A Grant Application To The NIH: How The Program
Officer And Scientific Review Officer Can Help”
Speaker: Stuart B. Moss, PhD

2009

“Using PowerPoint Without PowerPoint Using You”
Speaker: Barry T. Hinton, PhD

2008

“Professional Development Forum”
Panelists representing Academia, Industry and Government Positions

2007

“Ethics in Andrology”
Speakers: Stanley G. Korenman, MD

2006

“Career Development”
Speakers: Patricia A. Martin-DeLeon, PhD and Barry T. Hinton, PhD

Trainee Affairs and Diversity in the ASA

- Careers in Andrology
- Diversity Initiative
- Mentoring
- Interviews
- Trainee Fund Raising Activities
- Trainee-directed Mini-Symposium
- Trainee Travel Awards Allocation

Peter Liu, MBBS, PhD, FRACP
(Co-Chair, Trainee Affairs Committee)

Sophie La Salle, PhD
(Co-Chair, Trainee Affairs Committee)

Maria Christina W. Avellar, PhD
(Chair, Diversity Committee)

George L. Gerton, PhD
(PI/Program Director, NIH Diversity Grant)

Jamie Shuda, EdD
(Educational Coordinator)

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Trainees Receiving Travel Awards at the ASA Annual Meeting

2005



Trainees Receiving Travel Awards at the ASA Annual Meeting

2006



2007



Trainees Receiving Travel Awards at the ASA Annual Meeting

2008



2009



Trainees Receiving Travel Awards at the ASA Annual Meeting

2012



Trainees Receiving Travel Awards at the ASA Annual Meeting

2013



2014



Trainees Receiving Travel Awards at the ASA Annual Meeting

2015





Careers in Andrology



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The Annual ASA Meeting Is Soon!!

Reserve your T-shirt before the meeting so you do not miss out!!

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About "Careers In Andrology"

This website is a joint venture of the [Diversity Committee](#) and the [Trainee Affairs Committee](#) of the [American Society of Andrology](#). Several of the programs described on this website are funded in part by a grant from the [National Institute of Diabetes and Digestive and Kidney Diseases](#). George L. Gerton, PhD, is the Principal Investigator/Program Director. Jamie Shuda, EdD, is the Educational Coordinator.

As described in the [Standard Operating Procedures of the ASA](#), the purposes of the Trainee Affairs Committee and the Diversity Committee are listed below:

DIVERSITY COMMITTEE (Membership and Committee Chair Contact)

1. Assure diversity in membership and participants (e.g., speakers, chairs) in programs and courses sponsored by the ASA.
2. Identify new sources and seek funding for minority participation and travel to the annual meeting.
3. Increase participation in the field of male reproduction for underrepresented minority.
4. Outreach efforts to enhance diversity in academic training and disciplines of ASA members.

TRAINEE AFFAIRS COMMITTEE (Membership and Committee Chair Contact)

1. Foster activities that enhance the Society's Trainee Members' scientific interest in Andrology.
2. Encourage their active participation within the Society
3. Provide a position announcement service at the Annual Meeting
4. Develop other activities that will encourage continued trainee membership enrollment.

Diversity Lecture 2014

Sponsored by the ASA Diversity Initiative

with support from NIDDK Grant R25 DK 096957

Charles Modlin, MD, FACS

*A Kidney Transplant Surgeon, Urologist,
Founder and Director of the Minority Men's Health Center of
Cleveland Clinic's Glickman Urological Institute, and
Executive Director of Minority Health for Cleveland Clinic*

Biographical Sketch

In 1983, Dr. Modlin graduated from Northwestern University in Evanston, Ill., with a degree in chemistry. He received his medical school education at Northwestern University Medical School in Chicago, graduating in 1987. He then moved to New York City, where he completed a six-year residency in urological surgery at New York University in 1993. He came to Cleveland in 1993, where he completed a three-year fellowship in basic science transplant immunology and clinical renovascular and renal transplantation surgery. In 1996, he joined the Staff of Cleveland Clinic's Urological Institute with a joint staff appointment within the Transplant Center. He has authored scientific publications and presented scientific research at national meetings.



Dr. Modlin is not only the sole African American transplant surgeon in Northeastern Ohio, but he represents one of only 17 African American transplant surgeons in the entire United States. A special area of interest of Dr. Modlin is the issue of healthcare disparities experienced by minority patients in the United States. Minority patients suffer a disproportionate burden of disease in many areas, such as prostate cancer, cardiovascular disease, hypertension, diabetes and need for kidney transplantation. To this end, Dr. Modlin has developed a dedicated Minority Men's Health Center and Center for Health Equity at Cleveland Clinic. The center conducts dedicated research into elimination of minority healthcare disparities and provides community outreach as well as direct patient care and public education to minority patients.

Dr. Modlin is board-certified in urology and a member of the American College of Surgeons, American Society of Transplantation, American Society of Transplant Surgeons, the American Urological Association and the Urologic Society of Transplantation and Vascular Surgery. He is Chair of the MOTTEP of Cleveland Education and Medical Advisory Board. He also serves as an elected member of the Northwestern University Medical School Alumni National Board. He is Chair of the Cleveland NAACP Health Committee and Chairs the 100 Black Men of Greater Cleveland Health Committee.

Diversity Lecture 2015

*Sponsored by the ASA Diversity Initiative Program
with support from NIDDK Grant R25 DK 096957*

*"Current trends in the treatment of infertility in men with
spinal cord injury"*

Nancy L. Brackett, PhD, HCLD

Department of Urology and Neurological Surgery
University of Miami
Miller School of Medicine
Miami, USA

Research Overview

In countries throughout the world, men with spinal cord Injury (SCI) outnumber women with SCI, often by as much as 4:1. Because the most common causes of Injury include motor vehicle accidents, violence, falls, and sports-related injuries, it has been assumed that this gender disparity is due to more men than women engaging in risk-taking behaviors. However, this assumption has not been confirmed. The majority of new spinal cord injuries occur to persons between 18 and 35 years, i.e., the prime parenting years. Following SCI, women can conceive via sexual intercourse and deliver children with nearly the same success rate as women without disability. In contrast, most men with SCI are infertile due to a combination of erectile dysfunction, ejaculatory dysfunction, and semen abnormalities. Dr. Nancy Brackett is a researcher in the area of reproductive health and men with paralysis. Her talk on the current trends in the treatment and improvement of infertility in men with SCI will be the topic of the Diversity Lecture.





Careers in Andrology

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Pablo Visconti, PhD ([Http://Www.andrologycareers.org/Interviews/Pablo-Visconti-Phd](http://www.andrologycareers.org/Interviews/Pablo-Visconti-Phd))

4/20/2015



Professor
Department of Veterinary and Animal Sciences
University of Massachusetts, Amherst, MA, USA

Research Interests: Signal Transduction During Sperm Capacitation, Fertilization Process, Male Germ Cell Differentiation, Epididymal Maturation.

[Read More \(http://www.andrologycareers.org/interviews/pablo-visconti-phd\)](http://www.andrologycareers.org/interviews/pablo-visconti-phd)

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Peter Liu, MBBS, PhD ([Http://Www.andrologycareers.org/Interviews/-Peter-Liu-Mbbs-Phd](http://www.andrologycareers.org/Interviews/-Peter-Liu-Mbbs-Phd))

9/26/2014

Professor of Medicine
LABioMed at Harbor-UCLA Medical Center
Torrance, CA

Research interests: Male reproductive ageing, Male hormonal contraception, Influence of sleep on male reproductive ageing and metabolic health



[Read More \(http://www.andrologycareers.org/interviews/-peter-liu-mbbs-phd\)](http://www.andrologycareers.org/interviews/-peter-liu-mbbs-phd)

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Camilla M. Ribeiro, Ph.D.
Postdoctoral Scholar
Universidade Federal de São Paulo
Sao Paulo, Brazil



Naazish Alladin, MSc.
Product Specialist - ART
Somagen Diagnostics, Inc.
Edmonton, AB, Canada

The project "**Behind the Andrologist: Face 2 Face Interviews**" is an initiative, of the ASA Diversity Committee, in association with the Trainee Affairs Committee. Our aim is to broaden visibility of the Andrology group, inspire trainees in this field, and increase the diversity in the ASA membership.

Camilla Ribeiro and Naazish Alladin interviewed successful Andrologists with different scientific and personal backgrounds, who have shared some of their work

Steven M. Schrader, Ph.D

(<http://www.andrologycareers.org/Interviews/Steven-M-Schrader-Phd>)

9/26/2014



**Acting Chief
Biomonitoring and Health Assessment Branch
National Institute for Occupational Safety & Health (NIOSH)
Centers for Disease Control and Prevention
Cincinnati, OH**

Research interests: Toxicology, Semen analyses, Sexual function

Read More (<http://www.andrologycareers.org/interviews/steven-m-schrader-phd>)

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Humphrey Hung-Chang Yao, PhD

(<http://www.andrologycareers.org/Interviews/Humphrey-Hung-Chang-Yao-Phd>)

4/3/2014

**Principal Investigator
National Institute of Environmental Health Sciences
National Institutes of Health
Research Triangle Park, NC, USA**

Research interests: sex determination, Sertoli cell fate determination, Leydig cell differentiation, male germ cell development, Wolffian duct maintenance, developmental origins of adult reproductive tissues



Read More (<http://www.andrologycareers.org/interviews/humphrey-hung-chang-yao-phd>)

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Donna L. Vogel, MD, PhD

(<http://www.andrologycareers.org/Interviews/Donna-L-Vogel-Md-Phd>)

4/2/2014

Read More (<http://www.andrologycareers.org/interviews/donna-l-vogel-md-phd>)

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experiences and research interests. The andrologists share the challenges and inspirations encountered on their respective career paths.

We are happy to receive your feedback and suggestions for this initiative. If you have any comments, please do not hesitate to contact us. We can be reached at asacareerinterview@gmail.com (<mailto:asacareerinterview@gmail.com>).
Enjoy!

Archives

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- [Male Contraception \(/interviews/category/male-contraception\)](/interviews/category/male-contraception)
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- [Metabolism \(/interviews/category/metabolism\)](/interviews/category/metabolism)

Sergey I. Moskovtsev, MD, PhD

(<http://www.andrologycareers.org/Interviews/Sergey-I-Moskovtsev-Md-Phd>)

4/1/2014

**Andrology Director, CReATe Fertility Centre
Assistant Professor, Obstetrics & Gynaecology
University of Toronto, Canada**

Research interests: idiopathic male infertility, sperm DNA/nuclear architecture, telomere length in spermatozoa, characterization of exosomes in seminal plasma



Read More (<http://www.andrologycareers.org/interviews/sergey-i-moskovtsev-md-phd>)

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Terry T. Turner, PhD (<http://www.andrologycareers.org/Interviews/Terry-T-Turner-Phd>)

4/1/2014



**Professor Emeritus
University of Virginia School of Medicine
Charlottesville, VA, USA**

Research interests: epididymis cell biology and testis pathology

Read More (<http://www.andrologycareers.org/interviews/terry-t-turner-phd>)

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(/interviews/category/reproductive-genetics)
[Reproductive Medicine](/interviews/category/reproductive-medicine)
(/interviews/category/reproductive-medicine)
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(/interviews/category/wolfian-duct-maintenance)
[Women In Science](/interviews/category/women-in-science)
(/interviews/category/women-in-science)

Patricia A. DeLeon, PhD

([Http://Www.andrologycareers.org/Interviews/Patricia-A-Deleon-Phd](http://www.andrologycareers.org/Interviews/Patricia-A-Deleon-Phd))

4/1/2014

Trustees Distinguished Professor of Biological Sciences
University of Delaware
Newark, DE, USA

Research interests: Sperm function



[Read More \(http://www.andrologycareers.org/interviews/patricia-a-deleon-phd\)](http://www.andrologycareers.org/interviews/patricia-a-deleon-phd)

Other Activities of the ASA

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XXIII NORTH AMERICAN TESTIS WORKSHOP

Save the Date!
April 15 - April 18, 2015
Little America Hotel
Salt Lake City, Utah

[More information & Registration »](#)

DID YOU KNOW?

ANDROLOGY (AN-DROL'-UH-JEE)

The study of the male reproductive system, which includes male sexual health. Hence, Andrology includes the study of male reproduction in all species and most of what we know about reproductive health in men started from research in other animals. In common usage, andrology pertains to men just as gynecology pertains to women.

NEWS

XXIII NORTH AMERICAN TESTIS WORKSHOP

REGISTER NOW!
April 15 - 21, 2015
Little America Hotel, Salt Lake City, Utah

posted: November 25, 2014

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ANDROLOGY

Andrology

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Online ISSN: 2047-2927

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Special Issue: Testicular Germ Cell Cancer

November 2014

Volume 2, Issue 6

October 2014

Volume 2, Issue S2

Special Issue: Proceedings of the 8th Congress of ...

September 2014

Volume 2, Issue 5

July 2014

Volume 2, Issue 4

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The January issue of Andrology is a themed issue on 'Testicular Germ Cell Cancer' and all the authors featured are well know experts in the field!

Access the below sample articles for FREE

Biology of childhood germ cell tumours, focussing on the significance of microRNAs

Pediatric germ cell tumors presenting beyond childhood?

Welcome to Andrology

Welcome to the new merged journal of the American Society of Andrology and the European Academy of Andrology, incorporating *Journal of Andrology* and *International Journal of Andrology*.

All previously published content for *Journal of Andrology* can be found here.

Send your best work to *Andrology*. Click here to submit a paper today.

All articles accepted for publication, and approved by authors, but not yet assigned to an issue can be found here.

See [here](#) for full descriptive information.

Read the full history of the development of *Andrology* and start submitting to this exciting new Journal.

Forthcoming Conferences

XXIII North American Testis Workshop
Save the Date!
April 15th - April 18th 2015
Little America Hotel
Salt Lake City, Utah

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<http://www.andrologyamerica.org>



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There is life after prostate cancer, so get treatment early



What is Andrology?

Andrology (an-drol'-uh-jee) is the study of the male reproductive system, which includes male sexual health. Andrology includes the study of male reproduction in all species and most of what we know about reproductive health in men started from research in other animals. In common usage, *andrology* pertains to men just as *gynecology* pertains to women.

[Handbook of Andrology](#)



The "Vitruvian Man" was created by Leonardo da Vinci around 1490



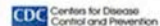
Andrology America

AndrologyAmerica.org was initiated October 12, 2013 by members of the **American Society of Andrology (ASA)** to develop a single site where collaborative work from the andrology community can be searched in the hopes of encouraging collaboration and translational research in the field of Andrology and Men's Health. With the excellent work already initiated by a national campaign in Australia called "Andrology Australia" bringing awareness to the public about andrology, we felt it important to bring awareness to not only the public, but also clinical providers and scientists. The ASA has long been involved in this type of collaboration but such activity has not been highlighted in a unified way. Numerous Andrology and male reproductive health Societies have been established in **North and South America**. We hope to encourage other societies to join us in this vision and hope that links to these sites serves to demonstrate an altruistic mission without biases or political agendas. We hope you enjoy searching the site and find the resources you need.

Our Purpose

Andrology America seeks to increase awareness of men's health issues involving the reproductive system and its general effect on health and well-being through a website that links the best science, medicine and basic information for both the general public and physicians in a manner that is relevant to the Americas. It is also our desire to encourage young scientists to consider research

Important Links for Male Reproductive Health



Center for Disease Control and Prevention



Society for the Study of Male Reproduction



American Urological Association



Andrology Australia

ASA Scrapbook

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The ASA Archives & History Committee

In 1984 at the ASA Business Meeting, Dr. Rupert Amann raised the question of having a Society Archivist. At the time it was recommended that as an alternative the Society could send documents to Iowa State University where there is a group interested in the history of scientific organizations could preserve important documents. Dr. Amann served as President of the ASA from 1989-1990 and subsequently donated numerous boxes of documents that he inherited upon becoming President. The entire collection is available for viewing by contacting the Iowa State Special Collections Department at least two days in advance. To see a listing of the hard copies of this collection, visit the following website:

<http://www.add.lib.iastate.edu/spcl/manuscripts/MS410.html>

Recently, the ASA approved the Iowa State Special Collections Department digitization of many copies of the stored documents, which can be viewed in any web browser at the following URL:

<http://cdm16001.contentdm.oclc.org/cdm/search/collection/p16001coll1>

The first mention of the Archives Committee in the minutes of the ASA Council meeting was on April 7, 2000, with Dr. Jean Fourcroy as the Chair. In 2002, the Council Book listed the Archives & History Committee as being ad hoc. The other committee members included the following: Rex Hess, Armando Amador, Arnold Belker, Steve Schrader and Anna Steinberger.

In 2004, the Council book mentioned that the committee should become a standing committee and subsequently it has become a major contributor to the annual activities of the ASA. Jean Fourcroy, with considerable enthusiasm, served as Chair of this committee for many years and began the routine preparation

of posters in honor of past and present Andrologist members of our Society. These posters are scattered throughout this volume, and continue to be major attractions at our annual meeting. Jean passed the Chair to Rex Hess in 2010, as he has served as a committee member since its inception. His leadership has led to increased digitization of the ASA documents, including a complete file of the Business meeting minutes and Executive Council Books. Steve Schrader has been Chair since 2014.

The first collection of photos to be taken at the Annual Meeting of the American Association of Andrology appears to have been taken by Jean Fourcroy in 1997, although numerous other individual photos were taken at other meetings. Every year after 2000, the Archives Committee was assigned the official duty of preserving the ASA records and to take the official photos of the Annual Meeting. Steven Schrader, the current Chair of the committee, opened an account with Shutterfly.com to store these photographs and the committee has begun adding past meetings to this collection. To view all the ASA meeting photos visit the following website:

<https://andrology.shutterfly.com>

The photo collection is quite extensive; therefore, it would be impossible to include even a fraction of those taken in this volume. However, we have attempted to include as many as possible to give you a flavor of the fun and excitement generated each year. We also included examples of the Past President's Breakfast, the Annual Banquet, some extra photos and the minutes of the first ASA Business Meeting in 1975.



Andrology meeting

http://andrology.shutterfly.com/

shutterfly


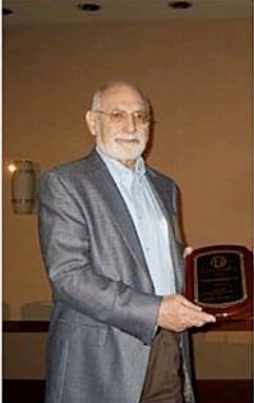

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Andrology meeting

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MS 410

American Society of Andrology
Records, 1975-[ongoing]

Special Collections Department
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<http://www.add.lib.iastate.edu/spcl/manuscripts/MS410.html>

Descriptive summary

creator: American Society of Andrology
title: Records
dates: 1975-[ongoing]
extent: 8.22 linear feet (6 records center cartons and 1 document box)
collection number: MS 410
repository: Special Collections Department, Iowa State University.

Administrative information

access: Open for research.

This collection is stored offsite. Please contact the Special Collections Department at least two working days in advance.

publication rights: Consult Head, Special Collections Department

preferred citation: American Society of Andrology Records, MS 410, Special Collections Department, Iowa State University Library.

Historical note

The purpose of the American Society of Andrology (ASA) is to encourage the scientific interchange and knowledge of the male reproductive system and to promote an interdisciplinary approach to the study of male reproduction.

The ASA was founded in 1975 and as of 2005 has over 775 members from all over the world specializing in a wide variety of fields. Membership consists of both scientists and clinicians whose specialty fields include male reproduction, endocrinology, urology, anatomy, gynecology/obstetrics, biochemistry, animal science, molecular and cell biology, and reproductive technologies.

The ASA supports its efforts by holding conferences and meetings and through its bimonthly scientific journal, the *Journal of Andrology*.

This collection (1975-[ongoing]) includes records of the American Society of Andrology. The records include materials related to annual meetings, the executive council, committee meetings and reports, and officers. The collection also includes correspondence between officers and committee members, records associated with the publication of the *Journal of Andrology*, and a publication on the history of the ASA.

Copies of the *Journal of Andrology* (v.21 (2000)-ongoing) are housed in the Special Collections Department (QP253 J68).

Organization

The collection is organized into eight series:

- Series 1, Constitution and Bylaws, 1975-1984, undated (chronological)
- Series 2, Committees, 1975-1996, undated (alphabetical)
- Series 3, Executive Council, 1976-1997 (chronological)
- Series 4, General Correspondence, 1975-1993 (chronological)
- Series 5, Meetings, 1975-1993 (chronological)
- Series 6, Membership, 1976-1992, undated (chronological)
- Series 7, Publications, 1977-2000, undated(alphabetical)
- Series 8, Subject Files, 1976-1993, undated (alphabetical)

Description of series

Series 1	Constitution and Bylaws	1975-1984, undated
extent:	3 folders	
description:	This series contains copies of the ASA constitution and bylaws. The files are listed in chronological order.	

Container list

Box	Folder	Title	Dates
1	8	Constitution and bylaws	1975-1978
3	17	Constitution	1984
6	15	Constitution and bylaws	undated

Description of series

Series 2	Committees	1975-1996, undated
extent:	52 folders	



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Thumbnail	Title	Subject	Description	Collection
	Business Meeting of the American Society of Andrology July 24, 1975	American Society of Andrology; Scientific societies; Minutes	Contains minutes from the July 24, 1975 business meeting.	American Society of Andrology
	Organizational Correspondence of the American Society of Andrology 1975	American Society of Andrology; Scientific societies; Correspondence	Contains correspondence regarding the Meeting of the Incorporators in Detroit, Michigan.	American Society of Andrology
	Publications Committee of the American Society of Andrology 1975	American Society of Andrology; Scientific societies	Contains correspondence.	American Society of Andrology
	Annual Meeting of the American Society of Andrology 1975	American Society of Andrology; Scientific societies; Constitutions; By-laws; Agendas; Minutes; Correspondence	Includes correspondence, agenda, minutes, and a copy of the constitution and bylaws from the 1975 Annual Meeting.	American Society of Andrology
	Constitution and By-laws of the American Society of Andrology 1975-78	American Society of Andrology; Scientific societies; Constitutions; By-laws; Correspondence	Contains different versions of the constitution and by-laws, drafts, correspondence and examples of related associations' governing documents used during the creation of the society's original constitution and by-laws.	American Society of Andrology
	Executive Council Meetings of the American Society of Andrology 1976	American Society of Andrology; Scientific societies	Contains meeting minutes, correspondence, program chairman report, and reports of membership and publications committees.	American Society of Andrology
	Annual Meeting of the American Society of Andrology 1976	American Society of Andrology; Scientific societies; Reports; Agendas; Minutes; Correspondence; Application forms	Includes committee and officer reports, membership application forms, minutes, and correspondence for the 1976 annual meeting.	American Society of Andrology
	Annual Meeting of the American Society of Andrology 1976	American Society of Andrology; Scientific societies; Minutes; Correspondence; Newsletters	Includes membership application forms, minutes, correspondence, and newsletters for a meeting in 1976.	American Society of Andrology
	Officers and Council Members of the American Society of	American Society of Andrology; Scientific	Contains materials related to officers and council	American Society of Andrology

Traditions at the ASA Annual Meeting



Past Presidents' Breakfast

2005



2006



Past Presidents' Breakfast

2010



2011



Past Presidents' Breakfast

2012



2013



The ASA Annual Banquet

The Annual Banquet has been enjoyed at the Annual Meeting of the American Society of Andrology ever since the very first meeting that was held March 31-April 2, 1976 in Worcester, MA. The 1976 Program listed the first Banquet on page 10, with tickets available at the Sheraton-Lincoln Inn. It was noted that the "Presidential Address" was to be given at the banquet. Thus, the first banquet may have been a bit more serious than subsequent events.

ANNUAL BANQUET


The Annual Banquet will take place on Thursday, April 1, at 7:30 p.m. at the Sheraton-Lincoln Inn. The Presidential Address will be given at the Annual Banquet. Tickets may be purchased at the Registration Desk.

The second banquet in 1977 was on a Friday night and called the FIESTA. It was held near a swimming pool, with a Mariachi Band. Pitchers of Margaritas were available starting at 7:30 pm. Now, that sounds more like the long-standing tradition of the ASA Banquet.

Friday night FIESTA

Poolside—Mariachi Band
Mexican Dinner and Dancing
7:30—Begin with pitchers of Margaritas

**8:00—Work your way through fresh fruit,
guacamole, enchiladas and all the best
South-of-the-Border favorites.**



In 1981, the 6th Annual Meeting was held in New Orleans at the Fairmont Hotel. The banquet tickets cost \$25, which included the meal, wine and the Jazz Band entertainment. "The event will be over by 10:00 which leaves plenty of time to enjoy the French Quarter at night."

Over the years, Banquets have varied considerably, depending on the local arrangement committee imagination, as well as the local community

environment. It has been held on boat cruises, in hotel ballrooms, in Museums, Aquariums, at the Kentucky Derby Museum in Churchill Downs, a Library Atrium, The Busch Gardens, Best of the City Restaurants, Seaside Docks, Bank of America Tower Club, the Last Territory courtyard, an Opera House, a even a Nightclub. In 1989, the banquet was held on a Steamboat Cruise, with a Jazz band. Interestingly, this meeting was also held in New Orleans.

Steamboat Cruise Banquet
Saturday, April 15, 6:00 P.M. (Boarding)
Departure at 6:45. Jazz band and regional food. Limit 300 persons.

Past Meeting Sites:

1976	Worcester, MA	1996	Minneapolis, MN
1977	Palm Springs, CA	1997	Baltimore, MD
1978	Nashville, TN	1998	Long Beach, CA
1979	Houston, TX	1999	Louisville, KY
1980	Chicago, IL	2000	Boston, MA
1981	New Orleans, LA	2001	Montreal, Canada
1982	Hilton Head Island, SC	2002	Seattle, WA
1983	Philadelphia, PA	2003	Phoenix, AZ
1984	Los Angeles, CA	2004	Baltimore, MD
1985	Boston, MA	2005	Seattle, WA
1986	Grand Rapids, MI	2006	Chicago, IL
1987	Denver, CO	2007	Tampa, FL
1988	Houston, TX	2008	Albuquerque, NM
1989	New Orleans, LA	2009	Philadelphia, PA
1990	Columbia, SC	2010	Houston, TX
1991	Montreal, Canada	2011	Montreal, Canada
1992	Bethesda, MD	2012	Tucson, AZ
1993	Tampa, FL	2013	San Antonio, TX
1994	Springfield, IL	2014	Atlanta, GA
1995	Raleigh, NC	2015	Salt Lake City, UT

Annual Banquet 2001



Annual Banquet 2001



Annual Banquet 2012



Annual Banquet 2013



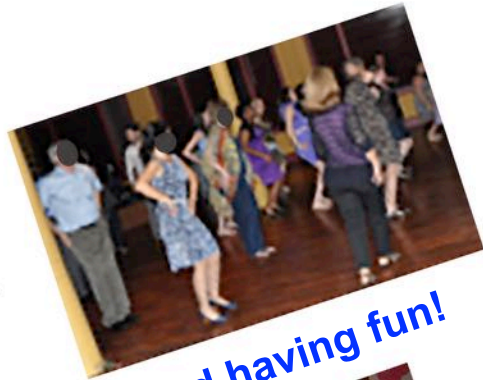
Annual Banquet 2014



Annual Banquet 2015



ANNUAL BANQUET



Dancing the night away and having fun!



Young Andrologist Traditions

This book is the history of the ASA and therefore contains the history of a few traditions that were never officially approved by the ASA Council. These events have been ongoing off and on for a long time at the Annual Meeting.

A rather humorous tradition was started for the introduction of the new Young Andrologist. The goal appears to have been simply to provide a bit of embarrassment to the awardee by making him or her wear a large condom hat and more recently to also wear an ugly pair of glasses from which a long phallus protrudes over the nose. While this display of childish fraternity has elicited roars of laughter, it has also produced some quite 'red' faces.

The history of this traditional moment of levity is not entirely clear, but those willing to talk about it have mentioned that it first appeared at what was called the "Zaneveld Party", which also became an unofficial tradition at the annual meeting. Dr. Lourens (Larry) Zaneveld, now retired from the Rush-Presbyterian-St. Luke's Medical Center in Chicago as the endowed Chair of ObGyn, was a Charter member of the ASA and became very active in the promotion of andrology research and the pursuit of contraception.

Larry believed that scientists should have fun and for many years sponsored the "party" in his hotel room at the annual meetings. After he retired, Dr. Stuart Ravnik carried on this tradition until he retired.

Eventually, the Young Andrologist spectacle was moved to the banquet, except for a couple of years when it was presented at the awards ceremony. One year the previous Awardee even lost the hat; at least that is what they claimed. After having experienced the embarrassment, the new Young Andrologists have typically been more than excited about bestowing the same tradition on the next young andrologist the following year. Although it is obvious that the event has always been performed in jest and as a fun 'rite of passage', with no desire to offend, there is discussion that maybe it is time for this tradition to be retired.

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Extra Photos

From the ASA Archives

Occasionally, a member will send us a photo that contains a former founding member. If possible we try to identify each member, but sometimes we may overlook someone, of course unintentionally.

1955 LOS ANGELES



50th Annual Meeting
American Urological Association
Biltmore Hotel - Los Angeles, CA
May 16-19, 1955

First European Testis Workshop 1980



A few members of the ASA were identified:

2. Andrzej Bartke; ...4. Howard Nankin; ...6. Martin Dym; ...11. Philip Troen; 12. Robert Bressler; 13. Tony Means; 14. Neal Musto; 15. Jennifer Dorrington; 16. Griff Ross; 17. Don Tindall; ... 21. Emil Steinberger; 22. Anna Steinberger; ...30. Dale Hoskins

“The European Workshop on Molecular and Cellular Endocrinology of the Testis was organized for the first time at Geilo, Norway, 8-11 April 1980. Since then, these meetings have been held in Holland, France, Italy, England, Sweden/Finland (Aland), Germany, and Belgium. This year the circle has been closed: The 9th European Testis Workshop is back in the Norwegian mountains where it all started. The Scientific Committee of the First European Testis Workshop included Dr. H.J. van der Molen (Rotterdam), Dr. V. Hansson (Oslo), Dr. B. Cooke (London), Dr. V. Monesi (Rome), Dr. E.M. Ritzen (Stockholm), and Dr. J.M. Saez (Paris). Since then, two of the founders have left the Scientific Committee. Dr. Monesi died suddenly on 29 December 1979, 3 1/2 months before the first workshop took place. Thus, in spite of being one of the founders, he never experienced a European Testis Workshop. Dr. Mario Stefanini, from the same research institute in Rome, replaced Dr. Monesi on the Scientific Committee. Another founder of this workshop series, Dr. H.J. van der Molen (Rotterdam), is one of the pioneers in research on molecular endocrinology of the testis in Europe. He left the Scientific Committee due to a change in his scientific career and was replaced by Dr. F.F.G. Rommerts, whose lectures on "Testomania" have been a characteristic feature of these meetings.”

Signal Transduction in Testicular Cells: Basic and Clinical Aspects - Ernst Schering Foundation Symposium Proceedings (Paperback). Editors: Vidar Hansson, F. O. Levy, K. Tasken
Publisher: Springer-Verlag Berlin and Heidelberg GmbH & Co. KG

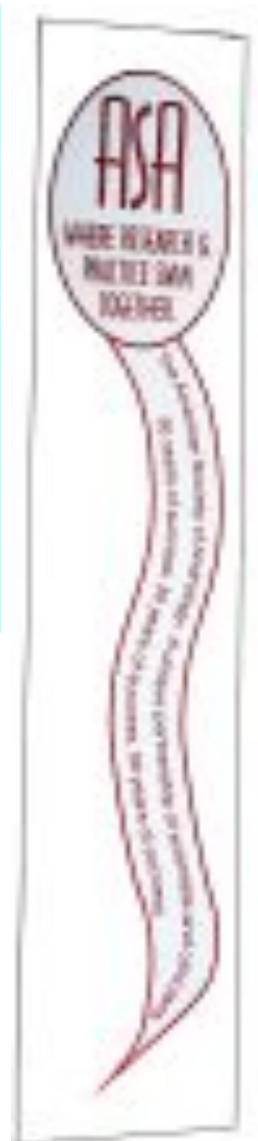
MISCELLANEOUS COLLECTION

1975-1985

The next few pages include examples of original items and documents collected by the Archives Committee. They are not always complete documents, but are presented to give you a flavor of the activities that surrounded the founding of the ASA.

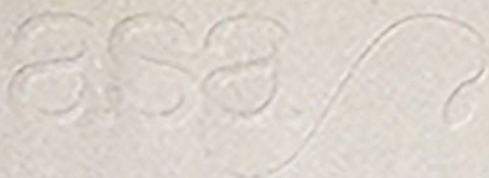
Scrapbook Photos

Items found here and there



**Dr. Emil Steinberger's
Conference Bag that he used
at the founding of the ASA**





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275 E. Hancock Ave.
Detroit, Michigan 48201 U.S.A.
(Tel: 313 / 577 1011)

AMERICAN SOCIETY OF ANDROLOGY

MINUTES OF THE MEETING OF THE OFFICERS AND MEMBERS OF THE COUNCIL

University Motor Inn, Fort Collins, CO

July 24, 1975

Presiding: Emil Steinberger, President

Secretary: E. S. E. Hafez

Present: E. Steinberger, President; S. J. Behrman, Vice-President; E. S. E. Hafez, Secretary; E. Rosemberg, Program Chairman; A. Bartke, Council; A. Paulsen, Council; R. Sherins, Council; A. Steinberger, Council

President's Report

Negotiations were conducted with CIDA concerning affiliation and utilization of Andrologia as the publishing arm of ASA. Affiliation will require one fee of \$50. Ten percent of the CIDA earnings from ASA membership subscriptions will be returned to ASA. Affiliation is a voluntary one. (There is controversy on the affiliation fee to CIDA. This will be resolved in our next business meeting.) Dr. Behrman was complimented for completing the formalities associated with incorporation of ASA. As of now, ASA has been incorporated in the State of Michigan. Dr. Eugenia Rosemberg was complimented for her superb work on organizing the first annual meeting. Because of the time limits Dr. Steinberger made up, with the help of Drs. Alexander and Hafez, a membership application form for immediate use, with the understanding it would be modified as necessary during the coming year. Dr. Hafez was to arrange for the Society stationery. Dr. T. N. Evans declined chairmanship of the Finance Committee. Dr. Zaneveld resigned as chairman of the Membership Committee because of pressure of new duties and lack of adequate administrative support in his new position at the University of Illinois at the Medical Center.

Discussion of the Report: It was moved and seconded that ASA affiliate with CIDA and use Andrologia as its publishing arm. Also, one affiliation fee of \$50 was approved. Dr. Behrman felt the by-laws would require further work and promised that the committee would work on the final copy of the by-laws to have it ready for reading by the officers and Council within the next couple of months. It was moved and accepted to use temporarily the current membership application forms. The officers noted with regret that Dr. Evans cannot serve as chairperson of the Finance Committee and voted Dr. Behrman to this position. The officers accepted with regret the resignation of Dr. Zaneveld. The administrative support necessary for the Membership Chairperson, particularly during the Society's first year, is a major one and an individual with such assistance would have to be nominated for the chairpersonship. Following a

discussion, Dr. A. Bartke was nominated and he accepted chairpersonship of the Membership Committee.

Report of the Program Chairperson (Dr. Rosemberg)

Dr. E. Rosemberg outlined the program of the first ASA scientific meeting to be held in Worcester, MA, on March 31-April 2, 1976. A copy of the tentative program has been circulated among officers of the Society. She stated that the annual meeting will attract new membership. She suggested that the official business meeting of ASA shall be held at the time of the annual meeting. She discussed registration fee, advance registration, and possible invited speakers.

Discussion of the Report: It has been noted that the meeting dates will not interfere with the meeting of the American Fertility Society and it was moved and accepted that the registration fees be: members--no fee; nonmembers--\$20; fellows, residents, and students--\$10, and guests--\$5. Dr. Rosemberg also mentioned to the officers that during the annual meeting of the Endocrine Society concern was voiced concerning the fragmentation of individuals interested in endocrinology and reproduction. The Endocrine Society has set up a committee composed of various societies related to endocrine and reproduction to look into this need. The first meeting was held in New York at the time of the Endocrine Society meeting. Drs. Eugenia Rosemberg and Anna Steinberger attended this meeting.

Report of the Publication Committee (Dr. Rosemberg)

Dr. Rosemberg reported of negotiations with *Andrologia* concerning publication of the abstracts and major papers of the first annual meeting. She announced the components of her committee:

Accepted:	Griff T. Ross	NIH
	Alexander Albert	Mayo Clinic
	R. Emslander	Mayo Clinic
	Larry Ewing	John Hopkins School of Public Health
	W. Odell	Harbor General Hospital, University of California
	Albert Parlow	Harbor General Hospital, University of California
	Philip Troen	University of Pennsylvania
	William L. Williams	University of Georgia

Not Yet

Accepted:	M.-C. Orgebini-Crist	Vanderbilt University
	C. Wayne Bardin	Penn State
	S. Howards	University of Virginia
	L. Persky	Case Western Reserve
	R. Bunge	University of Iowa
	Charles Rife	Mayo Clinic

Discussion of the Report: The role of the Publication Committee vis-a-vis Andrologia was discussed. It is hoped that ASA officers and Council would define the role of the Publication Committee.

Report of the By-Laws Committee (Dr. Behrman)

Dr. Behrman read the draft of the by-laws. However, due to the time limit, reading could not be completed and he promised to rework the by-laws and present them to the officers in the near future.

Report of the Treasurer

The Treasurer, Dr. Nancy Alexander, was unable to attend the meeting, but she communicated via telephone with the President, Dr. Steinberger. Dr. Alexander was primarily concerned with setting up an account with a bank.

Discussion of the Report: This issue was discussed, and it was moved and accepted that the following officers will have the authorization to sign checks: President, Vice President, and Treasurer. The Treasurer's signature will be sufficient for all ASA checks. The Treasurer was requested to inquire about laws pertaining to this issue in the State of Oregon. She was also urged to inquire about a special savings account which would permit withdrawal of funds without penalty.

Report of the Finance Committee

No report.

Report of the Liaison Committee

Lack of activity of the Liaison Committee was noted. However, it was noted that Dr. Behrman, Chairman of the Liaison Committee, had his hands full with the By-Laws Committee and incorporation of the Society. It was suggested that the President of the Society temporarily take over this function.

Financial Issue

It was moved that as soon as sufficient funds from membership dues are accumulated that the legal fees and other expenses incurred by Dr. Behrman in the process of incorporating ASA are refunded to him, as well as expenses incurred by Dr. Hafez in providing conference facilities at Fort Collins, stationery, and other expenses are reimbursed.

Other Societies

Dr. A. Paulsen expressed concern of certain societies and hazard of unnecessary fragmentation of societies. President Steinberger promised to communicate with AFS and SSR to augment their activities with that of ASA.

Tenure of Office

President Steinberger suggested to extend the tenure of the officers by one year. This suggestion was not settled and will be resolved during our next business meeting.

The meeting convened at 9:20 a.m. and adjourned at 1:30 p.m.

E. S. E. Hafez, Secretary

AMERICAN SOCIETY OF ANDROLOGY

FIRST BUSINESS MEETING

July 24, 1975

The first business meeting was held at University Motor Inn, East Collins, CO, on July 24, 1975.

Attending the meeting were: A. Bartke, S. J. Behrman, E. S. E. Hafez, E. Rosemberg, R. Sherins, A. Poulsen, A. Steinberger, and E. Steinberger.

Presiding was E. Steinberger, President.

Welcome by the President.

Presidential Report

The President contacted CIDA, and it was agreed that *Andrologia* will be the official journal of ASA. Affiliation will require a fee of \$50. Ten percent of the CIDA earnings from ASA membership subscriptions will be returned to ASA. Affiliation is a voluntary one.

The Membership Committee will revise the bylaws of membership and send comments to the President. President Steinberger read a letter for Dr. Zaneveld asking to be relieved from membership chairmanship. Drs. Bartke and R. Sherin accepted to serve on the Membership Committee.

ASA Stationary: Objections were raised by Dr. Nancy Alexander (by letter) and by Dr. Eugene Rosemberg on the ASA stationary. The addresses of officers and name of Council could be included in a new stationary with a new emblem. The old stationary could be used by the Secretary.

Finance Committee--S. J. Behrman (chairman), T. N. Evans, and E. Brueschke. The Finance Committee will deal with audit. The Council will take care of fund raising under the chairmanship of President E. Steinberger.

Treasurer. Authorized signatures of checks are of the President, Vice President, and Treasurer. Dr. Alexander will be the primary officer to sign ASA checks under normal circumstances. She is requested to find out about laws of the state of Oregon for details on nonprofit organization accounts for possible special savings accounts.

Report of the Program Chairman

Dr. Eugenia Rosemberg outlined her program of the first ASA scientific meeting to be held March 29-April 2, 1976, in Worcester, MA.

She aimed to attract new membership and to hold a business meeting during that occasion. She discussed registration fees, advance registration, and possible new invited speakers.

Liaison Committee

The Federated Society meeting was held in New York in June 1975. President Steinberger requested to reformulate additional members for the Liaison Committee to represent the following societies: American Urologic Society, American Fertility Society, Society of the Study of Reproduction, Endocrine Society, American Society of Anatomists, and the Neuroendocrinology Society.

Publication Committee (Eugenia Rosemberg, MD, Chairman)

Members: Griff T. Ross, NIH; Alexander Alberl, Mayo Clinic; R. Emslander, Mayo Clinic; Albert Parlow, Harbor General Hospital, CA; Philip Troen, University of Pennsylvania; William L. Williams, University of Georgia.

Not Yet Accepted: M.-C. Orgebin-Crist, Vanderbilt University; Larry Ewing (accepted), John Hopkins School of Public Health; C. Wayne Bardin, Penn State; W. Odell (accepted), Harbor General Hospital, CA; S. Howards, University of Virginia; L. Persky, Case Western Reserve; R. Bunge, University of Iowa; Charles Rife, Mayo Clinic.

It is hoped that the ASA officers and Council would define the role of the Publication Committee.

Financial Matters

As soon as membership dues are accumulated, Vice President Behrman will be refunded legal fees of incorporating ASA and Secretary Hafez will be refunded the price of the stationary and rent of a conference room in Ft. Collins.

Other Societies

Dr. Paulsen expressed concern of certain societies of the hazard of unnecessary fragmentation of societies. President Steinberger promised to communicate with AFS and SSR to augment their activities with that of ASA.

Bylaws

Vice President Behman read a draft of the bylaws. Dr. Behrman was requested to rewrite the bylaws for circulation among officers for any possible revisions.

Tenure of Office

President Steinberger suggested to extend the tenure of officers by one year as follows:

President April 1976-77
Vice President April 1976-77
President-Elect April 1977-78
Program Chairman will be selected in April 1976
Nomination Committee for the new President-Elect to take place in April 1976.

The meeting convened at 9:20 a.m. and adjourned at 1:30 p.m.

E. S. E. Hafez
Secretary of ASA

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Appendix A

AMERICAN SOCIETY OF ANDROLOGY

STATEMENT OF CASH RECEIPTS AND DISBURSEMENTS

FOR THE YEAR ENDED FEBRUARY 29, 1976

CASH RECEIPTS:

1975-76

Membership and subscription.....	\$5,560.00	
Membership.....	1,750.00	
Student membership and subscription.....	30.00	
Student Membership.....	<u>40.00</u>	\$7,380.00

1976-77

Membership and subscription.....	280.00	
Membership.....	<u>80.00</u>	360.00

Pending

Membership and subscription.....	160.00	
Membership.....	<u>75.00</u>	235.00

Annual Meeting - Registration Fees.....		<u>125.00</u>
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TOTAL.....		8,100.00
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CASH DISBURSEMENTS:

Andrologia Subscriptions.....		3,509.75
Foreign currency exchange.....		11.30
CIDA -- 1975 and 1976 dues.....		100.00
Incorporation expenses.....		390.00
Membership cards.....		<u>21.00</u>

TOTAL.....		4,032.05
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INCURRED EXPENSES 1975-76:

Stationery.....		463.00
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Annual Meeting

Programs.....	654.00	
Meeting arrangements.....	600.00	
Banquet expenses.....	160.00	
Miscellaneous.....	86.00	
Badges.....	<u>250.20</u>	<u>1,750.20</u>

TOTAL.....		<u>2,213.20</u>
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CASH BALANCE.....		<u>\$1,854.75</u>
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Appendix B

AMERICAN SOCIETY OF ANDROLOGY

TREASURER'S PROJECTED BUDGET

APRIL 1, 1976 THROUGH MARCH 31, 1977

Postage	
Billing.....	\$ 75.00
Correspondence.....	15.00
Copying.....	25.00
Secretarial Servies(1/20; includes 17% fringes).....	<u>560.00</u>
Total.....	\$ 675.00

Appendix C

AMERICAN SOCIETY OF ANDROLOGY

OFFICERS' EXPENSES 1976-77

E. Steinberger, President

 Badges - Annual Meeting..... \$ 250.20

S.J. Behrman, Vice President.....no expenses

E.S.E. Hafez, Secretary

 Stationery..... 463.00

N.J. Alexander, Treasurer.....no expenses

E. Rosemberg, Program Chairman

 Annual Meeting..... 3,964.39

 Total..... 4,677.39

All officers have waived secretarial, copying, and postage costs.

Dr. Steinberger has absorbed the cost of the certificates.

American Society of Andrology

SECRETARY
E.S.E. Hafez

Reproductive Physiology
C.S. Mott Center for Human
Growth & Development
275 E. Hancock Ave.
Detroit, Michigan 48201 U.S.A.
(Tel: 313 / 577-1011)

APPLICATION FOR MEMBERSHIP

Check one: Regular Membership Student Membership

NAME _____
(first) (initials) (last) (degree)

ADDRESS _____

(zip)

PHONE: Business _____ Home _____

EDUCATION (undergraduate, graduate, postdoctoral)
(Chronological order)

Institution	Degree	Year

PRESENT POSITION

Specialty (check one or two) Urology Endocrinology
Obstetrics-Gynecology Anatomy Physiology
Psychology-Psychiatry Microbiology Immunology
Biochemistry Reproductive Biology

Other (specify) _____

I wish I do not wish to receive ANDROLOGIA

DUES: Regular Membership \$25.00 per year

Regular Membership & subscription to ANDROLOGIA \$40.00 per year

Student Membership \$15.00 per year

Student Membership & subscription to ANDROLOGIA \$30.00

Please return the completed Membership form and a check for the appropriate amount (made out to: American Society of Andrology) to the secretary. Attach a list of fiver pertinent publications and two letters of recommendations.

Signature _____

Date _____



THE UNIVERSITY OF TEXAS
HEALTH SCIENCE CENTER AT HOUSTON

MEDICAL SCHOOL


John H. Freeman Building
Texas Medical Center

Post Office Box 20708
Houston, Texas 77025
713/792-2121

June 17, 1976

MEMORANDUM

To: Officers and Council Members
American Society of Andrology

From: Emil Steinberger 
President

Re: Summer Interim Meeting

I am certain by now you have received from our Secretary, Dr. Hafez, the minutes of the last business meeting. You will note that it was decided to hold an interim meeting. As I indicated to you in a previous communication it appears that more officers and Council members will attend the SSR meeting than any other summer or fall meeting. Consequently, it was decided to hold our interim business meeting in Philadelphia in conjunction with the SSR meeting. Please write me when you would like to hold the meeting. We will need probably most of a day. We could meet the day before or the day after the meeting, or if you so desire during the meeting. Also I will need items for the agenda. So far I have heard only from Dr. Rosemberg.

Please let me hear from you at your earliest convenience. Those of you who are committee chairman, as you will note from the minutes of the last meeting, you are charged with defining the duties and the responsibilities of the committees you chair. I would greatly appreciate that you have a draft of those with you at the meeting in Philadelphia. Those committee chairmen who will not be able to make it I would appreciate it if you would send me the draft so I could present it at the meeting.

I will be attending the Endocrine meetings and then I will be leaving on July 4 for Europe to attend the Andrology Congress and later the Endocrine Congress and will not return until July 29. Consequently it is most important that I hear from you before I leave for Europe. Happy sailing through the summer am looking forward to hearing from you at your earliest convenience.

Regards.

ES:jw

American Society of Andrology

SECRETARY
E.S.E. Hafez

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AMERICAN SOCIETY OF ANDROLOGY

1976-1977

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Help to Keep the American Society of Andrology Strong, Active and Always Looking Forward

<http://andrologysociety.org>



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