

Wake Forest Baptist Health Urology

Research & Clinical Update

MESSAGE FROM THE CHAIR

Like many of you, I viewed 2020 – at its beginning – as a touch point year, a time to focus on our clinical work with renewed commitment and passion to provide the best care to our patients.

And then a worldwide pandemic hit and our focus on clinical work and our patients took a turn into the unexpected and unknown. We all pivoted very quickly from seeing patients in the clinic to the virtual world of telemedicine. With patients' health and safety, as well as that of our clinical staff, as the number one priority, we persevered and maintained a high level of care for our patients. We closed out 2020 with in person clinical visits that look much different than they did at the start of the year while navigating a new normal.

I tell my team all the time that better days are ahead, and I truly believe this. In the meantime, until the vaccines are widely distributed and the COVID-19 virus is under control, we continue to support our patients and each other with an ongoing and enduring collaborative spirit.

All my best to you and your families in 2021. Be well and stay safe.

Anthony Atala

Anthony Atala, MD
William H. Boyce Professor and Chair

Innovations in Urology

The clinical work of our Wake Forest School of Medicine faculty members is complemented by their research endeavors with colleagues at the Wake Forest Institute for Regenerative Medicine (WFIRM) to provide solutions for a variety of health issues. Innovation is a driver of our success and extends throughout all we do to provide the latest clinical therapies to our patients.

Active Clinical Trials:

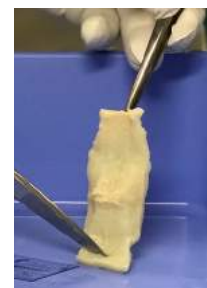
Tissue engineered urethras for stricture disease – Lab-engineered tissue is being used to treat urethral strictures in patients following years of research and regulatory processes. In an FDA-approved clinical trial, autologous urothelial and smooth muscle cells are being obtained from patients and culture expanded in vitro over 4 to 6 weeks. They are then used to seed tubular scaffolds to create autologous constructs for the repair of urethral strictures.

Tissue engineered bladders for augmentation - Bladder dysfunction can be caused by a number of conditions, and many of these require reconstructive procedures. However, current techniques may lead to a number of complications. Replacement of bladder tissues with functionally equivalent ones created in the laboratory could improve the outcome of reconstructive surgery. Engineered bladder tissues, created with autologous cells seeded on collagen-polyglycolic acid scaffolds, and wrapped in omentum after implantation, can be used in patients who need cystoplasty.

Damaged penile tissue replaced with bioengineered penile constructs – The concept of a tissue engineering-based therapy has been proposed for reconstructing damaged penile corporal tissue. Autologous endothelial and smooth muscle cells, obtained from patients' corpora cavernosa biopsies, are being cultured, expanded in vitro and used to seed decellularized corpora cavernosa + albuginea obtained from cadaveric-donors to create autologous bioengineered constructs. Following several weeks in a bioreactor, the engineered construct, including corporal tissue with attached tunica, are transplanted into the surgically prepared site of penile injury.

Urinary incontinence treated with muscle progenitor cell therapy - Sphincter insufficiency, caused by either acquired or congenital incompetent bladder neck, is being treated with autologous muscle progenitor cells that are isolated from a small biopsy of skeletal muscle from a patient. The processed cells are injected into the bladder neck sphincter region using an endoscopic needle via a cystoscope.

Penile Transplants - Current reconstructive techniques are limited in their ability to restore function, and the transplant procedure shows promise for restoring anatomy and function and helping patients live a normal life. The program combines Urology's expertise in microsurgery and reconstructive surgery with WFIRM's experience in penile research.



Wake Forest Research News

Strategies for Virtual Surgery Residency Selection

The interview is an important component of the selection process of future surgery residents and plays a key role in providing both the residency programs and the candidates helpful information to support the best match. The interview may also facilitate recruitment of appropriate residents who are more likely to complete their training and enter the surgical workforce. Virtual interviews have recently received great attention within the context of the COVID-19 pandemic. In order to comprehensively address the process of virtual interviews, the authors gathered information on the perspectives of different stakeholders and developed specific recommendations for surgery program directors and surgery residency candidates. This information was gathered through feedback from panels of business experts, program directors, and learners to share along with recommendations for programs and candidates. With planning and faculty commitment, it is possible to navigate the challenges of a virtual interview process and improve upon processes for possible post-pandemic retention.

Paris D. Butler, Alisa Nagler, Anthony Atala, L.D. Britt, James Denny, Brenessa Lindeman, John Mellinger, Ajit K. Sachdeva, Kathryn Spanknebel, and Mohsen Shabahang
Am J Surg. 2021 Jan;221(1):59-61. doi: 10.1016/j.amjsurg.2020.07.026.

Salvage Penile Plication: an Effective Modality for Resolving Residual Curvature

A review study of cases to determine the efficacy of salvage penile plication for the correction of residual and recurrent curvature of 134 patients treated surgically for Peyronie's disease was undertaken. A successful salvage was defined by residual curvature $<20^\circ$ with patient-reported satisfaction. Potential etiologies for initial plication failure were examined. Management involved plication incision and grafting, excision and grafting with inflatable penile prosthesis, plication with inflatable penile prosthesis, or grafting, plication, and inflatable penile prosthesis. Mean preoperative degree of curvature before initial surgery was 55° (30° - 90°). Of this cohort, 5.2% required salvage plication for a median residual or recurrent curvature of 45° (35° - 90°). Initially, 43% received an 8-dot plication, 43% underwent 16-dot plication, and 14% received plaque incision and grafting. Among salvage patients, 57% had initially satisfying results followed by recurrence of curvature and 43% desired correction of residual curvature. Salvage plication entailed an 8-dot plication in 42.9% and a 16-dot plication procedure in 57.1%. The median time to salvage surgery was 9 months, with all patients showing intraoperative resolution of curvature. At a median follow-up of 12 months, 86% patients reported satisfaction with residual curvature $<20^\circ$.

Nicholas A Deebel, Kyle Scarberry, Rahul Dutta, Ethan Matz, Ryan P Terlecki
Sex Med 2020 Dec;8(4):686-690. doi: 10.1016/j.esxm.2020.09.001.

Erectile Function Changes After Injected Stem Cells

A study was conducted to determine the effect of human placenta-derived stem cells on erectile function recovery and histological changes at various time points in a cavernous nerve injury model and to study the fate of injected stem cells throughout the regenerative process. The authors found that human placenta-derived stem cell therapy effectively restores erectile tissue and function in a pre-clinical model. Thus, human placenta-derived stem cell therapy may provide an attractive modality to lessen the incidence of erectile dysfunction after pelvic neurovascular injury. Further improvement in tissue regeneration and functional recovery may be possible using multiple injections or systemic introduction of stem cells.

Xin Gu, Parth U.Thakker, Ethan L.Matz, Ryan P.Terlecki, Frank C.Marini, Julie G.Allickson, Tom F.Lue, Guiting Lin, AnthonyAtala, James J.Yoo, YuanyuanZhangMD, and John D.Jackson
J Sex Med. 2020 Mar;17(3):400-411. doi: 10.1016/j.jsxm.2019.12.002.

Therapy Resistance in Prostate Cancer

There is accumulating evidence that continuous activation of the sympathetic nervous system due to psychosocial stress increases resistance to therapy and accelerates tumor growth via 2-adrenoreceptor signaling (ADRB2). However, the effector mechanisms appear to be specific to tumor type. The study shows that activation of ADRB2 by epinephrine, increased in response to immobilization stress, delays the loss of MCL1 apoptosis regulator (MCL1) protein expression induced by

cytotoxic drugs in prostate cancer cells; and thus, increases resistance of prostate cancer xenografts to cytotoxic therapies. The effect of epinephrine on MCL1 protein depended on protein kinase A (PKA) activity, but was independent from androgen receptor expression. Furthermore, elevated blood epinephrine levels correlated positively with an increased MCL1 protein expression in human prostate biopsies. In summary, the authors demonstrate that stress triggers an androgen-independent antiapoptotic signaling via the ADRB2/PKA/MCL1 pathway in prostate cancer cells. Presented results justify clinical studies of ADRB2 blockers as therapeutics and of MCL1 protein expression as potential biomarker predicting efficacy of apoptosis-targeting drugs in prostate cancer. Sazzad Hassan, Ashok Pullikuth, Kyle C. Nelson, Anabel Flores, Yelena Karpova, Daniele Baiz, Sinan Zhu, Guangchao Sui, Yue Huang, Young A. Choi, Ralph D'Agostino Jr, Ashok Hemal, Urs von Holzen, Waldemar Debinski and George Kulik
Mol Cancer Res. 2020 Dec;18(12):1839-1848. doi: 10.1158/1541-7786.MCR-19-1037.

Organoids Generated from Urine-Derived Stem Cells

This study found that human urine-derived stem cells induced to differentiate into renal tubular epithelial cells formed 3-D renal tubular organoids, which were sensitive to the nephrotoxic agents: cisplatin and acetone. These organoids could provide promising tools for nephrotoxic drug screening as an alternative to animal models. Combined with the 3-D bioprinting technology, the use of primary human urine-derived stem cells could provide a novel high throughput screening tool for the identification of nephrotoxic agents early in the drug development process, prior to reaching the clinic. In addition, 3-D organoids using patient-derived human urine-derived stem cells could provide a novel tool for kidney modeling and renal disease research in personalized medicine. Haibin Guo, Nan Deng, Lei Dou, Huifen Ding, Tracy Criswell, Anthony Atala, Cristina M. Furdu and Yuanyuan Zhang

ACS Biomater Sci Eng. 2020 Dec 14;6(12):6701-6709. doi: 10.1021/acsbomaterials.0c01468.

Potential Biomarkers for Prostate Cancer Status

Controversy continues over the effectiveness of prostate-specific antigen for distinguishing aggressive from indolent prostate cancer, the leading cause of cancer death in US men. In this study, the researchers sought to determine if there were metabolites associated with aggressive prostate cancer. Thirty-five identifiable plasma small molecules were associated with aggressiveness, 15 of which were sphingolipids; nine common molecules were present in both African-American and European-American men. The molecules most associated with prostate cancer aggressiveness were glycosphingolipids; levels of trihexosylceramide and tetrahexosylceramide were most closely associated with high-aggressive prostate cancer. The Cancer Genome Atlas was queried to determine gene alterations within glycosphingolipid metabolism that are associated with prostate cancer and other cancers. Genes that encode enzymes associated with the metabolism of glycosphingolipids were altered in 12% of prostate cancer and $>30\%$ of lung, uterine, and ovarian cancers. These data suggest that the identified plasma sphingolipids should be further validated and may be included in a diagnostic signature for prostate cancer. Ashley J Snider, Michael C Seeds, Laurel Johnstone, Justin M Snider, Brian Hallmark, Rahul Dutta, Cristina Moraga Franco, John S Parks, Jeannette T Bensen, Corey D Broeckling, James L Mohler, Gary J Smith, Elizabeth TH Fontham, Hui-Kuan Lin, Wialliam Bresette, Susan Sergeant, and Floyd H Chilton.
Biomolecules. 2020 Sep 30;10(10):1393. doi: 10.3390/biom10101393.

Pelvic organ prolapse: Surgical options

A study detailing the largest series of women undergoing minimally-invasive total laparoscopic hysterectomy and sacral colpopexy for advanced uterovaginal prolapse aimed to compare mesh and permanent suture exposure rates in the first year after minimally invasive total hysterectomy and sacrocolpopexy with a lightweight polypropylene mesh using permanent or delayed absorbable sutures. Symptomatic pelvic organ prolapse is common and 13% to 19% of women undergo surgical repair. Abdominal sacrocolpopexy is considered to be the most durable operation for advanced pelvic organ prolapse with reoperation rates of less than 5%. The authors concluded that mesh or permanent suture exposure rates and clinical success after minimally invasive total hysterectomy and sacrocolpopexy for primary advanced uterovaginal prolapse are not affected by suture type for vaginal graft attachment. The use of a lightweight mesh material resulted in a low rate of symptomatic mesh exposure, a high rate of success, and few serious adverse events within 1-year post-surgery. These findings can help surgeons when counseling women regarding mesh surgical procedure options for the primary treatment of advanced uterovaginal prolapse. Catherine A Matthews and colleagues. *Obstetrics & Gynecology*: August 2020/doi: 10.1097/AOG.000000000000388

Telemedicine: Health Care Access

By Catherine A. Matthews, MD and Ryan Terlecki, MD

In the August issue of *J Am Coll Surg* (2020 Aug;231(2):216-222), faculty from the Department of Urology at Wake Forest Baptist Health published a toolkit for rapid implementation of telemedicine for outpatient clinical services. Telehealth was previously touted as an opportunity to expand health care access to rural and underserved populations but was urgently adopted as a safer means of providing medical care during the COVID-19 pandemic. The Centers for Medicare & Medicaid Services (CMS) rapidly facilitated this change through the 1135 Waiver, allowing clinicians to provide telemedicine services in broader circumstances. As a result, many practices found themselves forced to acclimate to the sudden and broad implementation of telemedicine platforms without much assistance, a process that was frustrating for patients, providers, and support staff.

Our implementation guide was designed to share the resources that have allowed us to rapidly and successfully integrate telemedicine across all of our divisions in an academic specialty practice through the use of Epic® electronic medical record

system (EMR), the MyChart® (powered by Epic®) application, and video calling services such as FaceTime by Apple, Inc; Google Duo by Google LLC, Doximity, and Skype by Microsoft®. In summary, the toolkit outlines the 8 essential elements for telemedicine integration: An existing EMR system infrastructure; audiovisual platforms; institutional information technology (IT) support; provider and patient investment in hardware; provider and staff training; patient education; patient and caregiver participation; and coding/billing integration.

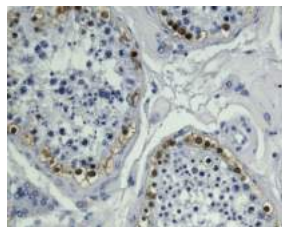
In our experience, a new patient visit conducted for 30 minutes via telehealth results in dramatic improvement in coordination of imaging and other ancillary services, such as urodynamic testing and cystoscopy, on the day of the in-person encounter.

Additional authors: Whitney R Smith, MD, Anthony J Atala, MD, FACS, and Erin E Kelly, MSN, ANP-BC.

Offering National Clinical Trials

► Testicular tissue and stem cell banking

This study is being done to help boys who undergo any therapy which may have a negative effect on their future fertility. Participants have a small piece of testicular tissue harvested under general anesthesia while they are undergoing another procedure associated with their care. Collected tissues stored in a freezer can be used to harvest stem cells that may lead to sperm for fertility applications. More than 130 patients have participated thus far. **Hooman Sadri, MD, PhD,** serves as PI.



► Is 10 Injections of Bladder Botox Less Painful Than 20?

The purpose of this research study is to help determine if 10 injections of Botox® 100 units is less painful than 20 injections based on effectiveness in reducing urge incontinence episodes. Pain of procedure and adverse outcomes of 20 versus 10 injections will be assessed. Forty patients are expected to be randomized.

Catherine A. Matthews, MD, serves as PI.

► Artificial urinary sphincter clinical outcomes

The purpose of this study is to see how well the AMS 800 Artificial Urinary Sphincter fixes urinary incontinence in men. The study is an observation of medical condition for a period of time after the initial implant of the device.

Ryan Terlecki, MD, serves as PI.

► Prostate Cancer Patients Undergoing Surgery

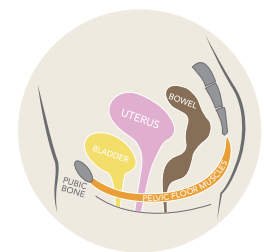
This clinical trial will look at how well propranolol hydrochloride works in treating prostate cancer patients undergoing surgery. When stressed, the body makes a molecule that may prevent tumor cells from dying, and propranolol hydrochloride may affect signals in cells that cause tumor cells survival and death.

Ashok Hemal, MD, serves as PI.

► Beyond the Pelvic Floor

A feasibility trial of group-based pelvic floor exercise for treatment of geriatric incontinence in older women, this study is intended to establish and validate key domains for the construction of a 'geriatric incontinence syndrome index' using the modified Delphi process.

Candace Parker-Autry, MD, serves as PI.



► Effects of Tamsulosin on Postoperative Urinary Retention

A clinical trial for the perioperative use of tamsulosin to prevent postoperative urinary retention in female pelvic reconstructive surgery undergoing same-day discharge with an enhanced recovery after surgery protocol.

Majid Mirzazadeh, MD, serves as PI.

Experimental Round Spermatid Injection (ROSI) to Treat Infertile Couples

By Hooman Sadri, MD, PhD

The purpose of this research study is to evaluate whether special types of cells called round spermatids can be gathered from men with non-obstructive azoospermia and used (in the absence of elongated spermatids and spermatozoa) to reliably and effectively create pregnancy with a procedure called Round Spermatid Injection (ROSI). This process is similar to In Vitro Fertilization, or 'IVF'. Also, in this study we will test ROSI's safety and see what effects (good and bad) it has on embryos created from this method.

Azoospermia is defined as the absence of sperm in the ejaculate. Around 1% of the general population suffers from azoospermia. Men who were rendered infertile due to non-obstructive azoospermia, subjected to Testicular Sperm Extraction (TESE) surgery, found to be lacking elongated spermatids or spermatozoa, are commonly advised to consider utilizing a sperm donor or apply for adoption. It is reported that ~30% of men with non-obstructive azoospermia lack elongated spermatids and spermatozoa but may still produce round spermatids (a less mature form of haploid germ cells) in their testicles.

Round Spermatid Injection (ROSI) technology to fertilize oocytes is not a brand-new technology. However, it is plagued with notoriously low efficiency. Despite this limitation, it has been reported that most of these patients still desire to have the ROSI procedure instead of applying directly for other options, i.e., sperm donation or adoption.

The high failure rate of traditional ROSI has been attributed to a few potential causes:

- Incorrect selection of round spermatids (to distinguish from diploid spermatogonia cells)
- Using round spermatids that were already in the process of degeneration
- Incomplete imprinting in the round spermatid
- Incomplete activation of oocytes

Tanaka and colleagues in Japan established a new ROSI method and reported over 90 babies born via this method. They described a new round spermatid selection process and oocyte activation using NEPA21 super electroporator (10 minutes before round spermatid injection). Babies born from this new ROSI method in Japan have been evaluated for developmental and cognitive differences for two years. Babies conceived with ROSI were found to have shorter gestation times and lower body weight at 12 and 18 months compared to their naturally conceived counterparts. They also showed an increased birth weight and showed no body weight differences at 24 months of age. No diseases resulting from genetic anomalies have been reported thus far, but the relatively small sample sizes present in the literature need to be tested in larger cohorts. Therefore, this effective ROSI method should still be considered as an "experimental fertility treatment".

This is the first ROSI clinical trial in the United States, a collaboration of the Wake Forest Institute for Regenerative Medicine and the Carolina Fertility Institute (CFI). Hooman Sadri, MD, and Tamer Yalcinkaya, MD, (CFI) serve as Co-PIs for this clinical trial. More information can be found on clinicaltrials.gov (NCT04298255) or by contacting fertilitystudy@wakehealth.edu.

Free, Online CME Course: Klinefelter Syndrome in Adults

The Wake Forest Department of Urology and AXYS, the association for X and Y Chromosome Variations, offer an online CME course for physicians and other health providers to:

- Become more familiar with patient characteristics that may indicate a need for further specialized testing for Klinefelter Syndrome (KS).
- Be aware of current best practice guidelines for testosterone management.
- Identify reasons and options for multidisciplinary evaluations and care.
- Understand current recommendations related to co-morbid medical conditions and risk.
- Understand current opinions and options related to fertility concerns and treatment.
- Be aware of the importance of referrals for psychological and socioeconomic issues and resources available to assist patients.

The educational objectives of this course are:

- Recognize the symptoms of KS.
- Manage CVD in patients with KS.
- Prevent Type 2 DM with proactive lifestyle referrals in patients with KS.
- Manage hypogonadism and treat infertility in patients with KS.
- Manage psychological treatment in patients with KS

This course is directed by Dr. **Hooman Sadri**, a member of AXYS Clinic and Research Consortium, and Dr. **Stuart Howards**, AXYS vice-chair.

For more information and registration, go to <https://genetic.org/> or contact Carol Meerschaert, AXYS Executive Director (Call 207-272-5093 or send an e-mail to Carolm@genetic.org)

A grant from the Kosloski Family Foundation supports this course; registration is free for health providers.

News Update

Stem Cell Technology: A New Avenue for all Klinefelter Patients, but Even More Critical for TESE Negative Patients

Klinefelter syndrome (KS) has been defined by sex chromosome aneuploidies (classically 47, XXY) with the incidence of 1:600 live male births. The peri-pubertal timeframe in KS patients has been associated with the initiation of progressive testicular fibrosis, loss of spermatogonial stem cells (SSCs), hypogonadism, and impaired fertility. Fewer than half of patients are positive for spermatozoa in the ejaculate or testis via semen analysis or testicular sperm extraction (TESE), respectively. However, the chance of finding spermatogonia, including the subpopulation of SSCs responsible for fertility in KS testes has not been well defined. In these circumstances given the recent demonstration of thriving cell culture techniques for human SSCs, it could be feasible to isolate from TESE biopsies and propagate SSCs and transplant them back to the patient or differentiate them in vitro to haploid cells in order to potentially restore fertility.

Our recently published systematic review and meta-analysis (Deebel et al., Human Reproduction Updated 2020) showed that spermatogonia could be found on testicular biopsy in all age groups of KS patients from infant to adult, with declining success noted with aging. These encouraging findings are important for the approximate 50% of KS patients who are semen analysis and TESE negative and are still seeking biological paternity. At least half of the peri-pubertal/ adolescent and one-quarter of adult KS patients negative for spermatozoa (TESE negative) were found to be positive for spermatogonia.

Broader implications: While azoospermia is a common finding in the KS patient population, many patients are positive for spermatogonia. Recent advances in SSC in vitro propagation, transplantation, and differentiation open new avenues for these patients for fertility preservation, offering this unique subset of KS patients a chance of biological paternity. Data surrounding KS patients' hormonal profiles and their relation to fertility should be interpreted with caution as adequately powered data to validate hormonal patterns as biomarkers for fertility are lacking and direct correlation is often not present. Future work is needed to validate further the utility of FSH, LH, testosterone, and inhibin B as biomarkers for the successful retrieval of spermatogonia.

In addition to ongoing SSCs research at the Wake Forest Institute for Regenerative Medicine regarding testicular SSC preservation and culture, Wake Forest Urology has an active clinical program to manage KS patients' reproductive health and fertility preservation at all ages, from prenatal to adult assessment and management. Our active clinical faculty in this field are Drs. **Stuart Howards**, **Stanley Kogan**, and **Hooman Sadri**. For patient referral from all 50 states for consultation in person or telemedicine, please call 336.716.4131.

Urology Today 2021
The Omni Grove Park Inn
Asheville, NC
Dates To Be Announced!

In a course designed for the practicing urologist and healthcare provider, thought leaders in urology discuss the latest evidence-based approaches to managing a wide range of urologic conditions, from stone disease to incontinence, pelvic health, sexual dysfunction, infertility, common pediatric conditions, and cancer. A presentation of practical topics, patient cases, and panel discussions, mixed with networking and the beautiful setting of the North Carolina mountains with its renowned foliage.

Asheville is a city known for a vibrant arts scene, historic architecture, the Biltmore Estate, premier golf courses, breathtaking scenic vistas and the highest peaks of the Appalachian mountains, making for an outdoor destination perfect for all-season exploration.



Bookmark the course catalog page for future updates!

<https://grandroundsinurology.learnupon.com/store>

Course Directors: Ryan Terlecki, MD and Anthony Atala, MD



Meet Our Faculty



Anthony Atala, MD, FACS, professor and chair, is editor of *Therapeutic Advances in Urology* and *Stem Cells Translational Medicine*, and is journal section editor for *Urology Survey*, for the *Journal of Urology*. He is a recipient of the Gold Cystoscope Award, the Ramon Guiteras Award from the AUA, and the Barringer Medal from the American Association of Genitourinary Surgeons for his contributions to the field of urology. He is a member of the National Academy of Medicine and is one of 98 innovators named a charter fellow of the National Academy of Inventors. He is editor of 30 books and has published over 800 journal articles. Atala directs a team of more than 450 researchers and staff at the Wake Forest Institute for Regenerative Medicine, which works to engineer replacement tissues and organs for more than 40 different areas of the body. He serves on the American College of Surgeons Board of Regents.



Gopal Badlani, MD, FACS, professor of urology and gynecology, and vice chair for urology clinical affairs, is co-director of the Female Pelvic Health unit. He is director of urology at the Salisbury VA Medical Center and is secretary of the Urology Care Foundation as well as the American Association of Genitourinary Surgeons. He is the editor of several textbooks and has authored more than 300 publications and book chapters. He is a recipient of the Karl Storz Lifetime Achievement Award from the Endourological Society and has been recognized by the AUA for extraordinary service and dedication in enhancing global urologic education and international membership. Badlani has been named an honorary member of the Brazilian, Japanese, and Peruvian Urological societies as well as the EAU & CAU and has received the B.C. Roy Medal from the President of India for humanitarian service. He and his team, at the Wake Forest Institute for Regenerative Medicine, are recipients of a number of NIH research grants in the field of female urology as well as a merit grant from the Veteran's Administration.



Ronald L. Davis, MD, MBA, FACS, associate professor, specializes in adult urology with an emphasis on urologic oncology. Davis is an experienced clinical investigator. He was part of one of the first teams in the nation to offer modern ultrasound-directed brachytherapy for prostate cancer. His expertise and research interests include minimally invasive prostate cancer surgery and novel therapies for bladder cancer. He is a board member of the N.C. Urological Society. He is a past president and urology representative of the NC Chapter of the American College of Surgeons and is a past board member of the AUA Legal Action Committee.



Robert J. Evans III, MD, FACS, professor of urology and gynecology, directs the department's clinic operations. He specializes in pelvic pain syndrome and serves on the medical advisory boards of the Interstitial Cystitis Association and the Interstitial Cystitis Network. He is involved in several clinical trials and NIH-funded studies evaluating new treatments for painful bladder syndrome. In addition, he is part of a genomics study looking at differences in subsets of IC patients. The American Urological Care Foundation selected him to provide oversight on patient education materials related to bladder pain, and he's been named the IC/BPS Doctor of the Year the past 7 years.



Laura Foster, MD, practices general urology but has special interests in treating voiding dysfunction/incontinence, urinary tract infections and kidney stones. She earned her medical degree from the University of North Carolina School of Medicine, Chapel Hill, and completed her residency in General Surgery and also Urology at UNC.



Jorge Gutiérrez-Aceves, MD, professor, heads the department's endourology and stone disease program and directs the fellowship program on Endourology. He has served as editor of the Spanish edition of *AUA News* for 8 years and is a recipient of the AUA Presidential Award and the Secretary General Commendation. He is a member of various urological associations, including the American Association of Genitourinary Surgeons, and is President of the International Endourological Society. His main research interest is on minimally invasive endoscopic surgery for renal and urinary tract stone treatment and on prevention of kidney stone-related urinary tract infections.



Ashok K. Hemal, MD, MCh, FACS, professor, and director of the Robotic and Minimally Invasive Surgery Program, is internationally known for his pioneering work in the field of uro-oncology, robotic and pure laparoscopic surgeries. He is principal or co-investigator on several research projects at the Wake Forest Comprehensive Cancer Center and the Institute for Regenerative Medicine. He has published more than 400 scientific papers in peer-reviewed journals and edited seven books, including the second edition of *Robotics in Genitourinary Surgery*. He is the recipient of many academic distinctions and awards. He currently serves as associate editor of the *Journal of Endourology* and on the editorial board of several urological journals. He is a current board member of the Endourological Society and past president of the Society of Urologic Robotic Surgeons.



Steve Hodges, MD, associate professor, specializes in pediatric urology. His research interests include the prevention of luminal strictures and scar disease throughout the urinary tract, and dysfunctional elimination. He has developed several new treatments, including drug-coated catheters and stents designed to prevent or treat urethral strictures, and disposable wipes designed to prevent vulvitis and urinary tract infections in females. He has co-authored four books on toilet training and voiding dysfunction.



Stuart Howards, MD, FACS, professor, is a nationally recognized expert in male infertility. He specializes in microsurgery for varicocele repair, vasectomy reversal and sperm retrieval. Howards has edited four editions of the textbook *Infertility in the Male* and has performed more than 1,500 vasectomy reversals. Howards served as executive secretary of the American Board of Urology for 15 years, and at the NIH as the urologic advisor to the director of the National Institute of Diabetes and Digestive and Kidney Diseases. He is the recipient of the AAGUS Keyes Medal for outstanding contributions in the advancement of urology.



Stanley Kogan, MD, FACS, professor, is a nationally recognized expert in pediatric conditions that can subsequently affect fertility. He directs a program for patients with Klinefelter syndrome that focuses on early identification and fertility restoration. He also developed several surgical procedures for children with disorders of sex development, including various modifications of feminizing genitoplasty techniques. During his career, he served on the executive committee of the urology section of the American Academy of Pediatrics and on the editorial board of the *Journal of Urology*.



David Kunkle, MD, joined Wake Forest in 2015 after having been in practice seven years prior. He specializes in men's health, urological cancers, kidney stones, urinary problems and vasectomy. He earned his medical degree from the University of Virginia Medical School in Charlottesville after completing his undergraduate study at Wake Forest University. He completed his residency at Temple University Hospital in General Surgery and Urology.



Catherine A. Matthews, MD, professor of urology and obstetrics/gynecology, co-directs Female Pelvic Health Services and serves as the director of the Female Pelvic Medicine and Reconstructive Surgery Fellowship. She specializes in conditions such as urinary and bowel incontinence, pelvic organ prolapse, fistulae, sexual dysfunction and post-obstetric perineal injury. She is internationally recognized for her expertise in robotic and vaginal surgery. Dr. Matthews is board-certified in Female Pelvic Medicine and Reconstructive Surgery by the American Board of Obstetrics and Gynecology. She has received numerous awards for her research, teaching and for excellence in surgery and patient care, and is extensively published in fecal incontinence and pelvic organ prolapse.



John D. McConnell, MD, FACS, is the Gordon Hanes Chair Professor and Residency Program Director. He is a recipient of the AUA's Gold Cystoscope Award and the American Association of Genitourinary Surgeon's Barringer Medal for his contributions to the urology field. McConnell's research in the field of prostate disease and related health policy contributions led to his 2004 election to the National Academy of Medicine. He has served on the board of directors of the American Urological Association and as a Council member of the National Institute of Diabetes and Digestive and Kidney Diseases of the NIH.



Majid Mirzazadeh, MD, associate professor, is a referral surgeon for a wide variety of complicated urologic surgeries including reconstructive, cancer and female urology and incontinence. He has held fellowships at UCLA, at the Institute of Urology and Nephrology, London, and in Wake Forest Urology. He is director of the urology teaching clinic. His primary research focuses on urinary tract infections. His other research interests center on improving the design and safety of clinical and surgical instruments. A leader in device development, he invented a syringe capable of safely delivering multiple doses of injection products to patients.



Vance Merhoff, MD, clinical adjunct faculty, joined the Urology department in 2019. A University of Tennessee Medical School graduate, he completed his General Surgery and Urology residency at Wake Forest. He has been a practicing urologist in Salisbury and the Salisbury VA Medical Center for almost 25 years before joining Wake Forest.



Candace Parker-Autry, MD, Board-certified in Obstetrics & Gynecology and Female Pelvic Medicine and Reconstructive Surgery, her research and clinical practice focus is on geriatric incontinence and she has expertise in surgical treatment of complex urinary and fecal incontinence, and pelvic organ prolapse. She has been recognized for leadership by the American Geriatric Society.



Ram A. Pathak, MD, assistant professor, specializes in the oncologic management of kidney, bladder and prostate cancers. He completed his fellowship in minimally-invasive robotic surgery at Wake Forest University. He leads the GU oncologic initiative at the Salisbury VA and takes an active role in clinical trials at the Comprehensive Cancer Center. Pathak serves as reviewer of various major urologic journals. His research interests lie in the treatment of kidney, ureteral, bladder and prostate cancers in minimally-invasive fashion. He has first-authored over 30 publications since 2017 and been an invited speaker at national/international meetings. With the partnership of Dr. Ashok K. Hemal, he has developed novel techniques for the treatment of prostate cancer, benign prostatic hypertrophy, and upper tract urothelial cancer.



Hooman Sadri, MD, PhD, assistant professor, specializes in male reproductive medicine and is a fellowship-trained male infertility clinician. Currently, he serves as the director-elect of the MD council for the American Society of Andrology. He is also an active member of the American Society for Reproductive Medicine, the American Urological Association, and the Association for X and Y Chromosome Variations. His clinic is the national referral for Klinefelter syndrome, other genetic causes of hypogonadism, and spinal cord injury infertility. His expertise includes electro ejaculation, vas reversal, and microsurgical testicular sperm extractions. As a former Research Scholar of AUA and principal investigator in regenerative medicine and stem cell therapy, Dr. Sadri is directing the male fertility research program at the Wake Forest School of Medicine. Since 2014, he has established and directed the spermatogonia stem cell bank for fertility preservation of high-risk boys and men, which has rapidly become one of the largest worldwide bio-banking systems in this field.



Marshall Z. Schwartz, MD, FACS, is a pediatric surgeon whose career has included leadership positions at several universities and teaching children's hospitals including Children's National Medical Center in Washington, D.C., and the Pediatric Surgery Research Laboratory at St. Christopher's Hospital for Children. He has held leadership positions in several national and international surgery organizations as well as the American Board of Surgery. His research and other academic activities have led to more than 155 publications, over 235 presentations at national and international meetings, including several named lectureships, and four patents on specific intestinal growth factors.



Allston J. Stubbs, MD, clinical associate professor, specializes in urinary incontinence, voiding dysfunction and benign prostatic hyperplasia. He directs the urodynamics lab at the Veterans Affairs Medical Center in Salisbury, N.C. Certified by both the American Board of Urology and the American Board of Surgery, Stubbs has been practicing urology for 36 years.



Ryan Terlecki, MD, FACS, professor and vice chair of research, is director of the Men's Health Clinic, the Urologic Cancer Survivorship Program, and the department's GURS fellowship in urologic reconstruction, prosthetic urology, and male infertility. He is a recognized leader in urethral reconstruction, Peyronie's disease, and prosthetic surgery for erectile dysfunction and male stress urinary incontinence. Additionally, he is an investigator in novel therapeutics that use cell-based and tissue-based technologies to treat urethral stricture, sexual dysfunction and urinary incontinence. Terlecki serves on the editorial board of the Journal for Sexual Medicine, assists development of AUA guidelines, and is the current president of the North Carolina Urological Association.



Matvey Tsivian, MD, assistant professor, joined the department in early 2020 and specializes in urologic malignancies. His research interest is in clinical trials and cancer outcomes research. He completed his urology residency at Duke University and a urologic oncology fellowship at the Mayo Clinic. He serves as a reviewer of multiple journals, including the Journal of Clinical Oncology, and has authored more than 120 papers.

Urology

Medical Center Boulevard
Winston-Salem, NC 27157

The Department of Urology is a major referral center that brings together the best of patient and family-entered care and research, offering expertise and the latest in diagnostic techniques and treatments for a range of urologic conditions for both children and adults.

Our physicians have expertise in treating kidney stones, urologic cancer, incontinence, pelvic issues, as well as men's health issues and pediatric urology. Our physicians are experienced in caring for the most complicated and difficult cases, and, in many areas, have helped set national standards for care. Because faculty members are active researchers as well as clinicians, the department is able to offer patients new treatments and technology before they are widely available.

The department specializes in: minimally-invasive surgical procedures, including robot-assisted laparoscopic procedures for both adults and children; women's pelvic health issues, ranging from incontinence and sexual dysfunction to pelvic pain and prolapse; pediatric urologic conditions; and uro-oncology.

The Department of Urology and the WFBH Comprehensive Cancer Center, the only National Cancer Institute designated cancer center in the region, formed part of the Wake Forest Prostate Cancer Center of Excellence, providing the most advanced and personalized care for patients.



Urology Department Physicians



Wake Forest Baptist Health Urology Clinic

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