



SMRU Newsletter



Editor - Moshe Wald, M.D.

Spring - Summer 2008

Mission Statement

"To promote the advancement of our understanding of male reproductive physiology and management of male infertility by providing a forum for the dissemination of both basic and clinical research information and support of educational programs."

MESSAGE FROM THE PRESIDENT

JAY I. SANDLOW, M.D.

A warm welcome to all of our members. The Society for Male Reproduction and Urology continues to provide information regarding Male Reproduction and Andrology for physicians, scientists, other health care providers, as well as the public. We accomplish this through our website and during the annual ASRM meeting. Members of our society include a diverse group consisting of urologists, medical and pediatric endocrinologists, reproductive endocrine and infertility specialists, basic scientists, nurses and laboratory scientists. Our postgraduate courses and symposia at the annual meeting are designed to appeal to all members of the ASRM. The 2008 Postgraduate Course is, "Unraveling the Mysteries of Spermatogenesis: Contemporary Therapies, Stem Cells, and Beyond" chaired by Robert E. Brannigan, M.D. By attending this course, we hope to broaden the attendees' understanding of spermatogenesis and the variety of contemporary therapies available to address specific spermatogenic disorders. We also aim to provide attendees with a state of the art overview of important, emerging technologies such as germ cell transplantation and stem cell based therapy



for male infertility. By the end of the course, the attendees should be able to describe the pathophysiology associated with both congenital and acquired disorders of spermatogenesis, discuss investigational and emerging technologies for the treatment of male infertility including germ cell transplantation and stem cell based therapy, as well as review contemporary methods to preserve and restore fertility in male cancer patients. We will also be co-sponsoring an interactive session, along with the Environment and Reproduction Special Interest Group (ERSIG) entitled, "Male Reproductive Toxicology" with Drs. Susan Benoff and Mark Sigman, three mini-symposia: Gabor Huszar M.D. (Yale): "Sperm Biochemical Markers and Their Relationship to Sperm Morphology", Darius Paduch, M.D., Ph.D (Cornell): "Klinefelter's Syndrome: Novel Scientific and Clinical Insights", and Gail Prins, Ph.D (UIC): "The Reproductive Aspects of the Prostate: Growth, Development, Function, and Impairment", as well as our three concurrent scientific sessions.

As part of our educational outreach program, the SMRU continues to support the Annual SMRU Traveling Scholars Award Program. The objective of this program is to expose residents, fellows, Ph.D students, and post-docs to new scientific information per-

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tinent to the study of male reproductive medicine. We invite all program chairs to encourage their trainees who are submitting abstracts on topics relevant to male reproduction to apply for these awards. Guidelines for eligibility can be found on the SMRU web site: www.smru.org.

I also want to remind all members about the SMRU banquet that is held at the ASRM meeting each year. Previous banquets have been very successful, and I encourage all members and guests to attend. Finally, I want to welcome our newest Board member. Dr. Nancy Brackett is our newly-elected Secretary /Treasurer and Dr. Gail Prins is Member at Large.

They join our other officers, President-Elect, Dr. Bob Brannigan, Past President Dr. Rebecca Sokol, current Members at Large, Drs. Karen Boyle and Natan Bar-Chama, along with the new editor of the newsletter, Dr. Moshe Wald. I would also like to thank Dr. Brannigan for his tireless work in putting the newsletter together and bringing it to its current lofty level. I hope you all have a wonderful year and we hope to see you at the annual meeting in San Francisco this fall.

Sincerely,

Jay Sandlow, M.D.
President

WE ARE PLEASED TO ACKNOWLEDGE THE FOLLOWING SMRU MEMBERS FOR THEIR VALUABLE SERVICE AS REPRESENTATIVES TO THE BELOW ASRM COMMITTEES:

CODING AND REIMBURSEMENT COMMITTEE

JEANNE H.S. O'BRIEN, M.D. (2005-2008)

MEMBERSHIP COMMITTEE

NATAN BAR-CHAMA, M.D. (2005-2008)

CONTINUING MEDICAL EDUCATION COMMITTEE

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PATIENT EDUCATION

JAY I. SANDLOW, M.D. (2005-2008)

PRACTICE COMMITTEE

MARK R. LICHT, M.D. (2006-2009)

RESIDENT EDUCATION

PAUL J. TUREK, M.D. (2006-2009)

2008 SMRU TRAVELING SCHOLAR AWARD

PROGRAM COMMITTEE

SUSAN BENOFF, Ph.D (CHAIR)

JAY I. SANDLOW, M.D.

SMRU BOARD AND OFFICERS 2007-2008

President

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Gail S. Prins, Ph.D

Board: 2 Year Term

Karen E. Boyle, M.D.

Board: 1 Year Term

Natan Bar-Chama, M.D.

Newsletter Editor

Moshe Wald, M.D.

ANNUAL MEETINGS OF THE AMERICAN SOCIETY FOR REPRODUCTIVE MEDICINE (ASRM)

NOVEMBER 8-12, 2008
MOSCONE CONVENTION CENTER
SAN FRANCISCO, CALIFORNIA

OCTOBER 23-27, 2010
THE COLORADO CONVENTION CENTER
DENVER, COLORADO

OCTOBER 17-21, 2009
GEORGIA WORLD CONGRESS CENTER
ATLANTA, GEORGIA

October 15-19, 2011
THE ORANGE COUNTY
CONVENTION CENTER
ORLANDO, FLORIDA

SMRU at ASRM 2007 Washington, DC October 13-17

ASRM 2007 Annual Meeting Abstract Summary Male Reproduction and Urology Session Reviewed by Joseph Alukal and A.J. Nangia

“Identification of Gene Variability Within the Contrin Gene of Azoospermic Patients” Page S21

S. Hammoud, D.M. Dunn, B.R. Emery,
R.B. Weiss and D.T. Carrell

The investigators assessed infertile males for polymorphism in the gene expressing contrin, a germ cell specific protein that is responsible for mRNA storage. Importantly, contrin knockout mice demonstrate male infertility. Single nucleotide polymorphisms (SNP) in MSY2 (the gene expressing contrin) were identified using PCR of DNA extracted from peripheral blood from 96 azoospermic men; the identical procedure was repeated on 96 control patients. Two SNPs identified in the azoospermic population were not identified at all in the control population. In all, seven SNPs were identified. The authors conclude that some degree of polymorphism of the MSY2 gene exists; this may play a contributory role in some patients with azoospermia.

“Increased Risk of Testicular Cancer Among Infertile Men” Page S22

T.J. Walsh, M. Schembri,
P.J. Turek and M.S. Croughan

The investigators performed a retrospective registry study utilizing the California Cancer Registry (CCR). Fifty-one thousand couples evaluated for infertility at 15 California centers between 1965 and 1998 were considered. Of these, 43,404 male partners could be linked within the CCR. Forty-four cases of post-infertility testis cancer were identified in this cohort. This

translated to a statistically significantly higher incidence of testis cancer in the infertility cohort (standardized incidence ratio 3.6; confidence interval 2.1 to 5.9). This finding is consistent with other studies that have identified a higher incidence of testis cancer in patients with male infertility. The authors conclude that this supports a potential common etiology for infertility and testis cancer.

“Soy Food and Soy Isoflavone Intake in Relation to Semen Quality Parameters” Page S22

J.E. Chavarro, S.M. Sadio,
T.L. Toth and R. Hauser

The investigators hypothesize that a diet high in soy products could decrease fertility; high dietary intake of isoflavones has been shown to have this effect in animal studies. A questionnaire assessing dietary soy intake was administered to 100 men presenting for infertility; complete semen analysis data was available for all of these men. Higher levels of dietary soy intake correlated with lower sperm density. This relationship remained statistically significant even after accounting for other factors including age, BMI, and smoking status. The authors conclude that high dietary intake of soy foods is associated with lower sperm density.

“The Frequency of Epididymal Protein P34H Deficiency in Men Evaluated for Infertility” Page S22

S.I. Moskovtsev, K. Jarvi, C. Legare,
R. Sullivan and J.B.M. Mullen

Epididymal protein P34H accumulates on the acroso-

mal cap of spermatozoa during maturation in the epididymis. This protein enables binding of spermatozoa to the zona pellucida of the oocyte. As such, the authors hypothesize that deficient amounts of this protein could result in male infertility. Western blot for P34H was performed on semen samples obtained both from patients with infertility and known fertile controls; other semen parameters including density, motility, and morphology were also assessed. Fourteen of 105 men in the infertility cohort were found to have deficient levels of p34H in their semen, in comparison to only one subject out of 108 in the fertile control cohort. Importantly, P34H deficiency did not correlate with any of the other semen parameters considered. The authors conclude that a significant number of men presenting for evaluation of infertility may be deficient in P34H.

"Chronic Exposure to Environmentally Relevant, Low-Doses of Cadmium (Cd) in a Rat Model Mimics Effects on Spermatogenesis Observed in Infertile Men with Varicoceles"

Page S23

S.H. Benoff, K.J. Auburn, D.-Z. Chen, J.L. Marmar and I.R. Hurley

The authors have previously demonstrated that chronic exposure to cadmium (Cd) results in decreased sperm motility in male Wistar rats. This follow-up animal study considered intratesticular testosterone, testis histology, apoptosis, and gene expres-

sion profile in the testis of Wistar rats exposed to various levels of Cd from ages 5 to 21 weeks. Testosterone levels and germ cell number decreased with increasing levels of Cd exposure. At the same time, levels of apoptosis increased. Gene expression profiles in Cd exposed animals showed increase expression of nitric oxide synthase (NOS) and genes relating to steroid biosynthesis. Decreased expression of genes regulating NOS inhibition and sperm maturation was also observed. The authors conclude that elevated levels of Cd may represent a significant cause of co-morbidity in patients with infertility.

"Sperm Motility is the Best Predictor of Ejaculatory Duct Obstruction"

Page S23

M. Khera, O. Mohamed, B.B. Najari, J.P. Alukal, E.D. Grober and L.I. Lipshultz

The authors retrospectively assessed patients undergoing seminal vesicle aspiration as part of a workup for suspected ejaculatory duct obstruction (EDO). In these patients, they found decreased sperm motility (<15%) to be a more sensitive predictor of a positive SVA than TRUS findings, including seminal vesicle size greater than 15mm or presence of a midline cyst (81.8% versus 43.8% and 56.3%, respectively). Sperm motility was not specific for EDO, however. The authors conclude that decreased sperm motility is a meaningful predictor of EDO.

ASRM 2007 Podium Summary - Tuesday, October 23

THE SOCIETY FOR MALE REPRODUCTION AND UROLOGY ABSTRACTS

Reviewed by Jessie Mills and Trey Brugh

O-128

"Sperm DNA Damage: is Altered Carbohydrate Metabolism to Blame?"

Lane, et al.

This study investigated the relationship between carbohydrate metabolism, ROS and DNA damage as measured by DCFDA and TUNEL assays, respectively. The authors incubated motile sperm in ascending concentrations of glucose media and found that as the glucose concentration increased, ROS production and DNA damage increased. Conversely, elevated fruc-

tose levels appeared to have no effect on ROS production or DNA damage. The clinical implications of this in vitro finding is whether men with high levels of ROS and DNA damage have altered carbohydrate metabolism.

O-129

"A Novel Form of the Whitaker Test for Ejaculatory Duct Obstruction"

Turek, et al.

Dr. Turek's group presented data diagnosing ejaculatory duct obstruction (EDO) via a novel manometric assay of the ejaculatory duct. The control group was

derived from men undergoing vasectomy reversal and the diagnostic group was made up of men presenting with infertility or pain with a presumed diagnosis of EDO. Both groups underwent seminal vesicle injection and ejaculatory duct manometry. Men with EDO then underwent TURED and had pressures rechecked. Control patients had opening pressures of 34.3 cmH₂O (n=5.). Nine men with presumed EDO underwent pressure study and had a mean pressure of 116 cmH₂O. After TURED, these men had a mean pressure of 53 cmH₂O. Based on these findings, Dr. Turek concluded that ejaculatory duct manometry is a useful diagnostic tool to define EDO and monitor efficacy of TURED.

O-130

“Relationship of Pubertal Gynecomastia with Varicocele and Various Parameters of Growth: a Seven-Year Prospective Study”
Agarwal, et al.

Dr. Agarwal et al presented a study correlating the presence of gynecomastia with varicocele in a longitudinal cohort of 131 boys. These boys were followed for 7 years starting between ages 6-8 through the onset of puberty. The boys were examined for the presence of gynecomastia and varicocele, testicular volume, height, weight, and Tanner stage. This prospective study found an incidence of varicocele and gynecomastia of 15.2%. Gynecomastia was transient, with mean age of onset of just over 12 years, and mean age of disappearance of 13 years. Presence of a varicocele was positively correlated with the development of gynecomastia.

O-131

“Proliferation and Differentiation of Male Germ-line Stem Cells from Testes of Non-obstructive Azoospermia using Sequential Culture Systems”
Kim, et al.

This study presented the feasibility of differentiating male germ-line stem cells into sperm lineage cells. The authors extracted testicular tissue from 35 men with non-obstructive azoospermia confirmed by testis biopsy showing maturation arrest or Sertoli cell only. By placing the tissue in various media, the authors found a dramatic increase in markers for post-meiotic germ cells (c-Kit receptor). These findings suggest that this sequential cell culture protocol could encourage germ-cell differentiation into sperm lineage cells.

O-132

“Combined Effects of the Experimental Left Varicocele and Lead or Nicotine on the Rat Testis”
Carrell, et al.

This study investigated whether the combined insult of a varicocele with exposure to lead and nicotine is worse for testicular weight and sperm concentration in the rat than varicocele alone. Rats underwent standard varicocele induction via partial ligation of the left spermatic vein at the level of the renal vein. They were then divided into groups fed lead in their water or injected with nicotine or given nothing. Rats in either the lead or nicotine group with varicoceles showed a decrease in testicular volume as well as sperm concentration in the caudal epididymis. These findings suggest that varicocele makes the testis more susceptible to environmental insult.

O-133

“Varicocelectomy for Infertile Couples with Advanced Paternal Age”
Zini, et al.

This study looked at the efficacy of repairing varicoceles in men with paternal age over 40. The retrospective study divided men with varicoceles into four groups: group one was men under 40 who underwent varicocele repair, group two was men under 40 who did not undergo repair, group three was men over 40 who underwent repair, and group four was men over 40 who did not have surgery. The outcome was spontaneous pregnancy rate. There were no statistically significant differences in baseline semen and clinical parameters between groups. The authors did observe that men over 40 who elected repair had a higher spontaneous pregnancy rate than men who did not undergo surgery. The data presented supports surgical repair of varicocele in men over 40.



ASRM 2007 Podium Summary - Wednesday, October 24
THE SOCIETY FOR MALE REPRODUCTION AND UROLOGY ABSTRACTS
Reviewed by David Fenig and Jay Sandlow

O-198

"Successful Cloning of the Male Genome"
T. Takeuchi, Q.V. Neri,
M. Cheng, Z. Rosenwaks,
G.D. Palermo.
New York, NY

The authors were able to replicate the male genome through injection of the sperm genome into ooplasts. Androgenic replicates were created from mouse oocytes injected with a single sperm and then transferred to haploid parthenotes. ICSI offspring served as controls. Seventy-seven percent developed into blastocysts compared to 81% of ICSI embryos. However, of 64 blastocysts transferred, 11 offspring (17%) were viable, compared to 43% of controls. The technique was more reproducible than whole genome cloning and did not alter epigenetic imprinting.

O-199

"Subtle Changes in Culture Environmental Temperature Appear to Affect Spermatozoan Physiology"
L. Penrose, M. Seller, S. Jabara, S. Overley,
J. Copeland, S. Prien.
Lubbock, TX

Penrose et al evaluated the effect of subtle temperature changes on sperm physiology and activity in order to create a more optimal environment for sperm culture. Porcine ejaculates were incubated for 3 hours at four different temperatures within $\pm 2^{\circ}\text{C}$ of gonad temperature at 0.5°C increments. CASA was performed. A trend towards increased migration of sperm to the chamber and increased motility was noted at approximate gonadal temperatures indicating that incubation at cooler temperatures than currently performed may be warranted. No change in forward progression was noted.

O-200

"Efficacy of Clomid, Arimidex, and Androgel in Normalizing Testosterone in Young Hypogonadal Men Presenting with Infertility and Sexual Dysfunction"
D.A. Paduch, J. Kiper.
New York, NY

In a study by Paduch and Kiper, the effectiveness of different methods of testosterone replacement therapy was evaluated in a cohort of 350 hypogonadal men presenting with infertility or sexual dysfunction. Hypogonadism was defined as testosterone <400 ng/dl in men younger than 40 years and <350 ng/dl in men older than 40 years. Patients treated for sexual dysfunction were replaced with Androgel. Infertility patients were replaced with Clomid if their estrogen/testosterone ratio was less than 10 or Arimidex if greater than 10. Testosterone levels normalized in all patients. Men taking Clomid had significantly higher estradiol levels after treatment. Elevated estradiol has been reported to predict the risk of atherosclerosis in young men and although unproven, there may be a causal relationship. Thus, Clomid use should be monitored closely in men with elevated estradiol.

O-201

"Correlation Between Sperm DNA Fragmentation and Morphology and Recurrent Spontaneous Abortion"
O.A. Mohamed, M. Khera,
J. Alukal, G. Youssef, M. Francis, H.A. Hamed.
Houston, TX

The group from Baylor College of Medicine evaluated the effects of semen parameters on recurrent pregnancy loss. In this prospective study by Mohamed et al, semen analysis data, including DNA fragmentation rate, was analyzed in the male partner of couples with ≥ 3 spontaneous abortions, using fertile couples as a control. Higher DNA fragmentation rates were found in the infertile cohort (72.55% vs. 28.37%). Lower strict morphology and motility rates were also found in the infertile cohort vs. the fertile cohort (65.5% vs. 37%, 39.5% vs. 62%, respectively).

O-202

"Microfluidic Sperm Sorting Device
Provides a Novel Method for
Selecting Motile Sperm with
Higher DNA Integrity"

R.T. Schulte, Y.K. Chung,
D.A. Ohl, S. Takayama,
G.D. Smith.
Ann Arbor, MI

A novel method to select sperm with high DNA integrity using a gravity-driven microfluidic sperm-sorting device was developed by the group from University of Michigan. A comparison of sperm DNA integrity and motility was made among different semen processing techniques: unprocessed, serial centrifugation, density gradient centrifugation, swim-up, and microfluidic sperm sorting. Sperm DNA integrity was evaluated using TUNEL and SCD analyses. Microfluidic sperm sorting selected a higher number of motile sperm with decreased DNA fragmentation. Compared to the next most effective tech-

nique, the swim-up technique, DNA fragmentation was lower (1.9% vs. 5.7) and motility higher (96.2% vs. 85.8%).

O-203

"Male Age Negatively Impacts Embryo
Development and Reproductive
Outcome in Donor Oocyte
Art Cycles"

J.L. Frattarelli, K.A. Miller,
B.T. Miller, K. Elkind-Hirsch, R.T. Scott.
Morristown, NJ; Troy MI

The authors demonstrate the impact of male age on IVF outcomes in couples using donor oocytes and fresh ejaculated sperm. Mean age of male patients, female recipients, and oocyte donors was 41.8, 41.4, and 27.1 years, respectively. Advanced paternal age was associated with significant impairment of later embryo development. In men older than 50 years, blastocyst development and live birth rate (41.3% vs. 56.0%) was decreased. An increase in pregnancy loss rate also was found (41.5% vs. 24.4%).

ASRM 2007 Annual Meeting - Post Graduate Course

"No Man is an Island: How the Environment Impacts Male Reproductive Health"

Susan H. Benoff, Ph.D, Chair

Russ Hauser, M.D., Sc.D, M.P.H., Jerrold J. Heindel, Ph.D, Shanna H. Swan, Ph.D

Summarized by Susan H. Benoff

The SMRU Postgraduate course, "No Man Is An Island: How The Environment Impacts Male Reproductive Health", was held in conjunction with the 63rd Annual Meeting of The American Society for Reproductive Medicine on Sunday, 14 October 2007, at the Washington Convention Center, Washington, D.C. The course was chaired by Susan H. Benoff, Ph.D (The Feinstein Institute for Medical Research, Manhasset, NY). Russ Hauser, M.D., ScD, MPH (Harvard School of Public Health), Jerrold J. Heindel PhD (NIEHS) and Shanna H. Swan, Ph.D (University of Rochester School of Medicine) were course faculty.

There were 63 registrants of varying backgrounds (M.D., laboratory professional, Ph.D, reproductive

biologist, others). The objective of this course was to educate reproductive health professionals about the current state of knowledge concerning the effects of environmental and occupational exposures on male reproductive health so that they could inform their patients how they can modify their behavior to minimize the risk of infertility or reverse the anti-fertility effects of toxic exposures.

To meet this objective, the course faculty prepared eight learned lectures to inform participants of the potentially harmful effects on semen quality and the development of the male reproductive tract of environmental exposures to organic toxicants and heavy metal exposures. The faculty reviewed data from epidemiologic human

models and from animal experimentation. Different approaches to study environmental effects on male reproduction were outlined. Emphasis was placed on the differing effects on adult fertility potential based on developmental timing of toxic exposures and on the common mechanism of action, e.g., endocrine disruption, of very diverse exposures.

The syllabus included the traditional copies of lecture slides and reference lists as well as a copy of the 2005 Vallombrosa Consensus Statement on Environmental Contaminants and Human Fertility Compromise. The latter was included to give the participants a brief summary of the state of the art, definitions of many of the terms used in the course lectures,

and to stimulate discussion during the time allotted for question and answer sessions. The goal of the Vallombrosa meeting was to identify conclusions concerning reproductive health that could be drawn with confidence from existing data and to identify critical knowledge gaps and areas of uncertainty. All course faculty were participants in the multidisciplinary conference that led to the construction of the Vallombrosa Statement and were signatories on the final document.

For the first time, the course chair allotted time for a free for all question and answer session with the aim of practical discussion. The goal of this session was to identify and provide answers to questions commonly posed to practitioners about environmental exposures and pregnancy outcome. The discussion that ensued was quite lively. Participants received a handout concerning patient and public communication of environmental health risks, which was a copy of the paper proofs of book chapter-

prepared by Gina Solomon and Sarah Janssen and which was taken from *The Handbook of Endocrine Disrupting Chemicals* edited by Andrea C. Gore (Humana Press).

At the close of the course, 24 registrants completed and submitted evaluation forms. The course rating was a 4.4 out of a possible 5.0 and the syllabus received a rating of 4.5. Overall, the course was judged a rousing success.

ASRM 2007 Annual Meeting - Interactive Session "Imaging of the Infertile Male: What is Necessary (and What Isn't)"

Chair: Jay I. Sandlow, M.D.

Presenters: Robert E. Brannigan, M.D., Ajay K. Nangia, M.D.

Summarized by Robert E. Brannigan

Dr. Jay Sandlow chaired this Interactive session. Drs. Ajay Nangia and Robert Brannigan were course faculty. This session proved to be very interactive, and several interesting and somewhat controversial issues were addressed. The course began with Dr. Sandlow overviewing the learning objectives, which included:

1. Describe the technique for TRUS in the evaluation of the infertile male.
2. Identify patients who should undergo scrotal US as part of their infertility work-up.
3. Discuss the utility of seminal vesiculography in the diagnosis of men with suspected EDO.
4. Describe the role of vasography in the evaluation of the azoospermic male.

Next, Dr. Nangia reviewed the role of scrotal ultrasonography in the infertile male. The issue of testicular microcalcifications was discussed, with Dr. Nangia noting that the relationship between tes-

ticular tumors and microcalcifications was first described by Azzopardi in 1961. Current recommendations are for regular testicular exams (by patient and physician) for men with testicular microlithiasis; isolated testicular microlithiasis does not require annual scrotal ultrasounds or tumor markers. Dr. Nangia presented an interesting case of an infertile male with a nonpalpable testicular mass. The audience weighed in on clinical approaches to such a patient, including intra-operative ultrasonography with partial orchiectomy as one consideration. Dr. Nangia noted that men with oligospermia or azoospermia have a significantly higher prevalence of varicoceles, hydroceles, microlithiasis, epididymal enlargement, and epididymal cysts compared to normospermic men. Dr. Nangia next highlighted the use of ultrasound in evaluation of men with orchalgia and varicoceles. He noted that literature on the use of scrotal ultrasonography in men with orchalgia is limited. He also noted that reversal of flow

in the main dilated vein >3 mm size correlated with the most improvement in semen analysis parameters post varicocelectomy. A thoughtful discussion between clinicians who perform routine scrotal ultrasonography in all infertile male patients and those who do not followed. Most clinicians present at the meeting do not perform routine scrotal US screening.

Dr. Brannigan next overviewed the topic of imaging for ejaculatory duct obstruction. He presented a case of a male with low ejaculate volume, fructose negative, acidic pH azoospermia. Clinical criteria for partial ejaculatory duct obstruction and complete ejaculatory duct obstruction were discussed. "Complete" ejaculatory duct obstruction includes ejaculatory volume <1.0 mL, azoospermia, acidic seminal pH, and sample negative for fructose. "Partial" or "functional" ejaculatory duct obstruction includes ejaculatory volume <2.0 mL, sperm motility <30%, and oligospermia.

Discussion ensued over the fact that "partial/functional" obstruction is a more controversial clinical entity, with some clinicians doubting its reported prevalence. Static testing methods include TRUS, MRI, and seminal vesicle aspiration. Dynamic testing includes vasography and seminal vesiculog-

raphy. On TRUS, seminal vesicle obstruction is noted when the A-P width is >1.5 cm. Additionally, >3-5 sperm/HPF on seminal vesicle aspirate suggests ejaculatory duct obstruction. The new Whitaker Test (seminal vesicle manometry) technique, reported by the group from UCSF, was discussed in

detail. Dr. Walsh was present in the audience and reported on specifics of the technique, and the audience undertook a more general discussion regarding the concept of "partial" ejaculatory duct obstruction. The session closed upon completion of this discussion.

ASRM 2007 Annual Meeting - Plenary Session: Ethicon Endosurgery Endowed Lecture "Innovations in the Surgery of Male Infertility: Life at the Cutting Edge"

Marc Goldstein, M.D.

Summarized by Tobias Kohler and Robert E. Brannigan

Dr Goldstein's plenary session "Innovations in the Surgery of Male Infertility: Life at the Cutting Edge" described how the field of male infertility has progressed over the last few decades. Despite IVF/ICSI, there remain many reasons to evaluate the infertile male: they have a 17-37 times higher incidence of testicular cancer, 30-100 times higher incidence of genetic abnormalities, and are at risk for impaired fertility and androgen deficiency from large varicoceles. The concept of upgrading male fertility status is also crucial, as men who are azoospermic and condemned to using donor sperm may become candidates for IVF/ICSI, men requiring IVF/ICSI can become IUI candidates, or IUI candidates may be able to conceive naturally.

Of all causes of male infertility, varicocele is by far the most common etiology, accounting for 41.2% of all male patient factors. This is followed in order of occurrence by obstruction (18%), testis failure (16.4%), idiopathic (8.8 %), hormonal (3.8%), ejaculatory (2.4%), cryptorchidism (2.2%), anti-sperm antibodies (1.8%), testis cancer (1.6%), gonadotoxic treatments (1.2%), infection (0.8%),

Klinefelter's syndrome (0.6 %) and non-testis cancer (0.4%). The majority of these conditions are treatable, most with microsurgery. Microsurgeries for male infertility are some of the most challenging of all microsurgeries. Important sizes to remember are the size of human hair (100 microns) and the red blood cell (6 microns). The epididymal tubule is 200-300 microns and is extremely delicate, the vas deferens is 300 microns, and 10-0 suture is 17 microns. Thus, systemized training for infertility microsurgery that utilizes rat models and human tissue specimens is essential.

Azoospermia is always due to either obstruction (indicated by large testicles with full epididymis and normal FSH), or lack of sperm production (typically small, soft testicles with high FSH). Equivocal cases should be decided with testis biopsy with the ability to cryopreserve sperm at that time. Obstruction can occur anywhere, but vasal obstruction is the most common, with 800,000 vasectomies occurring per year. Epididymal obstruction can occur because of infection or, secondarily, because of pressure in the system, as the testicle produces 50,000 sperm per

minute at the onset of puberty. This also accounts for lower success rates with longer periods from vasectomy to time of reversal.

Innovations in vasovasostomy to insure an accurate, watertight anastomosis include the microdot technique for precision suture placement. It has yielded impressive results of 99.5% sperm in the ejaculate, a 54% overall natural pregnancy rate, and 64% natural pregnancy rate excluding female factors. Overall pregnancy rates after reversal, including vasoepididymostomy, depend greatly on time from vasectomy, with <15 years yielding an 84% pregnancy rate versus 44% at >15 years. In situations in which couples seek to have more than one child, time since vasectomy of <15 years and the female partner is young favor reversal over IVF/ICSI. Data has shown that reversals are equal to or more cost effective than IVF/ICSI, especially with younger female age. Microsurgical epididymal sperm aspiration for congenital absence of the vas deferens combined with IVF/ICSI has the highest pregnancy rate (70%) per attempt of any infertility treatment.

Early and modern definitions of

varicoceles are "veins (that) are swollen and twisted over the testicle, which becomes smaller than its fellow" (Greek physician Celcius), and "abnormal dilation of the veins of the pampiniform plexus" (Stuart S. Howards, M.D.) Varicoceles occur in 15% of all males, in 35% of men with primary infertility, and in 80% of men with secondary infertility. They cause a progressive decline in fertility. Prior fertility does not predict resistance to future spermatogenic impairment in men with varicoceles, and men with varicoceles may benefit from early evaluation and prophylactic varicocelectomy to prevent future infertility and androgen deficiency. Males with large varicoceles (23%) are put at greatest risk and benefit the most from intervention. Varicocele repair will halt further damage and may upgrade male fertility status. Microscopic repair of large varicoceles is very safe and may be more conservative than not operating when considering their

possible sequelae. Ligation of the testicular artery is unlikely to enhance testicular function-its preservation is essential along with ligation of all veins except the vasal vein. The importance of keeping the scrotum warm through the use of heating pads or a high room temperature was emphasized to facilitate a good physical exam to detect varicoceles. New data on varicocelectomy in selected patients shows a 2.86 increase in pregnancy rates versus matched controls.

Non-obstructive azoospermia treatment was revolutionized by the micro-TESE technique. It has increased sperm yield over standard TESE and minimizes the potential loss of testosterone dysfunction. High FSH is not a negative prognosticator, and sperm can be found in very small testes (sperm has been found in a 1cc testis). Previous histology is a good predictor: hypospermatoge-

nesis yields sperm 80-90% of the time, maturation arrest 60-70%, Sertoli cell syndrome only up to 40%, undescended testicles 60%, and Klinefelter's 60%. The only condition in which sperm is never found is AZF-B deletion.

In summary, most male infertility is treatable with utilization of microsurgery techniques. Microsurgical skills are crucial and should be refined in a micro-skills laboratory. Through these techniques, men can upgrade their fertility status and facilitate effective collaboration with reproductive endocrinologists. Dr. Goldstein concluded his talk with quotes that have inspired and motivated him throughout his career. "Do the kind thing and do it first" and "The good physician treats the disease but the great physician treats the patient" (Sir William Osler). "For every complex problem there is a simple answer...and it is wrong!" (H.L. Mencken).

SMRU Newsletter Highlight

Antoine ("Tony") Makhlof, M.D., Ph.D

Antoine ("Tony") Makhlof, M.D., Ph.D
Assistant Professor
Department of Urologic Surgery
University of Minnesota



Tony Makhlof, M.D., Ph.D completed his training as a Fellow in Andrology at the University of Illinois at Chicago (UIC) in 2006. He is now an Assistant Professor at the University of Minnesota department of Urology.

Tony graduated summa cum laude from the American University of Beirut, Lebanon in 1993, and soon after moved to the United States to pursue a combined MD/PhD degree at the University of South Carolina. He then completed a urology residency at the University of Virginia, during which he decided

on an academic career in Andrology. As a fellow at UIC, he focused his research on computational modeling of urologic disease under the guidance of Craig Niederberger and was a recipient of the AUA/Pfizer Fellowship Award in support of this work. After moving to Minnesota, he resumed his interest in basic research.

His current projects include the study of defensins in the male reproductive tract and the characterization of a male infertility knockout model. In addition, he continues to actively collaborate with urologists in fields outside Andrology on applications of computational and statistical modeling. His clinical practice focuses on male sexual dysfunction and infertility.

His extra-curricular pursuits include computer programming, history and foreign languages. He lives with his wife and two sons in Eden Prairie, MN.

ASRM 2007 Annual Meeting - Interactive Session
“The Role of Directed Genetic Testing in Male Infertility Evaluation and Treatment:
Necessity and Advantages”

Chair: Robert D. Oates, M.D.

Presenters: Mark Sigman, M.D. and Paul J. Turek, M.D.

Summarized by Fnu Deepinder

A significant proportion of men with infertility may have a genetic cause. These men are at increased risk of having recurrent miscarriages with their partner. The development of assisted reproductive technologies, especially intracytoplasmic sperm injection (ICSI), now enables these infertile men to father children. However, ICSI carries a high risk of transmitting genetically determined diseases to the offspring as it bypasses all the physiological mechanisms that act as protective barriers against sperm with genetic defects. Hence, it is imperative for clinicians to discover the cause of infertility before subjecting these patients to ICSI. Primarily, three kinds of genetic testing are available for evaluation of male infertility.

Karyotype Evaluation: One in 20 infertile men bear a chromosomal anomaly; of these, 80% involve sex chromosomes and 20% involve autosomes. The most common karyotype abnormality associated with male infertility is Klinefelter syndrome, in which 90% have 46, XXY Karyotype and 10% have mosaic 46XY/47, XXY Karyotype. Some of the other common chromosomal abnormalities

associated with infertile men include Robertsonian and reciprocal translocations. Karyotyping should be considered a necessary part of pretreatment screening for all men referred for ICSI.

Yq-chromosome Microdeletions Testing: Yq microdeletions are observed in 10-15% of infertile men with azoospermia or severe oligospermia. Therefore, infertile men with non-obstructive azoospermia or severe oligospermia (sperm density <5 million/mL) in whom the cause of spermatogenic failure is not apparent should be tested for Yq microdeletions. The test involves detecting Yq microdeletions by PCR-based mapping of several molecular biomarkers or genes located within and outside the AZF (azoospermia factor) region of Y-chromosome. High-resolution microarrays for chromosome testing are being developed for detection of Y deletions. Although most Yq microdeletions occur de novo, transmission of Yq microdeletions from father to son through ICSI is known to occur; hence, the child's male factor infertility needs to be discussed.

Genetic Mutations Associated with Male Infertility: Congenital bilateral absence of the vas deferens is found in 2% of men presenting with infertility. Approximately 75% of men with congenital absence of vas deferens harbor mutations of the cystic fibrosis transmembrane conductance regulator (CFTR) gene. Azoospermic men with at least one absent vas deferens on physical examination or azoospermic men with evidence of normal spermatogenesis should be tested for CFTR gene mutation.

Infertile men with post-meiotic germ cell maturation arrest should undergo testing for cAMP response element modulator (CREM)-tau mutation. Mutations in the androgen receptor (AR) gene have been associated with infertility and undervirilization in phenotypic males. Furthermore, mutations in anosmin, GnRH receptor, GPR54, DAX-1, SF-1, NELF and FGFR-1 genes have been associated with idiopathic hypogonadotropic hypogonadism. Male infertility may also occur as a manifestation of other genetic diseases such as hemochromatosis, sickle cell disease, thalassemia major and myotonic dystrophy.

CREST ELIGIBILITY EXTENDED TO ALL MEDICAL SPECIALTIES
INCLUDING UROLOGY

The Clinical Research/Reproductive Scientist Training (CREST) Program is designed specifically to enable physicians in private or academic clinical practice in reproductive medicine to engage in clinical research while maintaining their clinical practice.

Admission to this innovative program requires completion of residency training in any specialty, including urology, internal medicine, etc. Subspecialty fellowship training is not a prerequisite. The deadline for receipt of applications has been moved to Tuesday, July 1, 2008.

Please see http://www.asrm.org/Media/misc_announcements/CREST.html for further information regarding program details, eligibility, and application.

SMRU Member Update

- ♦ Paul J. Turek, M.D. was awarded an Endowed Chair in Urology Education by the UCSF Academy of Medical Educators in honor of his medical student and resident teaching contributions. Dr. Turek has also been named Working Group Chair of the AUA Medical Student National Curriculum, which will develop a core curriculum in Urology for medical students throughout the U.S.
- ♦ Harris M. Nagler, M.D., Mark Sigman, M.D., and Paul Turek, M.D., have been designated by the AUA Office of Education to prepare a standard andrology curriculum for all urology residents in the U.S.
- ♦ Hassan W. Bakos, M.D., a 2007 SMRU Traveling Scholar, has been recently elected to Scientists in Reproductive Technology (SIRT) of the Fertility Society of Australia, and appointed Assistant Treasurer of the group. For more information about SIRT please visit: <http://www.fsa.au.com/sirt/>.
- ♦ Peter N. Kolettis, M.D. is a member of the Society of Reproductive Surgeons Good Surgical Practices Guidelines Committee. Dr. Kolettis is also serving on the American Society for Reproductive Medicine Continuing Medical Education Committee (Society of Reproductive Surgeons Representative), as well as the AUA Male Infertility Best Practice Policy Update Panel.
- ♦ Ajay K. Nangia, M.B.B.S., chaired the 2008 SSMR annual meeting program entitled "Vasectomy: What is All the Fuss About?", which was held in Orlando, FL, on May 20, 2008.
- ♦ Dale McClure, M.D., is President-Elect of ASRM and Dorrie Lamb, Ph.D, is serving on the ASRM Board of Directors.
- ♦ Craig S. Niederberger, M.D., has been appointed Chair of Urology at the University of Illinois at Chicago.
- ♦ Larry I. Lipshultz, M.D., Stuart S. Howards, M.D., and Craig S. Niederberger, M.D. have edited *Infertility in the Male*, 4th edition (Cambridge University Press). This text is currently in press.
- ♦ Larry Lipshultz, M.D., and Khera M. Atwal, D.T., have edited *Urology and the Primary Care Practitioner*, 3rd edition (Mosby). This text is currently in press.

This column provides SMRU members with a forum to keep colleagues abreast of each other's professional (and personal) accomplishments. If you would like an item posted in this newsletter, please email Dr. Moshe Wald, at moshe-wald@uiowa.edu.

DID YOU KNOW?

The SMRU web site is a valuable resource!!

1. Use the member search function. (It is easy to use and up to date, so bookmark it!)
2. Find links to important and useful ASRM web sites, such as ASRM/SMRU Practice Guidelines and excellent clinical resources. If you haven't visited the site recently, take a look!
3. See the listing of future meetings (dates, times, and locations) relevant to clinicians and scientists with an interest in male reproductive medicine and science.
4. There are numerous ASRM publications on male infertility diagnosis and treatment specifically designed for patients.
5. Find the postgraduate course syllabi from past SMRU postgraduate courses.
6. Read about the Male Reproductive Medicine and Surgery Fellowship program.
7. See the link to a valuable collection of ASRM publications and materials on lifestyle choices which affect fertility. Find downloadable materials for patients on tobacco, alcohol, drug use, safe sex practices, stress, weight, and age. Also, see excellent comprehensive and informative resources for patients!
8. All prior SMRU newsletters are housed on the web site.
9. Links to numerous professional organizations and societies important to clinicians and scientists in our field can also be found on our website.
10. Look for the quick and easy to use online application site. Encourage a friend, trainee, or colleague to join today!!!

ASRM 2007 Annual Meeting - Mini-Symposia “Epigenetics: What it is and How it Relates to Abnormal Reproductive Outcomes”

Speaker: Victoria K. Cortessis, Ph.D

Summarized by Trey Brugh

Dr. Cortessis presented a review of the emerging discipline of epigenetics. Related to genetics, epigenetics is a process that determines which genes will be expressed, i.e., regulate genetic activity. Regulation of gene expression is achieved through changing chromatin structure. Chromatin is DNA packaged with proteins called histones. The structure of chromatin is changed through methylation and histone modifications. These changes do not alter nucleotides or subsequent proteins and are common and beneficial. On the other hand, genetic change, in which a mutation occurs, resulting in a nucleotide, mRNA, and subsequent protein alteration is relatively rare.

Epigenetic reprogramming occurs

twice. The first reprogramming event occurs during germ cell development in the germline of a parent. The second event occurs during the early stages of the embryo. During these times, there is widespread erasure of demethylation and then stepwise sperm- and egg-specific de novo DNA methylation. Methylation of DNA results in imprinting, in which one allele, either the paternal or maternal copy, is expressed and the other allele is silenced. The conflict theory of imprinting reflects the differential expression of the maternal and paternal genomes in the developing embryo. Questions have been raised whether IVF, ICSI and embryo culture may affect imprinting. The incidence of two congenital syndromes have been studied to attempt to determine if

defects in imprinting may affect children conceived through ART. Beckwith-Wiedemann and Angelman syndromes are rare conditions, and some cases are the result of epigenetic defects. There is a 6.5 relative risk for children conceived through ART for developing either of these syndromes when compared to natural conception. Dr. Cortessis warns that this data is gathered from a limited number of studies which have very small patient populations. An alternative explanation for the increased risk for these couples to conceive children with this disorder is the possibility that infertile couples' gametes may be the cause of impaired methylation capacity and therefore, ART may not be the cause.

ASRM 2007 Annual Meeting - SMRU Poster Review

Summarized by Michael I. Eisenberg and Stanton C. Honig

A growing body of evidence has suggests that varicocele can affect Leydig cell function. Building on this, Tanrikut et al from Cornell retrospectively reviewed their own patient database. Compared to patients undergoing vasectomy reversal, men with varicoceles had significantly lower mean testosterone levels. This is especially striking given the fact that the control patients (those men undergoing vasectomy reversal) were significantly older. Furthermore, the group also documented an increase in testosterone levels in men after varicocele repair. While retrospec-

tive in nature, this study provides important information to help counsel patients on how varicoceles may impact male health.

Khera et al from Baylor College of Medicine retrospectively studied the impact of varicoceles on seminal fluid reactive oxygen species (ROS). Following varicolectomy, ROS levels fell significantly, although not to the level of infertile men without varicoceles. This further contributes to our pathophysiologic understanding of varicoceles.

While sponsored by the maker of

vardenefil (Bayer), Jarvi et al showed no impairment in semen characteristics (sperm concentration, total sperm count, sperm morphology, and sperm motility) after daily treatment with daily phosphodiesterase inhibitors for 6 months.

Another popular topic in the media today is obesity. Fariello et al from Sao Paulo, Brazil, showed that total motile sperm count declines with increasing BMI, with a significant difference between those with BMI <25 (eutrophic) and those with BMI >30 (obese).

Modder et al from Northwestern provided encouraging data for fertility preservation in patients with azoospermia or oligospermia at the time of cancer diagnosis. Overall, all but one of six patients had sperm preserved either by

microdissection or cryopreservation prior to cancer therapy.

Encouraging results for patients with obstructive azoospermia undergoing TESA/cryopreservation was published by Garg et al

from the Medical College of Wisconsin. Sperm adequate for cryopreservation was found in 94% of patients with a 71% pregnancy rate achieved with IVF.

ASMR 2007 Annual Meeting - Bruce Stewart Lecture

Speaker: Renee Reijo Pera, M.D.

Summarized by Dorrie Lamb

Dr. Renee Reijo Pera, who recently accepted the position of Director of the Stanford University Institute for Stem Cell Biology and Regenerative Medicine, presented the annual Bruce Stewart Lecture. Dr. Reijo Pera's work focused on the key molecular and cytoplasmic components that define and regulate stem cells-both primordial germ cells and embryonic stem cells. Indeed, Dr. Reijo Pera's work has shown that the expression of specific genes regulates the differentiation of human embryonic stem cells into primordial germ cells and modification of gene expression can set the cells down different pathways of differentiation.

NANOS were shown to be expressed at the relatively early stages of germ cell formation in both males and females. The expression of these genes in germ cell development is highly conserved and they play an important role for germ cell formation in lower organisms. Indeed, the timeline of gene expression during the early events of human embryogenesis may also provide insights into infertility and birth defects. A major research goal of her laboratory is to produce germ cells in vitro that could ultimately be used to assist infertile couples. Dr. Reijo Pera is also working to develop new embryonic stem cell lines, in part through somatic cell nuclear transfer.

During these studies, the genes *DAZL*, *PUMILIO* and

SSMR Subspecialty Society Program 2008 SSMR Annual Meeting at the 2008 AUA Annual Meeting Tuesday, May 20, 2008 "Vasectomy - What Is All the Fuss About?"

Ajay K. Nangia M.D.

Vasectomy is one of the "bread and butter" minor surgeries for most urologists with over 520,000 being performed every year in the USA. The National Survey for Family Growth reported that vasectomy accounted for 6% of the contraceptive methods used in 2002.

Recently, a connection between a form of Alzheimer's and vasectomy was published and resulted in a statement being made to address this by the AUA. The AUA is also looking at creating guidelines on vasectomy at the moment.

So how is it that such a "minor" operation can cause so much fuss? Why do so many of us get compulsive about the vasectomy consult to technique to post op instructions and semen analyses? What is the evidence for what we say and do? Is there any evidence?

This led to the topic of the 2008 SSMR Subspecialty Society meeting held at the AUA annual meeting in Orlando this past May.

Program Chair, Ajay K. Nangia M.D. gathered an enthusiastic and broad faculty eager to discuss this

relevant and common topic. They covered a myriad of issues including vasectomy technique - evidence for one over another; post op complications and associations - or lack of; to legal ramifications and whether this is what all the fuss is about. The final panel was a group of leaders from our field who reviewed the future direction by the AUA to develop guidelines. We hope that the information the faculty provided helped the audience have more evidence to support its current practices or provide new evidence that can help it adapt.

The Faces of SMRU at ASRM 2007



Dr. Peter Schlegel presents Dr. Arnold Belker the 2007 SRS Distinguished Surgeon Award.



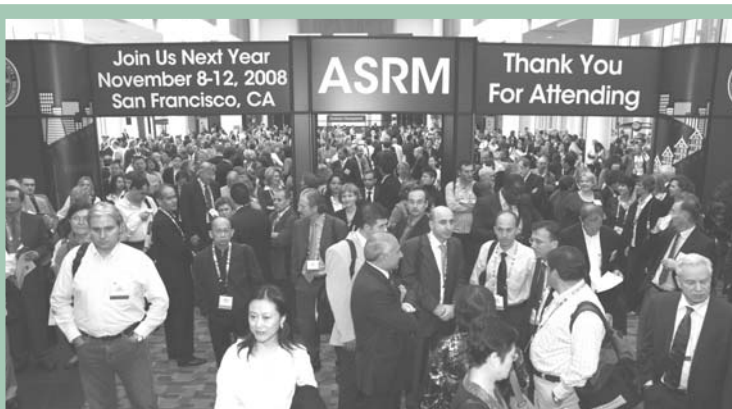
Drs. Tony Thomas and Dale McClure at the annual SMRU dinner.



Dr. Marc Goldstein was chosen by the Society of Reproductive Surgeons (SRS) to be the Ethicon Endosurgery Endowed Lecturer at ASRM 2007.



Drs. Toby Kohler, Bob Brannigan, and Fnu Deepinder take advantage of the collegial atmosphere at the SMRU dinner.



As they did at ASRM 2007 in Washington, DC, SMRU will have a strong presence at the ASRM 2008 Annual Meeting in San Francisco!

SMRU Benefits of Membership

THE SMRU

The Society for Male Reproduction and Urology (SMRU) is an affiliate society of the American Society for Reproductive Medicine (ASRM) whose members have special interests in male reproduction. The SMRU includes members who are urologists, andrologists, clinical endocrinologists, gynecologists, laboratory scientists involved in clinical activities and/or research, nurses, and other health care professionals. The SMRU is open to all Active and Associate members of the ASRM.

SMRU BENEFITS OF MEMBERSHIP

- Provides professional and lay education
- Develops postgraduate courses in male reproduction and urology
- Offers daily sessions during the ASRM Annual Meeting
- Sponsors SMRU Traveling Award program for urology residents/fellows and andrology graduate students for the study of male reproductive medicine
- Includes subscription to SMRU Newsletter
- Fosters research and development of new technologies

CATEGORIES OF MEMBERSHIP

Membership in the ASRM is a requirement for membership in the SMRU.

- Active Membership in the SMRU shall consist of Active Members in the American Society for Reproductive

Medicine (ASRM) with special interest in male reproduction.

- Associate Membership in the SMRU shall include members who are residents, fellows, or postdoctoral students with special interest in male reproduction. Associate members must apply for Active membership upon completion of their training. This membership category shall be entitled to all rights and privileges of the membership in the Society, except for the right to vote or hold office.

DUES

Active Members\$75.00 per year
Associate Members\$35.00 per year

TO JOIN

Join today!!! Fill out the online form and pay your first year's dues in the online ASRM Store .

Please mail completed application to:

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1209 Montgomery Highway
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Tel: (205) 978-5000, ext. 113
Fax: (205) 978-5005
E-Mail jclowers@asrm.org

SMRU New Members

Lawrence H. Newman, M.D. - Las Vegas, NV
Gianpiero D. Palermo, M.D. - New York, NY
Georgis Patsias, M.D. - Wellington, FL
James A. Daitch, M.D. - Phoenix, AZ
Jan Domitrz, M.D., Ph.D - Biaystok, Poland
Aaron J. Milbank, M.D. - Eagan, MN
Zev Rosenwaks, M.D. - New York, NY
Barry L. Stern, M.D. - Sun City, AZ
Rosario Tapia-Serrano, M.D. - Mexico City, Mexico

New Associate Members

Rafael Marin-Medina, M.D. - Neuvo Leon, Mexico
Tobias Kohler, M.D., M.P.H. - Chicago, IL
Emad Ibrahim, M.D. - Miami, FL
Christopher S. Gomez, M.D. - Miami, FL
Michael L. Fox, M.S., B.S. - Los Angeles, CA



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You will initially be billed for your annual dues upon approval of your membership application and thereafter with your ASRM dues.

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American Society for Reproductive Medicine
1209 Montgomery Highway
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or go to <http://www.asrmshopping.org/membership.html>
to sign up online!



Society for Male Reproduction and Urology (SMRU) Fundraiser

Mission: "To promote the advancement of our understanding of male reproductive physiology and management of male infertility by providing a forum for the dissemination of both basic and clinical research information and support of educational programs."

Support SMRU and receive a Sterling Silver Sperm Tie-Tac Pin or Sterling Silver Sperm Pin.

Please help support the mission of SMRU and provide funding for the Traveling Scholar's Program, the goal of which is to expose Urology Residents and Fellows and Andrology Graduate Students to new scientific forums and information pertinent to the study of male reproduction.

Your tax deductible contribution of \$300 will support the mission and educational programs of SMRU. In recognition of your contribution, SMRU will send you a Limited Edition Sterling Silver Sperm Tie Tac Pin or Sterling Silver Sperm Pin in a velvet presentation case, honoring Richard D. Amelar, MD, a world renowned pioneer in the field of male reproduction and urology.

The ASRM is a 501(c)3 tax exempt organization. All contributions made to the ASRM are fully tax deductible. Enclosed is my tax-deductible donation in the amount of:

\$300 \$400 \$500 \$1000 \$5,000 \$10,000 Other \$ _____

Please attach a check or pay by credit card. International members may remit payment in U.S. funds only, via check/draft drawn on a U.S. bank, or pay by credit card. I am paying by (*please check one*):

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