

Multidisciplinary Benign Urology Research Symposium

April 19, 2024

Trent Semans Center, Duke University

Duke Multidisciplinary K12 Urologic Research Career Development Program (KURe)



Urologic Effects of Aging

Trent Semans Center

Duke University

Durham, North Carolina

Thursday, April 19, 2024

8 am - 4:30 pm



- 8:00 am** **CHECK IN: Obtain the link to the program booklet**
- 8:15 am** **WELCOME AND INTRODUCTIONS:** Cindy L. Amundsen, MD,
KURe PI and Program Director
- 8:25 am** **INVITED SPEAKERS AND PANEL DISCUSSION**
Moderators: **Johanna Hannan, PhD** and **Petra Popovics, PhD**
- 8:30 am** **Nicole De Nisco, PhD**
Assistant Professor Biological Sciences, The University of Texas at Dallas
[Microbial and metabolic markers of recurrent urinary tract susceptibility](#)
- 8:45 am** **Anne-Catrin Uhlemann, MD, PhD**
Associate Professor of Medicine, Division of Infectious Disease,
Columbia University Irving Medical Center
[Molecular evolution of antimicrobial resistance in immunocompromised patients - challenges and opportunities](#)
- 9:00 am** **Zach Danziger, PhD**
Associate Professor, Department of Rehabilitation Medicine - Division of Physical Therapy,
Emory University
[Impacts of age on neural regulation of the lower urinary tract in animal models](#)
- 9:15 am** **Teresa Liu, PhD**
Assistant Research Professor, Department of Urology, University of Wisconsin-Madison
[Molecular mechanisms of aging that drive BPH/LUTS](#)
- 9:30 am** Moderated discussion (20 minutes)
- 9:50 am** **POSTER SESSION-1** (odd numbered posters) **AND REFRESHMENTS**
- 10:50 am** **TRAINEE PLATFORM PRESENTATIONS**
Moderator: **Matt Barber, MD, MHS**
- 10:55 am** **TOP CLINICAL ABSTRACT**
Rory Ritts, MD, Wake Forest University School of Medicine
[High autonomic symptom load in IC/BPS Patients correlates with a non-bladder-centric phenotype](#)
- 11:10 am** **KURE SCHOLAR**
Michael Odom, PhD, Duke University School of Medicine
[Sex hormones contribute more to the development of diabetic bladder dysfunction than the severity of hyperglycemia in type 1 diabetic Akita mice](#)
- 11:25 am** **TOP TRANSLATIONAL ABSTRACT**
Cassandra Kisby, MD, Duke University School of Medicine
[Exosome injection as a prevention strategy for mesh complications in a porcine model of sacrocolpopexy](#)
- 11:45 am** **LUNCH or LUNCH and CONVERSATIONS WITH THE EXPERTS**
Pre-registration required for conversations with experts at assigned tables
- 12:45 pm** **POSTER SESSION-2** (even numbered posters)

- 1:50 pm INVITED SPEAKERS AND PANEL DISCUSSION**
Moderator: **Abigail Woll, MD** and **Annika Sinha, MD**
- 1:55 pm Alison Huang, MD, MAS**
Professor of Medicine, Urology, and Epidemiology & Biostatistics,
University of California San Francisco
[Pelvic yoga to address multiple aging-associated contributors to urinary incontinence in ambulatory older women: results from a multisite randomized trial](#)
- 2:10 pm Ekene Enemchukwu, MD, MPH, FACS, FPMRS**
Associate Professor of Urology and by courtesy, Obstetrics & Gynecology (Urogynecology),
Stanford University
[Overactive Bladder Management in the Elderly: Challenges and Implications](#)
- 2:25 pm Scott Bauer, MD, MS**
Assistant Professor of Medicine, Urology, Epidemiology & Biostatistics,
University of California, San Francisco and the San Francisco VA
[Lower Urinary Tract Symptoms: Evidence for a Geriatric Syndrome and Clinical Implications](#)
- 2:40 pm Camille P. Vaughan, MD, MS**
Associate Professor of Medicine, Director, Division of Geriatrics & Gerontology,
Emory University School of Medicine.
[Bladder Matters in Parkinson Disease](#)
- 2:55 pm** Moderated discussion (20 minutes)
- 3:15 pm TRAINEE PLATFORM PRESENTATIONS**
Moderator: **Maryrose Sullivan, PhD**
- 3:20 pm Top Basic Abstract**
Samara Silver, BS, Eastern Virginia Medical School
[Characterization of foam cells and lipid dysregulation in benign prostate disease in men and mouse models](#)
- 3:35 pm KURe Scholar**
Em Abbott, PhD, Duke University School of Medicine
[Chronic monitoring of neurogenic bladder function in rats with spinal cord injuries](#)
- 3:50 pm KURe Scholar**
Sonali Advani, MBBS, MPH, Duke University School of Medicine
[Proposing the 'Continuum of Urinary Tract Infection \(UTI\)' for a nuanced approach to diagnosis and management of UTIs](#)
- 4:10 pm EVALUATIONS**
Please complete the symposium evaluation while we transition to the next presentation
- 4:15 pm PRESENTATION OF TRAINEE AWARDS AND CLOSING REMARKS**

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We Thank our Sponsors

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Top Trainee Abstracts - Trainee Platform Presentation Awards

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Trainee Poster Presentation Awards

Scott Bauer, MD, MS
Zach Danziger, PhD
Nicole De Nisco, PhD
Ekene Enemchukwu, MD, MPH
Alison Huang, MD
Teresa Liu, PhD
Anne-Catrin Uhlemann, MD
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A special thank you to CAIRIBU for providing Trainee Travel Awards to the following recipients.

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<https://cairibu.urology.wisc.edu/>

S-01**Microbial and metabolic markers of recurrent urinary tract susceptibility**

Nicole De Nisco, PhD

Assistant Professor Biological Sciences, The University of Texas at Dallas

Recurrent urinary tract infection (rUTI) affects millions of women annually and can persist for years, requiring frequent courses of antibiotic therapy that can eventually result in antibiotic-recalcitrant rUTI. Despite its prevalence, host-associated factors underlying rUTI susceptibility in women are poorly understood. The urinary microbiome (urobiome) is a key component of the female urogenital environment that may protect against infections like UTI. A critical open question in the field is how rUTI and the associated courses of antibiotic therapy affect urobiome composition and function. Here, we leverage urine metagenomics and metabolomics of a cross-sectional cohort of postmenopausal women designed to study rUTI, to identify both microbial and metabolic changes associated with rUTI and to determine if rUTI alters antimicrobial resistance encoded within the urobiome.

S-02**Molecular evolution of antimicrobial resistance in immunocompromised patients - challenges and opportunities**

Anne-Catrin Uhlemann, MD, PhD

Associate Professor of Medicine, Division of Infectious Disease, Columbia University Irving Medical Center

Immunocompromised patients such as liver transplant recipients are at an elevated risk for infections with AMR pathogens, including infections of the urinary tract. In this seminar I will discuss our studies on the gut an important reservoir for infections with organisms that harbor antimicrobial resistance (AMR) as well as review genomic approaches and challenges in tackling this important topic.

S-03**Impacts of age on neural regulation of the lower urinary tract in animal models**

Zach Danziger, PhD

Associate Professor, Department of Rehabilitation Medicine - Division of Physical Therapy, Emory University

Underactive bladder affects a huge portion of the aging population, but what underlies this loss of function? The very name "underactive bladder" suggests a deficiency with the bladder itself, but there are many ways weak voiding contractions could arise, many of which do not even originate in the bladder. Danziger will discuss an emerging research story in a rat model that points to sensory attenuation in the urethra as a key factor in age-related urinary tract changes, and work to disentangle it's structural and neural basis.

S-04**Molecular mechanisms of aging that drive BPH/LUTS**

Teresa Liu, PhD

Assistant Research Professor, Department of Urology, University of Wisconsin-Madison

Benign prostatic hyperplasia (BPH) and the subsequent lower urinary tract symptoms (LUTS) can occur due to a myriad of changes within the lower urinary tract. While the etiology of disease is unclear, age remains the single greatest risk factor for LUTS/BPH. Understanding the mechanisms of aging driving the molecular alterations within the prostate will be important in order to promote healthy aging and uncover interventions that target more than the symptoms of disease. The regulation of estrogen signaling with age and disease seems to underlie the onset of disease, affecting mitochondrial health and cellular senescence. Additionally, because aging is central to the development of disease, interventions that promote healthspan may be effective in treating LUTS/BPH.

S-05**Pelvic yoga to address multiple aging-associated contributors to urinary incontinence in ambulatory older women: results from a multisite randomized trial**

Alison Huang, MD, MAS

Professor of Medicine, Urology, and Epidemiology & Biostatistics, University of California San Francisco

Nearly one in three midlife and older women experience urinary incontinence (UI), but many report difficulty getting access to or tolerating standard clinical UI treatments. Pelvic floor yoga has been recommended as a complementary management strategy for UI in women despite limited evidence to evaluate its effects in representative populations. Dr. Alison Huang describes research by the UCSF Women's Health Clinical Research Center to develop and evaluate a therapeutic pelvic yoga program for ambulatory older women with incontinence, culminating in an NIH-funded multicenter trial comparing the efficacy and safety of this yoga program to non-specific muscle conditioning exercises among diverse women in the community. Although women assigned to the pelvic yoga intervention reported a more than 65% average decrease in UI frequency over 3 months, reductions in total and urgency-type UI were only modestly greater in the pelvic yoga group than the non-specific physical conditioning group, and no significant differences in improvement in stress-type UI were detected between groups.

S-06**Overactive Bladder Management in the Elderly: Challenges and Implications**

Ekene Enemchukwu, MD, MPH, FACS, FPMRS

Associate Professor of Urology and by courtesy, Obstetrics and Gynecology (Urogynecology), Stanford University

This presentation will highlight the challenges associated with overactive bladder (OAB) management in older adults, describe treatment patterns in this demographic group, and discuss the role of patient-centered care in improving OAB patient outcomes. Through these discussions, we will highlight the complexities of OAB management in older adults and the importance of tailored, patient-centric approaches to enhance care delivery and treatment effectiveness.

S-07**Lower Urinary Tract Symptoms: Evidence for a Geriatric Syndrome and Clinical Implications**

Scott Bauer, MD, MS

Assistant Professor of Medicine, Urology, Epidemiology & Biostatistics at University of California, San Francisco and the San Francisco VA

Lower urinary tract symptoms (LUTS) is a heterogenous syndrome that predominantly affects older adults. Despite the well-established relationship of LUTS with older age, frailty, falls, fractures, mobility limitations, and even death, the clinical approach to LUTS diagnosis and management in older adults remains focused on genitourinary pathology. Dr. Bauer will review the evidence supporting an alternative framework, LUTS as a geriatric syndrome. He will then describe how investigators have leveraged this alternative framework to secure funding for studies identifying and targeting new types of age-related LUTS pathophysiology.

S-08**Bladder Matters in Parkinson Disease**

Camille P. Vaughan, MD, MS

Associate Professor of Medicine, Director, Division of Geriatrics & Gerontology, Emory University School of Medicine.

Dr. Vaughan will discuss lessons learned as a clinician-scientist focused on developing the evidence to inform clinical guidelines for managing urinary symptoms in persons living with Parkinson disease. She will review results from studies along the clinical trial pipeline and considerations for engaging populations living with multiple chronic conditions in clinical research.

Basic Science Award (TP-01)**Characterization of foam cells and lipid dysregulation in benign prostate disease in men and mouse models**

Silver, Samara V^{1,2}; Ro, Chunghwan^{1,2}; Alvarez, Nehemiah S³; Malewska, Alicia⁴; Strand, Douglas⁴; Liu, Teresa⁵ and Popovics, Petra^{1,2}

¹Department of Microbiology and Molecular Cell Biology, Eastern Virginia Medical School, Norfolk, VA.

²Leroy T. Canoles Jr. Cancer Research Center, Eastern Virginia Medical School, Norfolk, VA.

³Department of Physiological Sciences at Eastern Virginia Medical School in Norfolk, VA. ⁴Department of Urology, UT Southwestern Medical Center, Dallas, TX. ⁵Department of Urology, University of Wisconsin-Madison, WI.

Background: Benign prostatic hyperplasia (BPH) is a prevalent age-related condition often characterized by debilitating urinary symptoms. Its etiology is believed to stem from hormonal imbalance, particularly an elevated estradiol-to-testosterone ratio and chronic inflammation. In a steroid hormone imbalance mouse model, we observed increased migration and accumulation of luminal macrophages that accumulated lipid droplets and differentiated into foam cells which implicates lipid dysregulation as part of the etiology. In this study, our objective was to define whether lipid accumulation and foam cell formation are associated with human disease and whether foam cells express genes encoding known pathological factors. We also assessed whether prostatic lipid accumulation is associated with aging using 24 month-old mice.

Methods: Male C57BL/6J mice were implanted with pellets containing 25 mg testosterone and 2.5 mg estradiol (T+E2) and ventral prostates were collected two weeks after implantation. Cells were dissociated with cold protease and subjected to scRNA-seq. Confirmation of scRNA-seq results was performed using *in situ* hybridization (ISH) or immunohistochemistry (IHC) with specific probes for *Ccl6*, *Cxcl16*, *Tgfb1* and *Vegf* and antibodies against GPNMB. For lipid accumulation, wholemount frozen sections of donor and BPH prostates and prostates from 2- and 24-month old mice were stained with Oil Red O (ORO). Tissue samples were analyzed using Mantra II. Pathological Workstation and InForm software. Student's t-test, ANOVA or the non-parametric equivalent was used for statistical analysis.

Results: Our scRNA-seq identified the foam cell cluster based on *Spp1* positivity (*Mac^{Spp1+}*), that also expressed *Gpnmb*, *Trem2*, *Fabp5*, *Ctsl*, and *Mmp12*. *Mac^{Spp1+}* exhibited upregulation in genes encoding cytokines and growth factors, notably *Tgfb1*, *Vegf*, *Cxcl16*, and *Ccl6*, as confirmed by ISH. Aged mice displayed significantly higher lipid accumulation within the ventral and anterior prostate in comparison to young mice. BPH glandular nodules had significantly higher lipid content when compared to donor transition zones (5.5-fold, $p < 0.001$), with foam cells predominantly localized in BPH prostates.

Conclusion: The association of foam cells with BPH and upregulation of cytokines and growth factors in foam cells may suggest a potential pathological role in BPH progression. Moreover, increased lipid accumulation within human BPH nodules and aged mice was also identified indicating an age-related process in this pathology. These findings offer potential avenues for developing novel lipid-targeting therapies to treat BPH.

Research Area: Benign Prostatic Hyperplasia, Aging, Voiding Dysfunction/Urinary Retention

Clinical Science Award (TP-02)

High autonomic symptom load in IC/BPS Patients correlates with a non-bladder-centric phenotype

Ritts, Rory^{1,2}, Wolff, Dylan¹, Namugosa, Mary^{1,2}, Hsu, Fang-Chi³, Ferrara, Kaylee², Evans, Robert¹, Walker, Stephen J¹

¹Wake Forest University School of Medicine, Department of Urology, Winston-Salem, NC. ²Wake Forest Institute for Regenerative Medicine, Winston-Salem, NC. ³Department of Biostatistics and Data Science, Wake Forest University School of Medicine, Winston-Salem, NC.

Introduction and Objective: The purpose of this study was to assess the relationship between autonomic symptom severity and clinical characteristics in patients with interstitial cystitis/bladder pain syndrome (IC/BPS).

Methods: 122 patients from our IRB-approved IC/BPS registry for patients undergoing therapeutic hydrodistension (HOD) completed the Composite Autonomic Symptoms Score (COMPASS-31) questionnaire, which is a validated self-assessment tool for autonomic symptoms. At the time of HOD, anesthetic bladder capacity (BC), Hunner lesion (HL) status, results for validated IC/BPS symptom questionnaires including pain and urgency/frequency symptom scale (PUF) and O'Leary Sant Interstitial Cystitis Symptom and Problem Indices (ICSI/ICPI), and patient report of comorbid non-urollogic associated syndromes (NUAS) known to co-occur with IC/BPS were collected. Patients were divided into two groups, with the lower 25th percentile of COMPASS-31 scores being the cut-off point. One group of patients (N=30) scored <20.36 (low symptom load), and the remaining patients (N=92) scored ≥20.36 (high symptom load).

Results: Patients scoring <20.36 had a significantly lower BC (635.00 ± 335.06 vs 823.10 ± 396.07; p=0.027) and a higher HL positive status (26.7% vs 10.9%; p=0.043). Patients scoring ≥20.36 had higher average scores on the PUF questionnaire (23.80 ± 4.98 vs; 19.61 ± 5.22 p<0.001) and a higher number of NUAS (5.65 ± 2.90 vs 2.60 ± 1.89; p<0.001) including fibromyalgia (38.0% vs 10.0%; p=0.003), migraines (46.7% vs 13.3%; p=0.001), allergies (69.6% vs 43.3%; p=0.016), vulvodynia (26.1% vs 3.3%; p=0.008), pelvic floor dysfunction (54.3% vs 23.3%; p=0.003), endometriosis (37.0% vs 6.7%; p=0.001), and asthma (29.3% vs 6.7%; p=0.012). Each of the six COMPASS-31 domains were significantly greater in the high symptom load group.

Conclusions: Patients with IC/BPS suffer from significant autonomic nervous system dysfunction, with higher autonomic symptom load being strongly correlated with a non-bladder-centric phenotype.

Research Area: Interstitial Cystitis/Bladder Pain Syndrome (IC/BPS)

Table 1: Statistical comparison of autonomic symptom severity with clinical features in a cohort of IC/BPS patients.

	COMPASS-31 <20.36 (N=30)	COMPASS-31 ≥20.36 (N=92)	p-value
Age	55.50 ± 14.35	49.18 ± 13.24	0.056
Mean Compass-31 Score	14.00 ± 4.93	42.12 ± 14.88	<0.001
Anesthetic Bladder Capacity	635.00 ± 335.06	823.10 ± 396.07	0.027
Hunner Lesion +	8 (26.7%)	10 (10.9%)	0.043
PUF Score	19.61 ± 5.22	23.80 ± 4.98	<0.001
Total NUAS	2.60 ± 1.89	5.65 ± 2.90	<0.001

Translational Science Award (TP-03)

Exosome Injection as a Prevention Strategy for Mesh Complications in a Porcine Model of Sacrocolpopexy

Kisby, Cassandra K., MD MS¹, Faraguna, Sam², Hitt, Abigail, MD MEng³, Newman, Hunter, PhD^{4,5}, Shadrin, Ilya, MD PhD⁶, Gilpin, Anna, PhD^{4,5}, Amundsen, Cindy L., MD¹, Varghese, Shyni, PhD^{4,5}

¹Duke Division of Urogynecology; ²Duke University; ³Duke Department of Pathology; ⁴Duke Department of Orthopedics; ⁵Duke Department of Biomedical Engineering, Mechanical Engineering and Materials Sciences; ⁶Duke Division of Cardiology, Durham, NC.

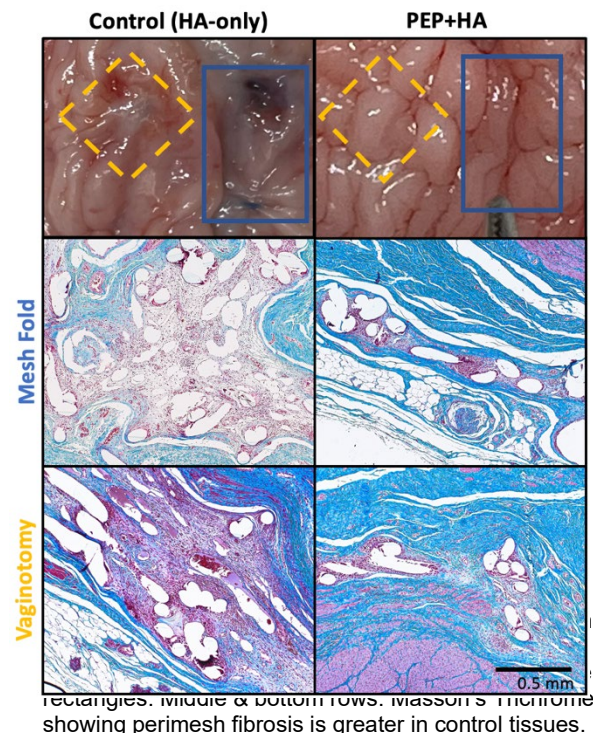
Introduction & Objectives: Surgical implantation of polypropylene mesh during sacrocolpopexy is an accepted and durable treatment for women experiencing pelvic organ prolapse, but carries a risk of vaginal mesh exposure, which is often treated via mesh excision. In our pilot studies using a porcine model, exosome injections (purified exosome product; **PEP**) induced tissue regeneration and *resolved* vaginal mesh exposures. In this study we aimed to evaluate the efficacy of PEP for *prevention* of vaginal mesh exposure in high-risk mesh configurations and assess local tissue characteristics.

Methods: 10 Yorkshire-crossed pigs (6 PEP, 4 control) underwent a hysterectomy, oophorectomy, and mesh sacrocolpopexy to create the animal model. Mesh was implanted in two high-risk configurations per animal – a vaginotomy dorsally and mesh fold ventrally. 20% PEP mixed with hyaluronic acid (HA) or HA-only (control) was injected at the time of surgery. At 12 weeks postoperatively, animals were euthanized and tissues evaluated for presence of mesh exposure. Hematoxylin and Eosin, Masson's trichrome, and Tunel assay were performed. Inflammation, fibrosis, neovascularization, and necrosis were scored using a severity index (score 0-4), by a blinded Pathologist. Non-parametric statistical tests were performed.

Results: Only the 4 control animals experienced mesh exposure (Fig1, top left): 2 of the tissues with prior vaginotomy and 4 of the tissues with the mesh fold. None of the PEP-treated tissues demonstrated mesh exposure (Fig1, top right). Histologic evaluation demonstrated lower scores for fibrosis and higher for neovascularization in the PEP-treated group. Control tissues with the mesh fold had higher Tunel positive area fraction (i.e. more necrosis; $p=0.02$).

Conclusions: Exosome injection at the time of high-risk mesh implantation decreases the incidence of vaginal mesh exposures 12 weeks postoperatively. Mesh exposures are more common following implantation of mesh in a folded configuration than with a vaginotomy; exposure risk is mitigated by PEP treatment via decreased fibrosis and necrosis and increased neovascularization. Sustained mesh exposure prevention should be evaluated.

Research Area: female pelvic medicine, regenerative medicine



KURE Scholar (TP-04)**Sex hormones contribute more to the development of diabetic bladder dysfunction than the severity of hyperglycemia in type 1 diabetic Akita mice**

Michael R. Odom, Francis M. Hughes Jr., Huixia Jin, J. Todd Purves

Department of Urology, Duke University Medical Center, Durham, NC

Introduction/Objectives: Diverse symptoms of diabetic bladder dysfunction (DBD), ranging from overactive bladder (OAB) to underactive bladder (UAB), manifest in half of all patients with diabetes. While the cause of such symptom variation is unknown, clinical evidence suggests sex hormones influence the presentation of DBD symptoms. Preclinical models like the type 1 diabetic Akita mouse support this notion as Akita females develop OAB while, for unknown reasons, Akita males develop UAB. It has been proposed the more severe hyperglycemia in males is responsible for UAB development rather than the OAB observed in females; however, the same genetic mutation is responsible for inducing diabetes in both sexes and the only critical variable responsible for differences in the severity of hyperglycemia and DBD phenotype appears to be levels of sex hormones. Therefore, we hypothesize sex hormone levels differentiate the development of diabetic OAB vs. UAB.

Methods: Both male and female type 1 diabetic Akita and non-diabetic C57BL/6J mice were either gonadectomized at 8 weeks of age or remained gonadally intact. Blood glucose was measured weekly from 8-15 weeks of age in all groups (n= 9-15 per group). At 15 weeks, awake-restrained cystometry was performed in all groups (n= 9-11 per group) to determine void volume and void frequency. Statistical significance defined as $p < 0.05$ was calculated using a two-way analysis of variance with Tukey post hoc for all groups of blood glucose data and a one-way analysis of variance with Tukey post hoc was used for all groups of either male or female cystometry parameter data.

Results: In gonadally intact mice, blood glucose is significantly higher in male diabetics (520 mg/dL) than female diabetics (258 mg/dL), and blood glucose of male and female diabetics is significantly higher than non-diabetics of both sexes (128-155 mg/dL). Compared to respective non-diabetics of each sex, male diabetics develop a significant increase in void volume and decrease in voiding frequency consistent with signs of UAB, while female diabetics develop a significant decrease in void volume and increase in voiding frequency consistent with signs of OAB. Within 7 weeks following a gonadectomy, blood glucose of gonadectomized male diabetics significantly decreases to levels comparable to female diabetics (235 mg/dL), while blood glucose of gonadectomized female diabetics significantly increases to levels comparable to male diabetics (490 mg/dL). Surprisingly, despite significant fluctuations in blood glucose, both groups of gonadectomized male and female diabetics fail to develop any discernable signs of DBD as their void volumes and frequencies significantly differ from their gonadally intact counterparts but are not significantly different than non-diabetics of each respective sex. Gonadectomies do not significantly alter the blood glucose and voiding parameters of non-diabetics from either sex.

Conclusions: Sex hormone levels have a greater impact on the development of DBD than the severity of hyperglycemia. Hormone-dependent mechanisms responsible for the development of DBD may serve as potential therapeutic targets to delay or prevent DBD development and possibly treat existing DBD.

Research areas: diabetes, urodynamics, voiding dysfunction / urinary retention

KURE Scholar (TP-05)

Chronic monitoring of neurogenic bladder function in rats with spinal cord injuries

Abbott, Em¹; La, Priscilla¹; Xu, Cindy¹; Young, Zachary¹; Grill, Warren¹¹Duke University, Biomedical Engineering, Durham, NC

Introduction/Objective(s) Spinal cord injury (SCI) disrupts intricate autonomic and somatic neural control often resulting in Neurogenic Bladder (NGB) dysfunction. Restoring bladder and bowel function is crucial for improving the quality of life for individuals living with SCI. Therefore, our objective is to conduct chronic in vivo studies to deepen our understanding of post-SCI bladder function and ultimately develop effective therapies.

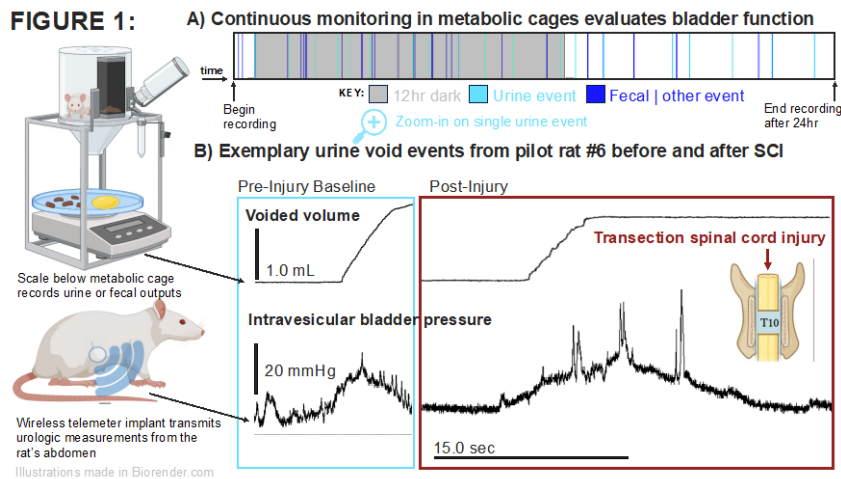
Methods For metabolic recordings, female Sprague-Dawley rats were housed in a metabolic cage set over a scale for 24hrs with ad libitum access to food and water, under a 12-hr light-dark cycle. Output events were characterized by scale increases in weight, determined to indicate urine output, fecal output or other incident type. Following two baseline recordings, rats underwent surgical implantation of a wireless device (Stellar Telemetry, TSE Systems) including a probe inserted into the bladder dome to measure intravesicular pressure and an electrode secured to the ventral side of the external urethral sphincter (EUS) to measure muscle activity. Data were transmitted via custom radio frequencies (Stellar Commander v3.3.0.1) to our data acquisition system (Instem, NOTOCORD-hem 4.4.0.3). After a four-week recovery, rats underwent spinal cord transection at T9 and weekly recordings continued after bladder reflexes returned. Rehabilitation was quantified using weekly open field tests (Basso Beattie Bresnahan (BBB) scale). Bladder size estimated from rat weights before and after bladder expression.

Results Intact rats had an average baseline urine void volume of $1.44\text{mL} \pm 0.24\text{mL}$ (light cycle) or $0.97 \pm 0.2\text{mL}$ (dark cycle) while intact rats that recovered from implanted telemeter devices showed an average urine void volume of $1.42 \pm 0.16\text{mL}$. Post-SCI rats exhibited similar void volumes with enlarged bladders ($9.68 \pm 3.42\text{mL}$) which demonstrates decreased voiding efficiency. Post-SCI rats also demonstrated classic neurogenic bladder symptoms such as detrusor overactivity (Figure 1).

Conclusion(s) We

successfully monitored intravesicular pressure, external urethral sphincter (EUS) activity, and voiding behavior in awake, behaving rats. Post-SCI rats exhibited tolerance to the telemeter instruments, which is encouraging considering the frequent manual bladder expressions required during the post-SCI acute recovery period. Building on this feasibility, we are eager to explore the promising potential of epidural electrical stimulation as a potential treatment for NGB.

Funding: CDMRP Award SC200190.e001; NIH KURE K12DK100024



Research area voiding dysfunction

KURE Scholar (TP-06)

Proposing the 'Continuum of Urinary Tract Infection (UTI)' for a Nuanced Approach to Diagnosis and Management of UTIs

Advani Sonali D, Turner Nicholas A, North Rebecca, Moehring Rebekah W, Vaughn Valerie M, Scales Charles D Jr, Siddiqui Nazema Y, Schmader Kenneth E, Anderson Deverick J

Division of Infectious Diseases, Duke University, Durham, NC

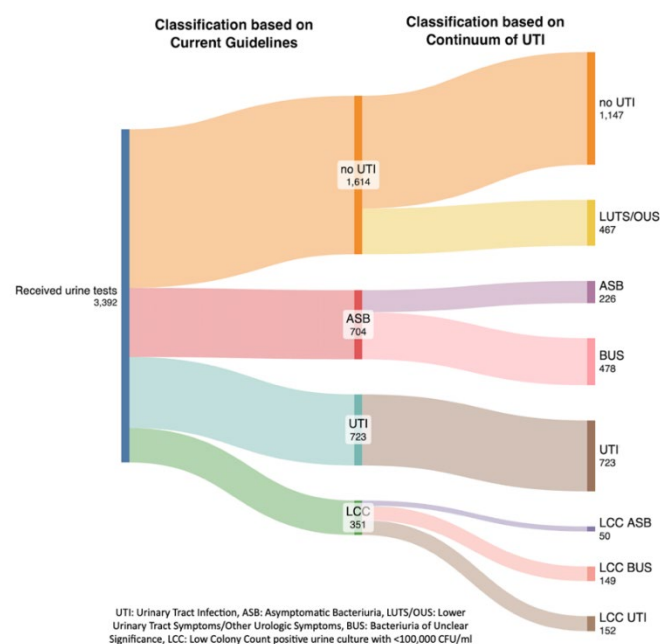
Introduction/Objective(s): Historically, diagnosis of urinary tract infections (UTIs) has been divided into three categories based on symptoms and urine culture results: not UTI, asymptomatic bacteriuria (ASB), or UTI. However, some populations (e.g., older adults, catheterized patients) cannot present with signs or symptoms referable to the urinary tract or have chronic lower urinary tract symptoms (LUTS) making the diagnosis of UTI challenging. Our objective was to understand the clinical presentation of patients who receive urine tests in a cohort of diverse hospitals.

Methods: This retrospective cohort study included all adult non-catheterized patient encounters (inpatient and ED) with paired urinalysis and urine cultures (24 hours apart) from 5 community and academic hospitals in three states (NC, VA, GA) between 01/01/2017 and 12/31/2019. Trained abstractors collected clinical and demographic data into a 60-question Redcap survey. An Expert Panel (ID, Urology, Geriatrics, Stewardship) met to define the "new continuum of UTI" definitions (Figure), which includes 2 new categories – LUTS to capture patients with chronic lower urinary tract symptoms, and bacteriuria of unclear significance (BUS) to capture patients who do not clinically meet criteria for ASB or UTI (e.g., older adults who present with delirium and bacteriuria). The newly defined categories were compared to current UTI categories defined by IDSA guidelines. The next step was to lower the bacterial threshold for ASB, BUS and UTI to 1000 colony forming units.

Results: 220,531 encounters met study criteria. After using a random number generator and removing duplicates, 3392 encounters were included. Based on current IDSA guidelines, prevalence of ASB was 32.1% (n=975), and patients with "not UTI" was 1614 (53%). On applying the expert panel's new "continuum of UTI" definitions, the prevalence of "not UTI" patients decreased to 1147, due to reassignment of 467 (15.3%) patients to LUTS. The prevalence of ASB decreased by 24% due to reassignment to BUS. Lowering the bacterial threshold had a slight impact on the number of definitive UTIs (452 vs 540, Figure).

Conclusions: Our rigorous review of laboratory and symptom data from a diverse population dataset reveals that diagnostic uncertainty exists when assessing patients with suspicion for UTI. We propose moving away from dichotomous approach of ASB vs UTI and using the "Continuum of UTI" for stewardship or deprescribing conversations. This approach will allow us to develop nuanced deprescribing interventions for patients with LUTS or BUS (e.g., watchful waiting, shorter course therapy), that take into account unique characteristics of these populations.

Research area: Infection of the Urinary Tract



Odd poster numbers are presented in the AM-session (9:50 - 10:50);

Even poster numbers are presented in the PM session (12:45 – 1:50)

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Aponte	Diana	Assessing financial toxicity in pediatric urology: validation of a patient-reported outcome measure tool in spina bifida	P-10
Chen	Junqin	In vitro Assessment of Thermal Injury Risk during Laser Lithotripsy by Visualizing Temperature Fields in Fluids via Thermal and Schlieren Imaging	P-13
Grimaud	Logan	Ureteral reconstruction is a viable management option for stricture in kidneys with less than 20% differential function	P-08
Gultekin	Aydin	Necroptosis of Schwann cells as a possible mechanism underlying Diabetic Bladder Dysfunction	P-27
Hassan	Hassan Yousif	Outcome of percutaneous nephrolithotomy (PCNL) in patients ≥ 65 versus < 65 years of age	P-18
Hintze	Kaylie	Analysis of competition amongst Lactobacilli Isolated from the human urinary tract	P-14
Hunter	Alexandra	Association of clinical outcomes with intrarenal pressure during ureteroscopy	P-20
Jenkins	Nicole	Prevalence of urge incontinence after urethral hydrogel injection in patients with mixed urinary incontinence	P-25
Julianingsih	Dita	Effects of sleep fragmentation and high-fat diet on prostate pathology in mouse models	P-06
Kamath	Soumya	Young female Ehlers-Danlos Syndrome mice have increased bladder contraction and sensitivity to muscarinic stimulation	P-26
Kitakule	Abigail	Understanding Female Urethra Closure: Anatomical and Molecular Insights in Mice	P-12
Margolin	Ezra J	Infection Risk in Patients with Mixed Flora in Urine Cultures Prior to Ureteroscopy	P-16
La	Priscialla	Chronic monitoring of neurogenic bladder function in rats with spinal cord injuries	P-28
Marshall	Daniel	Computational modeling of sacral nerve stimulation for treatment of overactive bladder	P-24
Mezes	Christina	Impact of native tissue vaginal repair with concomitant mid-urethral sling on urgency incontinence: a secondary analysis of the ALTIS trial	P-09
Mishra	Arpit	Assessing efficiency and thermal injury risk in treating impacted ureteral stones with the thulium fiber laser: an in-vitro study	P-15

Last Name	First Name	Title	Poster
Namugosa	Mary	Examining the role of the electronic frailty index (e-FI) in Characterizing the Geriatric Incontinence Syndrome in women	P-04
Namugosa	Mary	Frailty is common in older interstitial cystitis/bladder pain syndrome patients with a non-bladder-centric phenotype	P-05
Nose	Brent	Culture guided differentiation between artificial urinary sphincter erosion with and without infection	P-17
Odom	Michael	Sex hormones contribute more to the development of diabetic bladder dysfunction than the severity of hyperglycemia in type 1 diabetic Akita mice	P-30
Pati	Dipanwita	Selective neurokinin 2 receptor agonist, DTI-117, induces bladder and colorectal responses without producing hypotension in adult and aged F344 rats	P-29
Ruetten	Hannah	Local tissue response to a C-X-C motif chemokine ligand 12 therapy for underactive bladder syndrome in a rat model	P-21
Salvino	Matthew	Simple cystectomy with subtotal prostatectomy is associated with low rates of residual malignancy in prostate cancer survivors	P-02
Salvino	Matthew	Post-radiation simple cystectomy is not associated with occult urothelial carcinoma	P-03
Tucker	Kayah	De novo lipid synthesis in the pathogenesis of benign prostatic hyperplasia (BPH)	P-01
Vurture	Gregory	Addressing commonly asked questions in Urogynecology - accuracy and limitations of ChatGPT	P-22
Vurture	Gregory	Urodynamic mechanisms underlying overactive bladder symptoms in Hispanic women	P-23
Wilson	Brandon	Subtyping OAB using differences in bladder and brain functional Near Infrared Spectroscopy (fNIRS).	P-19

P-01

De novo lipid synthesis in the pathogenesis of benign prostatic hyperplasia (BPH)Tucker, Kayah J.^{1,2}, Silver, Samara V.^{1,2}, Alvarez, Nehemiah S.³, Popovics, Petra^{1,2}¹Department of Microbiology and Molecular Cell Biology, Eastern Virginia Medical School, Norfolk, VA.²Leroy T. Canoles Jr. Cancer Research Center, Eastern Virginia Medical School, Norfolk, VA.³Department of Physiological Sciences, Eastern Virginia Medical School, Norfolk, VA.

Introduction: Benign prostatic hyperplasia (BPH) describes the enlargement of the prostate around the urethra and affects ~ 50% of men \geq 50 years of age. Constriction of the urethra may lead to thickening of bladder walls, weakening of those walls overtime, and incontinence. Such symptoms are associated with a collection of lower urinary tract symptoms (LUTS), which exacerbate thickening of collagen bundles and fibrosis within the periurethral zone of the prostate. Age related steroid hormone imbalance, obesity, and inflammation are widely understood to contribute to the development of BPH. Macrophages are also suggested to play a significant role in BPH pathogenesis. Our team has previously used a steroid hormone imbalance (T+E2) mouse model to reveal the expansion of macrophage population, their translocation into the lumen of the prostate, and simultaneous generation of lipid-laden foam cells. Presence of lipid-laden foam cells is indicative of lipid dysregulation, but the exact source of excess lipids in BPH prostates is still unknown. In this study, we assessed alteration in gene expression of genes associated with the *de novo* lipid synthesis pathway in the T+E2 mouse model.

Methods: Male C57BL/6J mice were implanted with pellets containing 25 mg (T) and 2.5 mg (E2), and their ventral prostates were collected 14 days later. Cells were then dissociated with cold protease and loaded on Chromium Next GEM (7000 cells/sample). Each sample was sequenced on NextSeq2000 at 100 million reads/sample. *In situ* hybridization (ISH) was performed to confirm scRNA-seq results using probes for *FASN*. Immortalized BPH-1, NHPRE-1, and BHPRE-1 cell lines were established to test the effect of E2 (0.1-100 nM) on lipid dysregulation *in vitro*.

Results: ScRNA-seq analysis of T+E2 ventral prostates identified two luminal, a basal, a proliferating, and a progenitor epithelial cell cluster. In almost all the identified epithelial clusters, expressional analysis indicated an increase in most of the genes associated with *de novo* lipid synthesis pathway (i.e., *Fasn*, *Scd1*, *Acly*, and *Acat1/2*). Increased *Fasn* expression was confirmed via ISH ($p < 0.01$). BPH-1 demonstrated GPER and ESR1 expression, whereas GPER expression alone was identified in NHPRE-1 and BHPRE-1 cells. Expression of genes of the *de novo* lipid synthesis pathway was also explored in BPH-1 cells in response to E2 treatment.

Conclusions: Our findings indicate that steroid hormone imbalance leads to an increase in *de novo* lipid synthesis from T+E2 prostatic epithelium, potentially contributing to the pathogenesis of BPH. Our future studies aim to determine the effects of hormone imbalance (via E2 treatment) on epithelial cells in stimulating foam cell formation and macrophage polarization states (M1, pro-inflammatory and M2, anti-inflammatory). Such research benefits the development of therapeutic intervention aimed at potentially targeting lipid accumulation and foam cell generation in BPH/LUTS.

Research Area: Benign Prostatic Hyperplasia, Aging, Cell Therapy

P-02

Simple cystectomy with subtotal prostatectomy is associated with low rates of residual malignancy in prostate cancer survivors

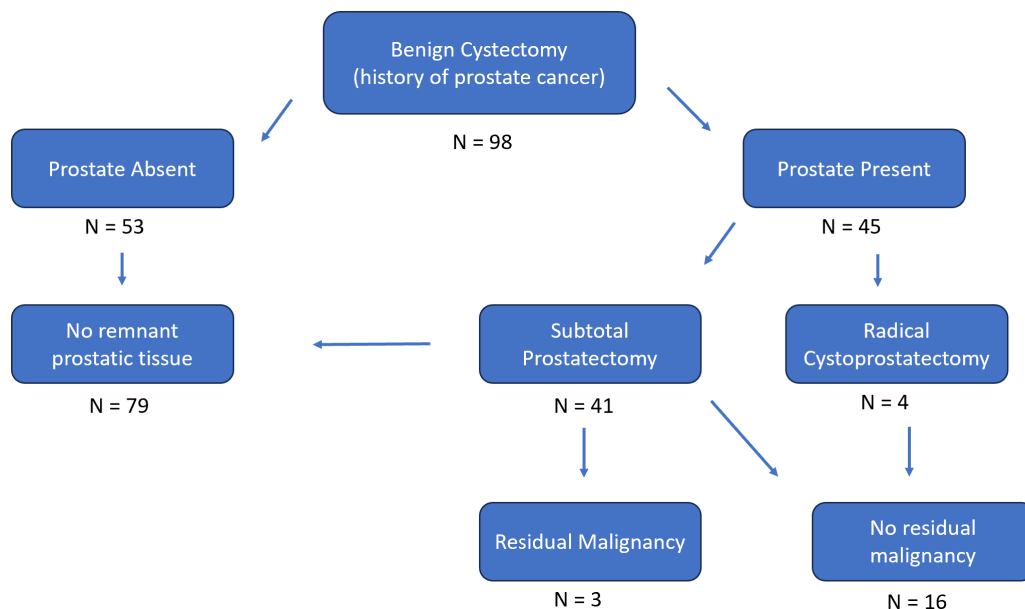
Salvino, Matthew¹; Sury, Kiran¹; Grimaud, Logan¹; Nose, Brent¹; Foreman, Jordan¹; Lentz, Aaron¹; Peterson, Andrew¹

¹Duke University, Department of Urology, Durham, NC

Introduction: Prostate cancer survivors, particularly those treated with radiation, may ultimately end up with complications best managed by benign cystectomy. Simple cystectomy with subtotal prostatectomy is an attractive alternative to radical cystectomy and salvage prostatectomy, with less morbidity and minimal risk to the rectum. However, the remnant prostate tissue raises the question of cancer control. We assessed the rates of residual prostatic malignancy found on benign cystectomy specimens.

Methods: We reviewed all benign cystectomies for patients with a history of prostate cancer involving a single reconstructive surgeon (AP) from 2010-2023. Radical cystoprostatectomies were performed in the standard fashion. Subtotal prostatectomies were performed with suction curettage of the remnant prostate as able. We reviewed bladder and prostate pathology for malignancy and collected patient characteristics.

Results: 98 patients met inclusion criteria, with a median age at surgery of 73 (52-84) years. 88 (90%) received external radiation, 7 (7%) brachytherapy, and 25 (26%) had both. 10 (10%) patients had prior chemotherapy, and 18 (18%) had prior cryotherapy. 53 (54%) patients had prior radical prostatectomy, with no residual prostate tissue on bladder pathology. Of the 45 patients with remnant prostates, 19 had prostatic tissue available for pathology. All 4 radical cystoprostatectomies had no residual malignancy. 12 subtotal prostatectomies had residual inflammation and fibrosis. 3 patients had residual prostatic malignancy, one with prior biochemical recurrence on surveillance, and one with T4 disease discovered at surgery.



Conclusion: Simple cystectomy with subtotal prostatectomy may be a reasonable option for prostate cancer survivors undergoing extirpative surgery, with low rates of residual prostate malignancy in this cohort.

Research Area: Urinary Reconstruction

P-03

Post-radiation simple cystectomy is not associated with occult urothelial carcinoma

Salvino, Matthew¹; Sury, Kiran¹; Grimaud, Logan¹; Nose, Brent¹; Foreman, Jordan¹; Lentz, Aaron¹; Peterson, Andrew¹

¹Duke University, Department of Urology, Durham, NC

Introduction: Cancer survivors with a history of radiation may suffer devastating complications that are often best managed by cystectomy. Simple cystectomy is an attractive alternative to radical cystectomy with less morbidity and minimal risk to the rectum. While safe, this technique may put a patient at risk for incomplete treatment of cancer in the bladder should it arise as a secondary malignancy. We assessed the rates of urothelial malignancy found on simple cystectomy specimens.

Methods: We reviewed all benign cystectomies involving a single reconstructive surgeon (AP) from 2010-2023. Patients with a known history of urothelial cancer, cystectomy performed for active malignancy or a non-cancer survivorship reason (such as neurogenic bladder or trauma), and patients without a history of radiation were excluded. Bladder pathology was examined for malignancy and patient characteristics were collected.

Results: 112 patients met inclusion criteria, with a median age at surgery of 71 (34-84) years. Primary cancers were prostate (83%), colorectal (6%), gynecologic (11%) and other (3%). All patients had a history of radiation, with 105 (94%) receiving external radiation, 7 (6%) brachytherapy, and 25 (22%) receiving both. 24 (21%) patients also had prior chemotherapy and 67 (60%) had a history of smoking. 69 (62%) patients had prior hyperbaric oxygen therapy. All patients had an end-stage defunctionalized bladder (100%), 51 (46%) managed with indwelling catheter and 4 (4%) with prior urinary diversion. There were 54 (48%) cases of osteomyelitis and 22 (20%) rectourethral/vesicovaginal fistulas. 108 (96%) patients had simple cystectomy, with 4 (4%) radical cystectomies. All patients had inflammation/cystitis on their bladder pathology. 0 (0%) patients had evidence of urothelial malignancy. At a median follow up of 30 (0.1-138) months, no patients were diagnosed with urothelial malignancy.

Conclusion: Simple cystectomy is a reasonable option for cancer survivors undergoing extirpative surgery, as we found no evidence of occult secondary urothelial malignancy in this cohort of patients.

Research Area: Urinary Reconstruction

P-04

Examining the role of the electronic frailty index (e-FI) in Characterizing the Geriatric Incontinence Syndrome in women

Namugosa M¹, Rong A², Mezes C¹, Craven T.E², Parker-Autry C¹

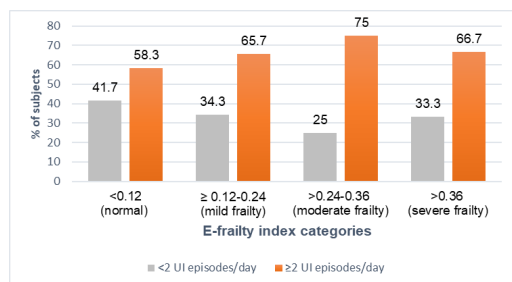
¹Department of Urology, Atrium Health Wake Forest Baptist, Winston Salem, NC, USA, 27127. ²Wake Forest University School of Medicine, Winston-Salem, NC, USA, 27101

Introduction: The Geriatric Incontinence Syndrome (GIS) is marked by severe urinary incontinence (UI) symptoms and functional impairments such as reduced gait speed and prolonged chair-stand pace and has been linked to frailty. Integrating gait speed or chair-stand pace assessment in surgical settings can be challenging. We explore the potential of the electronic frailty index (eFI), an electronic medical record tool, as a feasible alternative for characterizing GIS. We hypothesize that eFI may correlate with gait speed, chair-stand pace, and predict UI severity, making it a practical alternative for characterizing GIS. Our objective was to investigate the associations between eFI and functional geriatric assessments in determining eFI's feasibility as a frailty marker in women with GIS.

Methods: We present a retrospective cohort study of women, older than 70 years seeking treatment for UI. This is a retrospective cohort study of women over 70 seeking treatment for UI symptoms between 2016-2023. Subjects underwent a clinical geriatric assessment to evaluate gait speed, chair-stand pace, and UI symptoms. UI severity was the primary outcome, distinguishing GIS, alongside gait speed <1m/sec and chair-stand pace >14 sec. eFI was categorized as mild frailty (>0.12-0.24), moderate frailty (>0.24-0.36), and severe frailty (>0.36). Univariate analyses compared clinical and functional characteristics based on UI severity. Spearman's rank correlation examined the association between eFI and functional impairments. Logistic regression analyzed the odds of severe UI symptoms based on eFI frailty risk, adjusted for age and BMI.

Results: 81 subjects were included in this analysis. The mean age was 77.5±5.6. Among cohort subjects, We analyzed 81 subjects with a mean age of 77.5±5.6. The cohort had a higher BMI (31.7±12.5 kg/m²) than controls (27.5±6 kg/m²), with no other significant clinical differences. The eFI score was 0.22±0.10, with 85% of the cohort categorized as frail. eFI weakly correlated with gait speed ($r = -0.29$, $p=0.02$) but not with chair-stand pace or UI severity ($r = 0.22$, $p=0.11$ for chair-stand pace, $r = 0.05$, $p=0.74$ for UI severity). Categorical frailty was significantly associated with severe UI symptoms ($p=0.01$). The odds of severe UI symptoms and at least mild frailty risk based on eFI score were OR 1.15, 95% CI [0.71, 1.88].

Figure 1: Summary of cohort e-Frailty



Conclusions: The eFI may not substitute functional geriatric assessments for characterizing GIS, as it exhibits weak correlations with gait speed and chair-stand pace and is a weak predictor of UI severity, a key. However, eFI categories closely associate with UI severity.

Research area: Aging, Overactive Bladder (OAB) Female Pelvic Medicine,

P-05

Frailty is common in older interstitial cystitis/bladder pain syndrome patients with a non-bladder-centric phenotypeNamugosa, M^{1,2}, Ritts R.^{1,2}, Evans R¹, Badlani G¹, Parker-Autry C¹, Walker SJ²¹Wake Forest School of Medicine, Department of Urology, Winston-Salem, NC. ²Wake Forest Institute for Regenerative Medicine, Winston-Salem, NC

Introduction: Frailty is a physical state marked by increased vulnerability to adverse health outcomes. The electronic frailty index (eFI) provides an automated electronic health record (EHR)-based instrument that uses a combination of clinical encounters, diagnosis codes, medications, and Medicare annual wellness visit data as markers of frailty status, i.e., fit, mildly frail, moderately frail, and severely frail (Clegg et al., 2016, PMID 26944937). The objective of this study was to use the eFI to assess the degree of frailty in older patients with interstitial cystitis/bladder pain syndrome (IC/BPS) and to identify clinical characteristics that were significantly associated with frailty.

Methods: eFIs were available from the charts of 183 IC/BPS patients (≥ 55 years old) in our IRB-approved registry who had undergone therapeutic bladder hydrodistension (HOD). Validated questionnaires were completed prior to HOD. Demographic, and clinical characteristics were assessed through patient report and medical records. Fisher's exact test was used for categorical variables to compare the 'fit' and 'at least mildly frail' groups. The category of 'at least mildly frail' included mild, moderate and severe frailty.

Results: 149/183 (81%) of the participants were female. The mean age for all participants was 68 ± 8.46 and the average eFI was 0.134 ± 0.09 . Frailty classifications were as follows; fit: 96 (52.4%), mild: 67 (36.6%), moderate: 15 (8.2%), and severe: 5 (2.7%). Between the 'fit' and 'at least mildly frail' groups, significant differences were observed for gender, bladder capacity, irritable bowel syndrome (IBS), fibromyalgia, migraines, panic disorder, asthma, and small-fiber polyneuropathy (SFPN) status ($p < 0.05$).

Table 1: Fisher's Exact test for categorical clinical characteristics (fit vs at least mildly frail*)

Variable	Number in category**	Fit N=96	At least mildly frail N=87	P-value
Gender	183	71F(25M)	78F(9M)	0.008
Autoimmune disease	183	13/96	15/87	0.541
Hx smoking	180	34/95	42/85	0.071
Race	183	(89W/70)/96	(76W/11O)/87	0.320
Non-low BC (BC >500cc)	174	47/92	60/82	0.003
Hunner lesion positive	174	25/92	13/82	0.097
Hx cystectomy	183	9/96	5/87	0.414
IBS	143	18/72	31/71	0.022
Sleep disorder	139	8/69	16/70	0.115
Chronic pelvic pain	144	14/73	19/71	0.324
Chronic fatigue	140	7/70	5/70	0.382
Fibromyalgia	142	9/71	23/71	0.008
Migraines	145	13/73	24/72	0.037
Depression	146	20/71	30/75	0.163
Panic Disorder	142	10/69	27/73	0.004
Allergies	139	59/69	66/70	0.099
Asthma	140	5/69	19/71	0.003
Endometriosis	142	8/72	13/70	0.243
SFPN positive	61	6/33	12/18	0.050

*The eFI is categorized as fit (0-0.12), mildly frail (>0.12-0.36), moderately frail (>0.24-0.36) and severely frail (>0.36). The category of at least mildly frail includes mild, moderate and severe frailty. **Data not available for all patients. Availability is contingent on patient previously completing validated questionnaires and diagnostic tests.

Conclusion: This study provides new insight into the complex associations between frailty and co-occurring conditions in older IC/BPS patients, and suggests frailty is significantly more common in the non-bladder-centric phenotypic subgroup, i.e., non-low BC, multiple NUAS, SFPN, and low prevalence of HL.

Research Area: Clinical Research, Aging & Interstitial Cystitis/Painful Bladder Syndrome

P-06

Effects of sleep fragmentation and high-fat diet on prostate pathology in mouse modelsJulianingsih, Dita^{1,2}; Silver, Samara V^{1,2}; Alsamaræe, Adnan T^{1,2}; Jensen-Wachspress, Mariah A^{1,2}; Popovics, Petra^{1,2}¹Eastern Virginia Medical School, Department of Microbiology and Molecular Cell Biology, Norfolk, VA.²Eastern Virginia Medical School, Leroy T. Canoles Jr. Cancer Research Center, Norfolk, VA.

Objectives: Benign Prostate Hyperplasia (BPH) poses a significant health burden among aging males, impacting urinary function and quality of life. While the etiology of BPH is multifactorial, emerging evidence suggests that lifestyle factors such as sleep quality and dietary habits play crucial roles in its pathogenesis. Sleep fragmentation, a common occurrence driven by factors like shift work, stress, and age-related sleep disturbances, has drawn attention for its association with various adverse health outcomes. Individuals with BPH may experience sleep fragmentation due to the need to wake up frequently during the night to urinate, further disrupting their sleep patterns. Chronic sleep fragmentation induces systemic inflammation, which may worsen prostatic inflammation, promote fibrosis development and contribute to BPH progression. Moreover, high-fat diet can induce systemic inflammation and alter hormonal profiles, potentially influencing prostate tissue remodeling and hyperplasia. This study aimed to determine the impacts of sleep fragmentation and high-fat diet on BPH-related pathologies using mouse models. We aimed to provide insight into the underlying mechanisms linking lifestyle factors to BPH pathogenesis by characterizing immune cell infiltration, collagen accumulation, and lipid droplet deposition in prostate tissue.

Methods: Sleep fragmentation was conducted on three-month-old black 6 (C57BL/6J) mice in a sleep fragmentation chamber with a rod moving every two minutes during sleep period, from 6am-6pm, for three months. To explore the impact of a high-fat diet on benign prostatic hyperplasia (BPH), two-month-old mice were fed with a high-fat diet comprising 60% fat, 20% protein, and 20% carbohydrates for a duration of 4 months. Control mice were maintained on a standard diet. Immunohistochemistry (IHC) with CD45 antibody was employed to evaluate immune cell infiltration in the anterior, dorsal, ventral, and lateral prostate lobes. Collagen accumulation was assessed using Picrosirius staining (PSR) for sleep fragmentation groups, while lipid droplets were analyzed using Oil Red O staining for high-fat diet groups. Statistical analysis was performed using the Mann-Whitney test.

Results: In mice with sleep fragmentation, significant elevation in CD45-positive immune cells was observed across all prostate lobes compared to sham groups ($p < 0.05$). Additionally, collagen accumulation was significantly elevated in the anterior prostate (1.9-fold change, $p < 0.01$), while trends toward increased fibrosis were observed in other lobes. In mice subjected to a high-fat diet, a significant increase in CD45-positive immune cells were observed in all prostate lobes compared to controls ($p < 0.001$). Lipid droplet accumulation was significantly higher in the ventral prostate lobe (0.75%) compared to sham groups (0.04%, $p < 0.01$), indicative of metabolic perturbations induced by high-fat diet.

Conclusions: Our findings indicate that both sleep fragmentation and high-fat diet contribute to inflammation in mouse models, as evidenced by increased immune cell infiltration and tissue remodeling. Sleep fragmentation appears to primarily influence fibrosis development, while high-fat diet induces metabolic alterations. These results underscore the complex interplay between lifestyle factors and BPH pathogenesis.

Research area: Benign Prostate Hyperplasia, Immunology.

P-07

Sub-chronic exposure to perfluorooctane sulfonate (PFOS) and perfluorooctanic acid (PFOA) has minimal impact on erectile function in Sprague-Dawley ratsAlexander MK¹, Hou A¹, DeWitt JC², Hannan JL¹

¹Department of Integrative Physiology and Metabolism, Brody School of Medicine at East Carolina University, Greenville, NC; ²Department of Environmental and Molecular Toxicology, Oregon State University, Corvallis, OR

Introduction/Objectives: Per and polyfluoroalkyl substances (PFAS) are commonly used in industrial and consumer products and are environmental and health contaminants. The most common PFAS chemicals, perfluorooctane sulfonate (PFOS) and perfluorooctanic acid (PFOA), are used in firefighting foam, nonstick bakeware, water-resistant fabrics, grease-resistant paper and fire-resistant materials. PFAS is a known endocrine disruptor and can reduce testosterone and lower semen quality. The impact of PFAS exposure on erectile physiology is unknown. Our study will assess the effect of PFOS and PFOA on erectile function in Sprague-Dawley rats. We hypothesize that PFOS and PFOA will decrease erectile function.

Methods: Adult male Sprague-Dawley rats were divided into four groups (n=6-10/group): 1) Control/Naïve; 2) Control/Tween; 3) PFOS (10mg/kg/day); and 4) PFOA (10mg/kg/day). PFOS/PFOA was dissolved in 0.05% Tween 20 and administered in drinking water for 28 days. Control/Tween animals received 0.05% Tween 20 in drinking water and Control/Naïve received regular water. Following 28 days of PFOS/PFOA exposure, rats were placed on regular drinking water for 2 weeks. Body weights were collected weekly and terminal organ weights of liver, testes, spleen, heart, lungs, brain, seminal vesicles, kidneys, bladder, and thymus were recorded. Erectile function was assessed prior to PFAS exposure and every 2 weeks thereafter via apomorphine. Nerve-stimulated intracavernosal pressure and mean arterial pressure (ICP/MAP) was measured 2 weeks after exposure stopped.

Results: Four weeks of PFOS exposure significantly decreased body weight while PFOA exposure did not impact body weight (Con/N: 551±41.6g; Con/T: 588±63.5g; PFOS: 453±16.3g; PFOA: 535±29.9g, p<0.01). The PFOS dose was overtly toxic with 6/10 rats dying following 3-4 weeks of exposure. Two weeks following PFOS/PFOA exposure, livers were markedly enlarged (Con/N: 16.9±2.75g; Con/T: 19.4±2.85g; PFOS: 25.4±0.16g; PFOA: 20.2±3.77g, p<0.01), spleens were smaller (Con/N: 0.85±0.17g; Con/T: 0.93±0.12g; PFOS: 0.65±0.03g; PFOA: 0.88±0.12g, p<0.05), and testes were larger in PFOS rats (Con/N: 1.71±0.27g; Con/T: 1.8±0.07g; PFOS: 2.0±0.06g; PFOA: 1.8±0.07). No other organ weights were different across exposure groups. Serum testosterone concentrations were significantly increased in PFOS animals (Con/N: 4.6±1.9; Con/T: 3.07±1.06; PFOS: 6.56±2.88; PFOA: 3.19±1.80, p=0.023). PFOS/PFOA exposed animals had a similar number of apomorphine-induced erections throughout the 6 week period. Two weeks post-exposure, ICP/MAP was unchanged between all groups (n=5-10/group).

Conclusions: PFOS exposure markedly decreased body weight, increased liver size, decreased spleen weight, and increased testes weight. PFOS also increased serum testosterone concentrations. However, there was no change in apomorphine-induced behavioral erections or ICP/MAP two weeks post-exposure. Unexpectedly, the dose of PFOS was overtly toxic. Additional chronic PFAS exposure studies are warranted to confirm the effects of PFAS on erectile health.

Research Area: Sexual dysfunction, toxicology/environmental health

P-08

Ureteral reconstruction is a viable management option for stricture in kidneys with less than 20% differential function

Grimaud, Logan W¹, Sury, Kiran¹, Salvino, Matthew¹, Livingston, Austin¹, Lentz, Aaron C¹, Peterson, Andrew C¹

¹Duke University School of Medicine, Department of Urology, Durham, NC

Introduction: Dogma states that patients with a poorly functioning kidney (defined as <20% split function) have unfavorable outcomes following ureteral reconstruction. While no guidelines recommend against ureteral reconstruction in this population, nephrectomy has become the de facto standard of care. With today's increasingly aging population we feel it imperative to always preserve as much renal function as possible. Herein we report favorable outcomes of ureteral reconstruction in patients with poorly functioning ipsilateral kidneys.

Methods: We conducted a review of 114 adult patients who underwent ureteral reconstructive surgery at our institution between 2013 and 2023. Patients with poorly functioning kidneys were identified by a preoperative renal scan (MAG3 renogram) showing <20% ipsilateral split renal function. We limited review to those with a minimum follow-up of 6 months. We recorded resolution of hydronephrosis, need for additional intervention, pre/postoperative renal function, and preservation of renal parenchyma on imaging along with development or progression of hypertension, flank pain, recurrent urinary tract infections (rUTIs), and proteinuria.

Results: Of the 8 patients meeting inclusion criteria, 5 underwent bladder elongation psoas hitch (BEPH), 1 ileal ureter, 1 ureteroureterostomy, and 1 ureteroureterostomy with BEPH. Median preoperative split renal function was 16.0% (12.5-19.9%) with a median preoperative serum creatinine (sCr) of 1.65mg/dL (1.0-2.1mg/dL) before decompression and 1.47mg/dL (1.0-2.1mg/dL) after percutaneous nephrostomy tube (PCN) placement. Preoperative median average renal parenchyma thickness (RPT) was 15mm (10-21mm). At 6-month follow-up, median sCr and RPT were preserved at 1.34mg/dL (0.9-1.8mg/dL, p=0.042) and 14mm (11-21mm, p=0.21), respectively. There were no significant complications (Clavien-Dindo 3 or above). At median follow-up of 49.2 months (11.1-93.3 months), all patients had a successful repair, defined as no reinsertion of stent/PCN, resolution of hydronephrosis, and no return to the OR for revision or nephrectomy. Three patients presented with flank pain and 1 with new onset hypertension prior to reconstruction- all resolved postoperatively. No patient developed hypertension, rUTIs, flank pain or proteinuria after reconstruction.

Conclusions: Reconstruction is safe and successful for obstructed kidneys with less than 20% split function. While further investigation is indicated, we recommend abandoning the dogma of nephrectomy alone for these patients to maximize the preservation of renal function.

Research Area: Urinary Reconstruction, Clinical Outcomes Research

P-09

Impact of native tissue vaginal repair with concomitant mid-urethral sling on urgency incontinence: a secondary analysis of the ALTIS trialMezes, Christina M¹; Matthews, Catherine A¹¹Atrium Health Wake Forest Baptist, Department of Urology, Winston-Salem, NC.

Introduction/Objective(s): Limited evidence exists on the effect of combined native tissue vaginal repair with mid-urethral sling on urgency urinary incontinence (UUI) symptoms. The aim of this study was to evaluate the impact of native tissue vaginal repair with mid-urethral sling on UUI symptoms and determine associated factors for bothersome baseline and persistent UUI at 12 months post-operatively.

Methods: This retrospective cohort study is a secondary analysis of the ALTIS trial, a multicenter, non-inferiority, randomized trial of women with \geq Stage II pelvic organ prolapse and symptomatic or occult stress urinary incontinence (SUI) who underwent native tissue vaginal repair or colpopoiesis and were randomized to single incision (SI Altis™) versus retropubic (RP) sling. UUI symptoms were assessed at baseline and 12 months post-operatively using PFDI question #16 to determine the rates of persistent, resolved, and de novo UUI. We grouped women according to severity of UUI symptoms into no or mild UUI bother (0,1) and significant bother (2, 3, or 4). A logistic regression was performed to determine associations between preoperative UUI and age, BMI, race, Charlson comorbidity index (CCI), menopausal status, symptomatic SUI, stage of POP and dominant prolapse compartment. The same analyses were repeated at 12 months post-operatively including the type of sling performed (SI vs. RP).

Results: Between 2018 and 2023, 280 subjects were enrolled across 7 sites and 255 were randomized. The mean age of the cohort was 67 ± 12 years and preoperative median stage of prolapse was III. Overall, 81% underwent reconstructive native tissue repair and 19% colpopoiesis. At baseline, 58 (23%) of the subjects had no bothersome UUI symptoms (0,1) and 196 (77%) had greater than mild bother (2, 3, 4). Variables associated with baseline UUI bother included BMI (OR 1.58, 95% CI (1.12-2.21), $p < 0.08$), Black race (OR 3.54, 95% CI (0.80-15.52), $p = 0.09$) and symptomatic SUI (OR 4.76 95% CI (2.52-8.97), $p < 0.001$). At 12 months, 41% had persistent UUI, 59% reported UUI resolved, and 11% developed de novo UUI symptoms. At 12 months post-operatively, univariate analysis showed only age (OR 1.03, 95% CI (1.00-1.06), $p = 0.014$) and CCI (OR 1.20, 95% CI (0.99-1.45), $p = 0.05$) to be significantly associated with bothersome UUI. On multivariate analysis, only the association with age persisted (OR 1.06, 95% CI (1.01-1.12), $p < 0.001$). Colpopoiesis was the only significant protective factor (OR 0.10, 95% CI (0.48-1.68), $p = 0.004$). Sling type (SI vs. RP) and prolapse compartment repair were not associated.

Conclusion: For women undergoing native tissue vaginal repair and concomitant sling, almost 60% saw resolution of baseline UUI symptoms, especially those undergoing colpopoiesis.

Research Area: Female Pelvic Medicine

P-10

Assessing financial toxicity in pediatric urology: validation of a patient-reported outcome measure tool in spina bifida

Diana Aponte-Colon¹, Rafael Tua-Caraccia¹, Leonid Aksenov¹, Dandan Chen², Kevin Hobbs¹, Rohit Tejwani¹, Rebecca Fairchild³, Bryce Reeve^{4,2,5}, John Wiener¹, Jonathan Routh¹

¹Duke University, Department of Urology, Durham, NC, ²Duke University, Department of Population Health Sciences, Durham, NC, ³Duke University School of Medicine, Durham, NC, ⁴Duke University, Department of Pediatrics, Durham, NC, ⁵Duke Cancer Institute, Durham, NC

Introduction: The concept of “financial toxicity” explores the negative therapeutic side effect of healthcare-related expenditure on individuals undergoing medical treatment, including financial burden as well as emotional distress. Little is known regarding the impact of financial toxicity on patients with congenital conditions, including spina bifida. To that end, our group previously created a questionnaire based on semi-structured patient and caregiver interviews that identified themes related to the financial burden experienced by patients with spina bifida and their caregivers. Our current study aimed to validate the financial toxicity patient reported outcomes measure tool.

Methods: We partnered with the Spina Bifida Association to distribute the patient reported outcomes measure tool for patients with spina bifida and their caretakers through their listserv and social media platforms. The patient survey consisted of 19 questions and the parent/caretaker survey consisted of 20. Descriptive analyses of the survey questions were used to check data quality. Confirmatory factor analysis was used to examine the factor structure and assess the reliability of the surveys.

Results: 180 patients and their parents/caregivers were included in the study. Among those, 67% had a household income of less than \$50,000. Of the 93 parents, 30% had a household income of less than \$50,000. The results of confirmatory factor analyses found that a one-factor model fit the patient survey data well, with a comparative fit index (CFI)=0.96, root mean square error (RSMEA)=0.08, and standardized root mean square residual (SRMR) =0.05. A one-factor model represented the parent survey data well with a CFI= 0.93, RSMEA=0.12, and SRMR=0.09. The factor structures were shown to be reliable with an internal consistency of 0.94 for the patient survey and 0.94 for the parent survey.

Conclusion: This new instrument demonstrated significant internal consistency and validity among US individuals with spina bifida and their caregivers. The use of validated, internally consistent survey questions is crucial to guide clinicians in counseling families and may help identify those at risk of financial toxicity. Early identification of at-risk families could allow for early case management/social work intervention; further work to prove this hypothesis is ongoing.

Research area: Health services research, Pediatric Urology, Congenital urogenital abnormalities

P-11 WITHDRAWN

P-12

Understanding Female Urethra Closure: Anatomical and Molecular Insights in MiceKitakule Abigail S¹, Yao Humphrey HC¹, and Amato Ciro M¹

1. Reproductive and Developmental Biology Laboratory, National Institute of Environmental Health Sciences, National Institute of Health, Research Triangle Park, NC

Introduction: Hypospadias is a congenital anomaly of the external genitalia where the urethra does not properly close and thus is misplaced. In females, hypospadias is rare, although it is generally considered under-reported. The lack of urethra closure in the female genitalia causes recurrent genitourinary tract infections and infertility. In mice, exposure to estrogens causes female hypospadias. Aside from the link between estrogen exposure and female hypospadias, the process of female urethra closure is largely understudied, with the precise timing of urethra closure and the associated molecular mechanisms remaining poorly understood. To address this gap, we aimed to determine when female urethra closure occurs and then identified gene expression patterns during the process of urethra closure.

Methods: We collected female mouse neonates from postnatal day (PND) 0- PND 10, aligning with preliminary observations that closure occurs during this timeframe. To identify the genes associated with urethra closure, we conducted bulk RNA sequencing on female external genitalia before and after urethra closure.

Results: Using whole-mount imaging and histology, we discovered that the urethra remained open along the entire length of the female genitalia until PND 6. By PND 7, the two sides of the open sulcus began to fuse at the base of the genitalia along the mid-line. By PND 10, the urethra was fully closed and exited out the tip of the female genitalia. With gene ontology analysis, we identified pathways associated with axonal guidance and extracellular matrix remodeling, implicating that there are extensive morphological changes during this time of female genitalia development. We also found several genes involved in steroidogenesis to be increased during urethra closure.

Conclusion(s): The increase of steroidogenic genes Cyp17a1, 3B-Hsd, and Star suggests that the female genitalia locally produce steroids, which in-turn may help support urethra closure. These findings will aid in understanding the role of hormonal signaling during the process of urethra closure in females. With this study, we provide an anatomical timeline of female urethra closure and potentially find a novel mechanism of urethra closure within the female external genitalia.

Research Area: Congenital Urogenital Anomalies/Embryology

P-13

***In vitro* Assessment of Thermal Injury Risk during Laser Lithotripsy by Visualizing Temperature Fields in Fluids via Thermal and Schlieren Imaging**

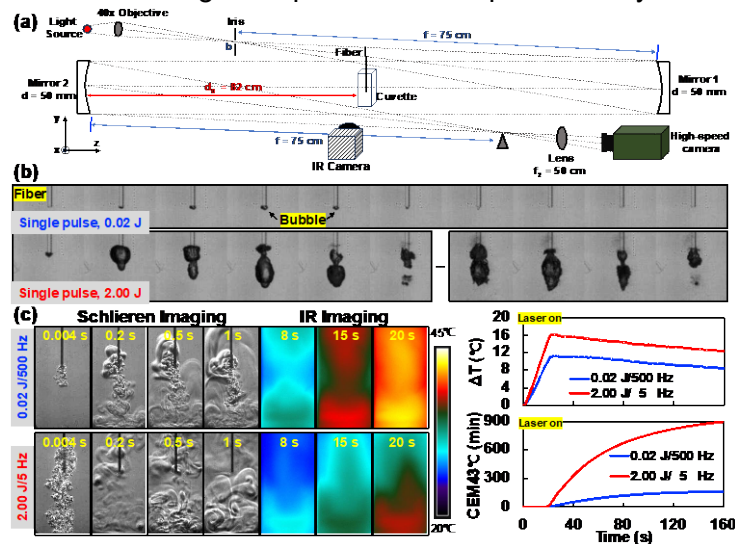
Chen, Junqin¹; Chen, Chuan-Hua¹; Zhong, Pei¹

¹Thomas Lord Department of Mechanical Engineering and Materials Science, Duke University, Durham, North Carolina

Introduction: Temperature rise and associated risk of thermal tissue injury have become significant clinical concerns during laser lithotripsy (LL) following the introduction of new thulium fiber laser (TFL) in 2020. However, due to the inherent formation of laser-induced cavitation bubbles around the fiber tip, the heat transfer process in LL is highly dynamic, which has not been well understood. In this study, we aim to elucidate the mechanisms underlying thermal injury risk during TFL procedures through the thermal and schlieren imaging techniques.

Methods: A schlieren imaging system was built up as shown in Fig. 1a. To mimic a calyx environment, a quartz cuvette (10 x 10 x 45 mm, L x W x H) filled with 2 ml water was placed between the two concave mirrors (Mirror 1 and 2) with a 200 μm fiber fixed at the center of the water. Using a TFL system (TLR-50W, IPG Photonics) under a laser power of 10 W, a total energy of 200 J (i.e., 20 s treatment) was delivered into the water with two distinctly different pulse energy (E_p) and frequency (F) combinations - 0.02 J/500 Hz and 2.00 J/5 Hz. During the treatment, schlieren images, which can reflect bubble dynamics and resultant temperature changes/flow patterns in the fluid volume, were captured by a high-speed camera (Phantom v7.3, Vision Research). Simultaneously, temperature distributions along the cuvette wall (i.e., tissue boundary) were recorded by an infra-red (IR) camera (A700, FLIR) and used to calculate the cumulative equivalent minutes at 43°C (CEM_{43°C}) to assess the thermal injury risk.

Results: For a single laser pulse, one cycle of small bubble expansion and collapse was produced at $E_p = 0.02$ J, while multiple cycles of irregular and chaotic oscillations of elongated vapor bubbles were generated at a higher E_p of 2.00 J (Fig. 1b). Consequently, even though the laser energy input was kept the same (every 100 pulses x 0.02 J = 1 pulse x 2.00 J), the heat dissipation from the fiber tip to the cuvette wall was much faster at $E_p = 2.00$ J compared to $E_p = 0.02$ J (see schlieren images in Fig. 1c). As a result, the temperature rise (ΔT) and corresponding thermal dose along the cuvette wall were significantly higher at 2.00 J/5 Hz settings compared to those produced by 0.02 J/500 Hz settings.



Conclusion: : The risk of thermal tissue injury during LL may highly correlate with convective heat transfer induced by the bubble activities. Future studies are warranted to find thermally safe laser settings under clinically relevant scenarios.

Research Area: Nephrolithiasis

P-14

ANALYSIS OF COMPETITION AMONGST LACTOBACILLI ISOLATED FROM THE HUMAN URINARY TRACTKaylie Hintze¹, Layla Jeries², Tatyana A. Sysoeva¹¹Department of Biological Sciences, The University of Alabama Huntsville, Huntsville, AL

Introduction/objective(s): Urinary tract infections (UTI) are one of the most common bacterial infections accounting for over 150 million cases per year across the globe. The rise of antibiotic-resistant UTIs has led to an increased interest in alternative treatment and prevention methods that do not rely on traditional antibiotic use. One of these proposed prevention strategies is the use of lactobacilli probiotics due to their innate antimicrobial properties such as lactic acid formation. We recently showed that some commensal lactobacilli, naturally inhabiting female urinary tract, inhibit uropathogens *in vitro*. This led to the idea that introduction of a better uropathogen-competing strain of urinary lactobacilli into the bladder might serve as a candidate for probiotic protective against UTI. As the female urinary microbiome is already populated with some species of lactobacilli and other bacteria it is not known how these intrinsic urinary microbes interact amongst themselves and introduced probiotic species. To address these two questions, we set to analyze the potential for competition amongst urinary lactobacilli.

Methods: Well-diffusion inhibition assays were performed to test the ability of urinary isolates of *Lactocaseibacillus rhamnosus* to inhibit urinary isolates of other lactobacilli species (*Lactobacillus gasseri*, *Lactobacillus delbrueckii*, *Lactobacillus animalis*, *Lactobacillus johnsonii*, and *Lactobacillus crispatus*). De Man-Rogosa-Sharpe and NYCIII media were used for liquid cultures and for well-diffusion experiments. *L. rhamnosus* cell cultures and cell-free spent media were tested to determine if such antimicrobial properties required cell-dependent activation. The zones of inhibition or areas of no visible growth were measured around the wells using GIMP measuring software and were quantified. For genetic analysis, DNA was extracted using Qiagen Dneasy Blood and Tissue kit and the extracted DNA was sequenced with long-read Oxford Nanopore and short-read Illumina methods. Whole genome sequences were then obtained using Unicycler assembler.

Results: The well-diffusion assays showed that tested strains of *L. rhamnosus* inhibit growth of *L. delbrueckii* isolates in a cell-dependent manner, but the other lactobacilli species were minimally inhibited or showed no inhibition by *L. rhamnosus*. Initial genetic analysis of the strains indicates that the *L. delbrueckii* strains have a lysogenic phage most similar to *L. delbrueckii* phage JCL 1032 which could cause *L. delbrueckii* to be less capable of competing with strains such as *L. rhamnosus*. Additionally, further examination is needed for interactions between *L. rhamnosus* and *L. crispatus* since there were no zones of inhibition there were areas of apparent increased growth. However, later tests will be needed to determine if the microbial makeup of these areas of increased growth.

Conclusions: The discovery of interlactobacilli inhibition identified species specific interactions among the most common species of lactobacilli in urinary microbiome. Whole genome sequences of these urinary isolates are established and will be compared for possible genetic explanations for these interactions. Further studies are required to understand the mechanism of observed interactions amongst commensal bacteria residing in urinary tract and design probiotics to promote urinary health with these interactions in mind.

Research areas: Microbiome, Infections of the Urinary Tract

P-15

Assessing efficiency and thermal injury risk in treating impacted ureteral stones with the thulium fiber laser: an in-vitro study

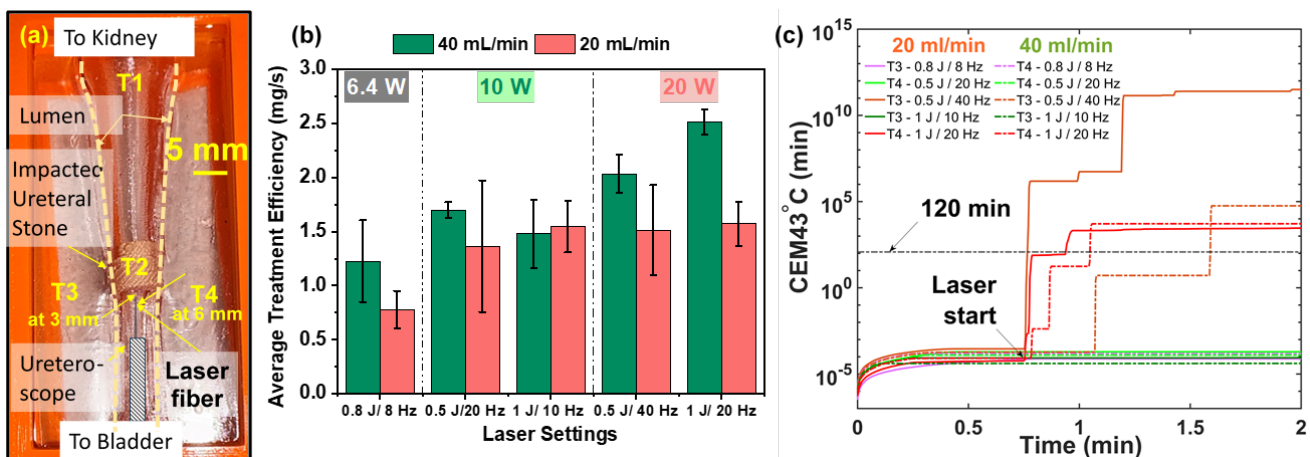
Mishra Arpit¹, Margolin Ezra J.², Chen Junqin¹, Antonelli Jodi², Preminger Glenn M.², Medeiros Robert A.², Lipkin Michael E.², Zhong Pei¹

¹Department of Mechanical Engineering and Materials Science, Duke University, Durham, North Carolina, USA. ²Division of Urology, Department of Surgery, Duke University Medical Center, Durham, North Carolina, USA.

Introduction/Objective(s): The Thulium Fiber Laser (TFL) effectively treats nephrolithiasis. However, it's highly absorbed in water, leading to rapid temperature rise, especially in confined spaces like impacted ureteral stone cases. We aimed to determine the optimal TFL settings for efficient treatment of impacted ureteral stones in a ureter model while assessing the potential thermal injury risk.

Methods: We developed a hydrogel (Gelatin #1, Humimic Medical, SC, USA)-based anatomical ureter model (Fig. a) to simulate impacted stone treatment, submerging it in a water bath set at body temperature ($\sim 37.2 \pm 0.5$ °C). Ureteroscopy with laser lithotripsy (LL) was performed for a fixed duration of 3 minutes using TFL (IPG Photonics) on cylindrical Begostone samples ($\sim 1.016 \pm 0.035$ gm, 10 x 10 mm, BEGO™ USA) positioned in the model to fill the ureteral lumen with a 150 μ m diameter fiber. Different irrigation rates (IR: 0 mL/min, 20 mL/min, 40 mL/min) and laser settings (power: 6.4 W to 20 W) were utilized. Each procedure was conducted in triplicate. Temperature was monitored using K-type thermocouples inserted through the ureteral wall. The thermal dose, quantified as cumulative equivalent minutes at 43 °C (CEM43), was calculated to assess the potential risk of thermal injury, with a safety threshold set at 120 minutes. Treatment efficiency (i.e., treated stone mass per unit time) was determined by subtracting the residual mass (all fragments > 3mm) from the initial stone mass.

Results: Stone treatment efficiency increased with higher laser power (Fig. b). Average treatment efficiency was 0.77 ± 0.17 mg/s at 6.4 W, 1.45 ± 0.42 mg/s at 10 W, and 1.54 ± 0.31 mg/s at 20 W, with IR = 20 mL/min. The thermal dose increased with laser power and decreased with a faster IR = 40 mL/min (Fig. c). At 6.4 W and 10 W, the CEM43 safety threshold was only surpassed at IR = 0 mL/min. At 20 W, it was exceeded at all IRs.



Conclusions: TFL treatment at a power of 20 W has significant potential to cause thermal injury to the ureter unless a high IR is used. Power of 10 W and below results in safe temperatures, even at 20 mL/min irrigation. In future work, we will assess these optimal settings for impacted Calcium Phosphate stones, which are prone to char formation and have a clinical reputation for being difficult to fragment.

Research area: Nephrolithiasis

P-16

Infection risk in patients with mixed flora in urine cultures prior to ureteroscopy

Kim, Joshua¹; Margolin, Ezra¹; Barquin, David¹; Moehring, Rebekah²; Antonelli, Jodi¹; Lipkin, Michael¹; Preminger, Glenn¹; Scales, Charles¹; Faerber, Gary¹; Medeiros, Robert¹

¹Department of Urology, Duke University School of Medicine, Durham, NC. ²Duke Center for Antimicrobial Stewardship and Infection Prevention, Duke Division of Infectious Diseases.

Introduction: Prior to endourological surgery, urine cultures inform preoperative antibiotic choice and duration. The presence of mixed flora in preoperative urine cultures holds unclear clinical significance. This study examines infectious outcomes after ureteroscopy in patients with preoperative mixed flora urine cultures.

Methods: A retrospective chart review was conducted on adult patients who underwent ureteroscopy with laser lithotripsy between January 2014 and June 2023 who had urine cultures performed within 60 days preoperatively. Patients were categorized into cohorts based on their preoperative urine culture: mixed flora, negative, or positive. Rates of postoperative urinary tract infection within 14 days were compared between cohorts, and logistic regression was performed adjusting for demographic and clinical variables.

Results: We identified 5,060 patients who underwent ureteroscopy with laser lithotripsy (2,111 mixed flora, 1,451 negative, 1,498 positive). Preoperative antibiotics were used more often in the mixed flora cohort (32%) than in the negative cohort (25%, $p < 0.001$) but less often than in the positive cohort (66%, $p < 0.001$). Postoperative infections were observed in 99 patients (5%) in the mixed flora cohort, compared with 49 (3%) in the negative cohort ($p = 0.054$) and 136 (9%) in the positive cohort ($p < 0.001$). Multivariable logistic regression demonstrated that positive cultures were associated with increased risk of infection (OR 2.04, 95% CI 1.47-2.84, $p < 0.001$, Table), but negative cultures had similar risk of infection compared to mixed flora (OR 0.78, 95% CI 0.51-1.19, $p = 0.262$). Within the mixed flora cohort, preoperative antibiotic treatment was not associated with a decrease in infection (OR 0.81, 95% CI 0.43-1.50, $p = 0.517$).

Table. Multivariable logistic regression of variables associated with postoperative infection

Variable	Odds Ratio (95% CI)	P-Values
Preoperative Urine Cultures		
Mixed	Ref	
Negative	0.78 (0.51-1.19)	$p = 0.262$
Positive	2.04 (1.47-2.84)	$p < 0.001$
Female Sex	1.06 (0.80-1.42)	$p = 0.690$
Age, per year	1.00 (0.99-1.01)	$p = 0.576$
Body Mass Index, per unit kg/m^2	1.00 (0.98-1.01)	$p = 0.747$
Diabetes	0.88 (0.63-1.23)	$p = 0.457$
Preoperative Stent or Nephrostomy	0.69 (0.51-0.93)	$p = 0.015$
Preoperative Antibiotic Treatment	1.17 (0.87-1.57)	$p = 0.297$
Preoperative Pyuria	1.08 (0.80-1.45)	$p = 0.637$
Elixhauser Comorbidity Index, per point	1.10 (1.06-1.14)	$p < 0.001$

Conclusion: While patients in preoperative mixed flora urine cultures received preoperative antibiotics more often than patients with negative urine cultures, they were not at higher risk for postoperative infection. Routine preoperative antibiotic use in patients with mixed flora cultures may not be effective in reducing infectious complications after ureteroscopy.

Research Area: Nephrolithiasis, Infections of the Urinary Tract, Clinical Outcomes Research

P-17

Culture guided differentiation between artificial urinary sphincter erosion with and without infectionBrent Nosé, MD¹ Kiran Sury, MD¹ Aaron Lentz, MD¹ Andrew Peterson, MD, MPH¹ Jordan Foreman, MD¹

1. Department of Urology, Duke University, Durham, NC

Introduction and Objectives The management of artificial urinary sphincter (AUS) erosion has long mimicked the management of infections of the more commonly implanted inflatable penile prosthesis. While robust data has been reported on the common pathogens in penile prosthesis infection, there is a dearth of data for AUS erosions since the introduction of Inhibizone coated devices in 2008. We aim to identify common organisms and the incidence of culture confirmed infection coinciding with AUS device erosion.

Methods We reviewed our prospectively collected, institutionally approved QI database for this study. Cases of erosion in which the device was implanted after 2008 were included for review. Descriptive analyses of clinical and culture data were performed. Erosion was confirmed cystoscopically either pre or intraoperatively in all cases.

Results During the study period, 1104 AUS devices were implanted. We identified 69 (6.3%) cases of AUS erosion with Inhibizone coated devices. The median patient age was 74 (IQR 11) with the median time to erosion of 8 months (IQR 31). 50 patients (72%) received prior pelvic radiation. 58 patients (84%) had preoperative urine cultures available for review and 34 (49%) had intraoperative swab and tissue culture data available for review. The most common finding on urine culture was mixed flora. This was followed by E Coli, Citrobacter and Klebsiella. Notably, 17 (29%) of the cases had negative urine cultures and 12 (71%) of the patients with negative urine cultures received antibiotics prior to collection of their urine sample. Intraoperatively, 23 (68%) of swab cultures were positive. The most common organisms from tissue and device swab cultures were Staphylococcus species, followed by Pseudomonas and then E Coli. Candida species grew from 3 (9%) of explanted devices where culture data was available.

Conclusions Prior studies indicated that infections associated with AUS erosion were primarily gram-positive organisms. Like penile prosthesis infections, after the introduction of Inhibizone, gram negative and fungal pathogens seem to be increasing in frequency. Further study is needed to elucidate the etiology of erosion with negative cultures and the implications of mixed flora results. However, this shift is important when considering empiric antibiotic therapy and treatment pathways in the eroded patient.

Research Area Urinary reconstruction

P-18

Outcome of percutaneous nephrolithotomy (PCNL) in patients ≥ 65 versus < 65 years of ageHassan Yousif Hassan, MD¹, Mahmoud Elhagagy, DO¹, Mahmoud I Khalil, MD², Mohamed Kamel, MD¹¹Department of Urology, University of Cincinnati, Cincinnati, Ohio., ²Department of surgery, Section of urology, University of Chicago, Chicago, Illinois.

Introduction/Objective: Nephrolithiasis is a common condition that affects all age groups. The estimated overall prevalence of kidney stones in adults in the United States is 9.9% with increased prevalence among the elderly population. This study evaluates the outcome of PCNL in patients ≥ 65 years versus < 65 years.

Methods: This is a retrospective study includes adult patients who underwent PCNL for treatment of kidney stones at University of Cincinnati Medical Center between July 1st, 2018, and December 31st, 2022. Patients were divided into two age groups: group 1 (≥ 65 years) and group 2 (< 65 years). Perioperative complications, Operative time, hemoglobin level, postoperative stay, and stone-free rate were assessed for each group. The level of significance was set at P value < 0.05 , indicating statistical significance.

Results: A total of 170 patients were included; 40 in group 1 and 130 in group 2. The mean age in group 1 was 70.5 ± 4.8 years and 45.6 ± 12.4 years in group 2 (P < 0.001). The mean stone size was 2.3 ± 1.1 cm in group 1 and 2.1 ± 0.9 cm in group 2 (P=0.5). DM and Chronic airway disease were more prevalent in group 1 vs group 2 (35% vs 18.5% and 12.5% vs 3.1%) respectively. The overall incidence of complications (42.5% vs 49.2%) and stone-free rate (62.5% vs 65.5%) was not significant between the 2 groups (P > 0.1). Similarly, no significant difference was observed in operative time, postoperative stay, or hemoglobin level change.

Conclusion: PCNL in patients ≥ 65 years is safe and demonstrates comparable outcomes to those observed in younger patients.

Research area: Nephrolithiasis

P-19

Subtyping OAB using differences in bladder and brain functional Near Infrared Spectroscopy (fNIRS).

Wilson, BC¹; Burkett, LS²; Daniels Peter²; Query H²; Ghatas M²; Grob G²; Matthew A²; Rogers D²; Stothers L³; Klausner AP²; Speich J⁴.

¹Department of Obstetrics and Gynecology, Virginia Commonwealth University, Richmond, VA.

²Department of Surgery/Division of Urology, Virginia Commonwealth University School of Medicine, Richmond, VA. ³Department of Urology and Obstetrics and Gynecology, University of California Los Angeles, Los Angeles, CA. ⁴Department of Mechanical and Nuclear Engineering of Engineering, College of Engineering, Virginia Commonwealth University, Richmond, VA

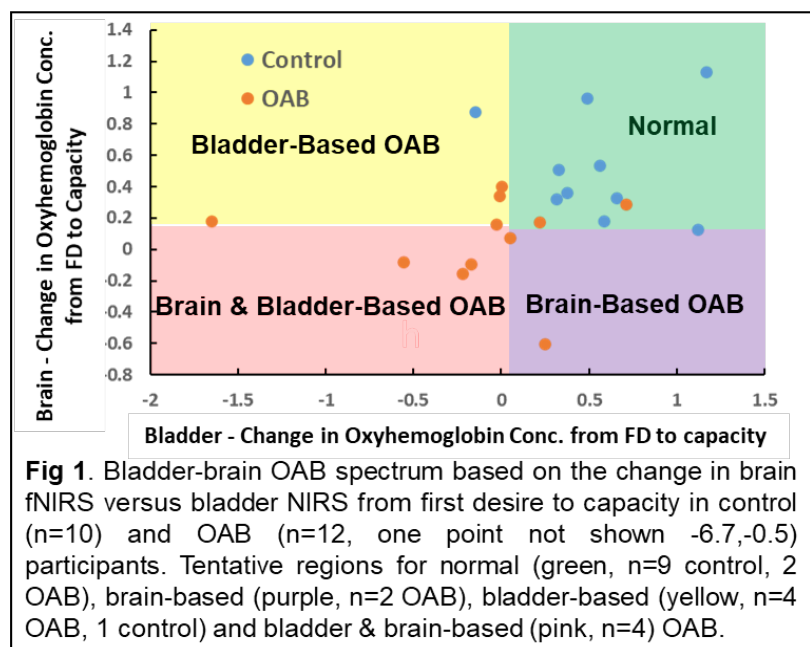
Objectives: Changes in prefrontal cortex (PFC) neuroexcitation and bladder hemodynamics can be recorded during bladder filling by measuring O₂Hb using functional near infrared spectroscopy (fNIRS) in the (PFC) and standard NIRS in the anterior bladder wall. This study's objective was to compare O₂Hb responses during natural filling in both the brain and bladder to create a 4-quadrant grid for improved OAB subtyping.

Methods: Participants with OAB (ICIQ-OAB urgency question (≥ 2) and controls without urgency completed a validated natural filling protocol. NIRS was recorded over two complete filling cycles from the bladder (Portalite, Artinis) and functional NIRS (fNIRS) was simultaneously recorded from the PFC (Brite, Artinis). Differences in average O₂Hb from the 1st to 2nd half of the period from first desire to void to bladder capacity were calculated for the right PFC and bladder. Relative change in bladder O₂Hb was plotted against relative change in bladder O₂Hb to compare bladder and brain O₂Hb. Data were compared with Fisher's Exact tests or t-tests as appropriate.

Results: Twenty-seven participants were recruited and 22 completed the study with sufficient data (OAB: n=12, normal controls: n=10). The OAB group was significantly older and with higher BMI ($p < 0.05$). Groups had comparable race and baseline fluid intake. Groups are compared in **Fig 1**. In the normal quadrant (Top Right: high bladder and brain O₂Hb) there were 9/10 normal (90%) and 2/12 OAB (17%), $p < 0.05$. The remainder of the OAB participants clustered in the Bladder-Based OAB quadrant with 4/12 (33%), Brain-Based OAB quadrant with 2/10 (33%), and Both quadrant with 2/10 (17%).

Conclusion: Combining brain fNIRS and bladder NIRS, our data show a potential method to subtype OAB as brain-based, bladder-based, or both. Comparisons were made using non-invasive NIRS testing during natural filling, which may eventually provide more objective tools for diagnosis and management of OAB. Further studies are needed to verify these interactions and assess for clinical correlates.

Research Area: Overactive Bladder



P-20

Association of intrarenal pressure during ureteroscopy with clinical outcomes: a pilot study

Barquin, David L.¹; Margolin, Ezra J.¹; Hunter, Alexandra¹; Kim, Joshua¹; Antonelli, Jodi¹; Preminger, Glenn M.¹; Scales, Charles D.¹; Faerber, Gary J.¹; Lipkin, Michael E.¹; Medeiros; Robert A.¹

¹Department of Urology, Duke University Medical Center, Durham, North Carolina

Introduction: Elevated intrarenal pressure during ureteroscopy has been hypothesized to cause detrimental patient outcomes including pain and infection, but these effects have not been proven in clinical studies. We aimed to assess the clinical impact of elevated intrarenal pressure using pressure monitoring during ureteroscopy.

Methods: We conducted a retrospective review of patients who underwent ureteroscopy and laser lithotripsy using the LithoVue Elite single-use flexible ureteroscope (Boston Scientific Corporation, Marlborough, MA) at a single institution from July 2023 to March 2024. Intrarenal pressure was measured using a pressure sensor on the tip of the scope. The duration of intrarenal pressure above and below 40 mmHg was calculated for each patient. The primary endpoint was perioperative opioid requirement in the operating room and the recovery room, measured as morphine milligram equivalents (MME). Secondary endpoints included emergency department visits and urinary tract infections within 30 days. Outcomes were compared between patients with high pressure (pressure > 40 mmHg for at least 10 minutes) and those with low pressure (pressure > 40 mmHg for less than 10 minutes) using Student's t-test and chi squared tests.

Results: Intrarenal pressure readings during ureteroscopy were available for 31 patients. There were 15 patients in the high-pressure group and 16 patients in the low-pressure group. On multivariable linear regression, perioperative opioid requirement was associated with the duration of pressure > 40 mmHg (coefficient 0.61 MME/min, 95% CI 0.09 – 1.13, p=0.023, Table 1). There was no significant association between opioid requirement and duration of pressure < 40 mmHg (coefficient 0.17 MME/min, 95% CI -0.45 – 0.78, p=0.584). Unadjusted analysis did not demonstrate a difference in perioperative opioids between the high-pressure group and the low-pressure group (mean 34.9 MME vs. 29.6 MME, p=0.432). Emergency department visits occurred in 3/15 patients in the high-pressure group and 0/16 patients in the low-pressure group (p=0.060). Urinary tract infections occurred in 2/15 patients in the high-pressure group and 0/16 patients in the low-pressure group (p=0.131).

Variable	Coefficient	95% CI	P-value
Duration of pressure > 40 mmHg, per minute	0.61	0.09 – 1.13	0.023
Duration of pressure < 40 mmHg, per minute	0.17	-0.45 – 0.78	0.584
Age, per year	-0.94	-1.53 – -0.35	0.003
Female gender, n (%)	-8.56	-21.07 – 3.95	0.171

Conclusions: On multivariable analysis, increased ureteroscopy duration with intrarenal pressures above 40 mmHg was associated with increased perioperative opioid requirement. Emergency department visits and urinary tract infections were only seen in the low-pressure group, but no statistically significant difference was seen. This should be further explored in larger cohorts.

Research Area: Nephrolithiasis, Innovative technologies

P-21

Local tissue response to a C-X-C motif chemokine ligand 12 therapy for underactive bladder syndrome in a rat modelHannah M. Ruetten^{1,2*}, Shannon Lankford¹, Gopal Badlani^{3,4}, and James K. Williams¹

¹Wake Forest Institute for Regenerative Medicine, Wake Forest Baptist Medical Center; ²Department of Pathology, Section on Comparative Medicine, Wake Forest School of Medicine; ³Department of Urology, Wake Forest Baptist Medical Center, Winston-Salem, North Carolina, USA; ⁴Section of Urology, VA Medical Center, Salisbury, North Carolina, USA

Introduction: Bladder outflow obstruction is common in older men and often leads to underactive bladder syndrome which is the clinical manifestation of bladder over-distension, detrusor fibrosis, and reduced detrusor contractility. Current treatment options include surgical removal of the obstruction and palliative therapeutics. However, even when the obstruction is surgically removed, the detrusor does not fully recover. CXCL12 is a chemokine known to recruit stem/progenitor cells to sites of injury. In this study we investigate the ability for local injection of CXCL12 chemokine therapy, alone or in combination with stricture release, to reduce detrusor fibrosis, restore muscle content, vascularization, and innervation, and restore bladder function in a rat model of underactive bladder.

Methods: This study was conducted in two phases. In phase one, adult male rats were assigned to four groups: controls, and obstructed/no treatment (Untreated) for 6 weeks, 9 weeks, and 12 weeks (n=4-6 each). In phase two, adult male rats were assigned to 3 groups: CXCL12 treatment (CXCL12 alone), stricture release (Stricture release alone) and CXCL12 treatment/stricture release (Combination therapy), all rats had an obstruction procedure (n=6-7 each). Obstructed groups were anesthetized and a silk ligature placed around the urethra to cause partial outlet obstruction. Intra-detrusor injection of 200ng of human recombinant CXCL12 was used for CXCL12 treatment. Stricture release groups had the ligature surgically removed. All treatments occurred six weeks after obstruction. Cystometry was performed immediately prior to euthanasia. Control group and 12 week untreated cystometry data from phase one were used for comparison in phase two. Void spot assays were performed at baseline, two, five, seven, and 11 weeks in phase two only. In phase two necropsy was performed 12 weeks after obstruction surgery (six weeks after treatment). Bladders were removed, fixed, embedded in paraffin, sectioned, and mounted to slides for histologic analysis of collagen and muscle content and fiber characteristics; innervation, and vascularization.

Results: In phase one, bladder compliance (infused volume/ leak point pressure) was significantly reduced in the 12 week group compared to week 9 and control (p=0.01 and p=0.03). In phase two, bladder compliance was significantly reduced in all groups (untreated, CXCL12 alone, stricture release alone, and combination therapy) compared to control (p=0.001, p=0.004, p=0.02, and p=0.002). Analysis of additional cystometry parameters, bladder tissue, and void spot assays are ongoing.

Conclusion: We were able to successfully induce bladder outlet obstruction resulting in reduced bladder compliance at 12 weeks in a rat model of under active bladder. Similar to in humans, surgical release of the obstruction did not restore bladder compliance. None of our treatments restored bladder compliance, however, data analysis is ongoing to determine if there are any additional signs of detrusor regeneration/function improvement. If we find other signs of bladder regeneration, it is possible we will need to evaluate a later time point to assess for restoration of bladder compliance.

Research Area: Bladder outlet obstruction, Therapeutic Development, Regenerative Medicine/ Tissue Engineering

P-22

Addressing commonly asked questions in Urogynecology - accuracy and limitations of ChatGPT

Vurture, Gregory¹; Jenkins, Nicole P¹; Ross, James¹; Sansone, Stephanie¹; Conner, Ellen¹; Jacobson, Nina¹; Smilen, Scott¹; Baum, Jonathan¹

¹ Department of Obstetrics and Gynecology, Division of Urogynecology, Hackensack Meridian Health - Jersey Shore University Medical Center, Neptune, New Jersey

Introduction: The ease of use of large language models (LLMs) such as Chat Generative Pre-training Transformer (ChatGPT) has facilitated their wide-scale use by patients and physicians. Nonetheless, this artificial intelligence (AI) technology is still in its infancy. There is a paucity of literature regarding its accuracy in healthcare, and to date, none in urogynecology. The aim of the present study is to assess ChatGPT's ability to accurately answer commonly asked questions in urogynecology based on published guidelines using a validated scoring tool.

Methods: We developed 10 commonly asked questions by patients in a urogynecology office that could be answered by published guidelines. These questions were fed into ChatGPT. Each question was asked in a separate instance to avoid bias in response. Answers were evaluated by a panel of board certified urogynecologists for appropriateness and assigned a score using the Brief DISCERN (BD) scoring system, a validated healthcare information assessment questionnaire. Responses were graded based on their accuracy and consistency with expert opinion and published guidelines. A score of ≥ 16 is consistent with good quality content. Statistical analyses were performed using JMP v.16.2 software (SAS Institute Inc, Cary, NC, USA).

Results: The average BD score across all 10 questions was 18.9 ± 2.7 . Twelve out of thirteen (92.3%) questions had a response that was determined to be of good quality ($BD \geq 16$). The lowest scoring topic was "Pelvic Organ Prolapse" (mean $BD=14.0 \pm 2.0$). The highest scoring topic was "Interstitial Cystitis" (mean $BD=22.0 \pm 0$). ChatGPT provided no references for its responses.

Conclusions: ChatGPT provided appropriate responses to 92.3% of the questions based on an expert panel's review with the BD scoring system. ChatGPT may be a promising option for patients looking for answers to their urogynecological problems on the internet. However, given the lack of references in its responses and evolving nature of LLM technology, continued analysis is essential before ChatGPT can be accepted as an accurate and reliable source for urogynecological information.

Research area: Artificial intelligence, Innovative Technologies, Female Pelvic Medicine

P-23

Urodynamic mechanisms underlying overactive bladder symptoms in Hispanic womenVurture, Gregory¹; Jenkins, Nicole P¹; Jacobson, Nina¹; Smilen, Scott¹

1: Division of Urogynecology, Department of Obstetrics and Gynecology, Hackensack Meridian Health - Jersey Shore University Medical Center, Neptune, New Jersey.

Introduction: There is limited knowledge about the role of urodynamics (UDS) for racial minority women with overactive bladder (OAB) symptoms. Prior studies suggest that OAB is more prevalent among Hispanic women compared to other ethnic groups. Hispanic women are under-represented in the OAB literature. The aim of this study is to assess the urodynamic mechanisms underlying OAB in Hispanic women.

Methods: The charts of all Hispanic women at least 18 years old who underwent UDS for lower urinary tract symptoms between 2018 and 2022 at a single academic institution were retrospectively reviewed. Only patients who had an ICD-10 diagnosis of OAB and had undergone UDS were included in the study. Race and ethnicity were self-reported by patients and documented in the electronic medical record. Means and standard deviations were reported for continuous variables and proportions for nominal variables. Univariate analysis using Fisher exact test or chi-2 test for nominal variables and Mann-Whitney test for continuous variables were performed to seek for clinical predictive factors of various urodynamic parameters.

Results: Two-hundred patients were included in the present analysis. On UDS, 38 of the 200 patients had at least one involuntary detrusor contraction (IDC) (19.0%) during filling, consistent with detrusor overactivity (DO). The mean volume of the first uninhibited contraction was 219.8mL. The first desire to void occurred on average at 143.6mL with an average cystometric capacity of 291.8mL. On pressure flow analysis, the patients had an average maximum flow of 22.0mL/s, with an average detrusor pressure at maximum flow of 36.0 cm H₂O. The maximum detrusor pressure was 58.3cm H₂O. The average voided volume was 275.7mL. The mean maximum urethral closure pressure was 74.6 cm H₂O. A subanalysis revealed trends towards greater age (p=0.14), lower degree of pelvic organ prolapse (POP) (p=0.09), and lack of insurance (p=0.11) as predictive factors of DO on UDS.

Conclusions: Many Hispanic women with OAB do not exhibit DO on UDS. The decision to perform UDS in these patients should be prompted by other objectives than diagnosing DO. However, greater age, lower degree of POP, and lack of insurance may be predictive of DO, though they did not reach statistical significance. Thus, further prospective and randomized studies are needed to confirm our findings and elucidate the mechanisms by which social determinants of health may affect UDS performance for Hispanic women with OAB.

Research Area: Health Services Research, Overactive Bladder, Urodynamics

P-24

Computational modeling of sacral nerve stimulation for treatment of overactive bladderMarshall, Daniel P¹; Pelot, Nicole A¹; Grill, Warren M¹¹Department of Biomedical Engineering, Duke University, Durham, NC.

Introduction: Overactive bladder is a debilitating condition that affects 16.0% of men and 16.9% of women in the U.S. When medication fails to treat symptoms, sacral nerve stimulation (SNS) has proven to be an effective and safe treatment option, with up to 90% of patients seeing >50% symptom improvement. While SNS has been in use since FDA approval in 1999, an understanding of the underlying mechanisms is lacking, and (re)programming of stimulation parameters is often a trial-and-error process.

Methods: We constructed a computational model of the pelvis and third sacral nerve root (S3) (Figure 1A) to quantify nerve fiber activation from SNS. We used publicly available segmentations to model the pelvic organs and published histology of S3 to sweep a three-dimensional nerve through the sacral foramen; we modeled the Medtronic InterStim™ lead alongside S3. We used this finite element model to solve for the electric potentials in the tissues. Using NEURON, we calculated the response of biophysical fiber models (Figure 1B) within S3 to different combinations of active electrode contacts while varying lead positioning. Finally, we designed novel leads that enable selective activation of fiber populations in S3.

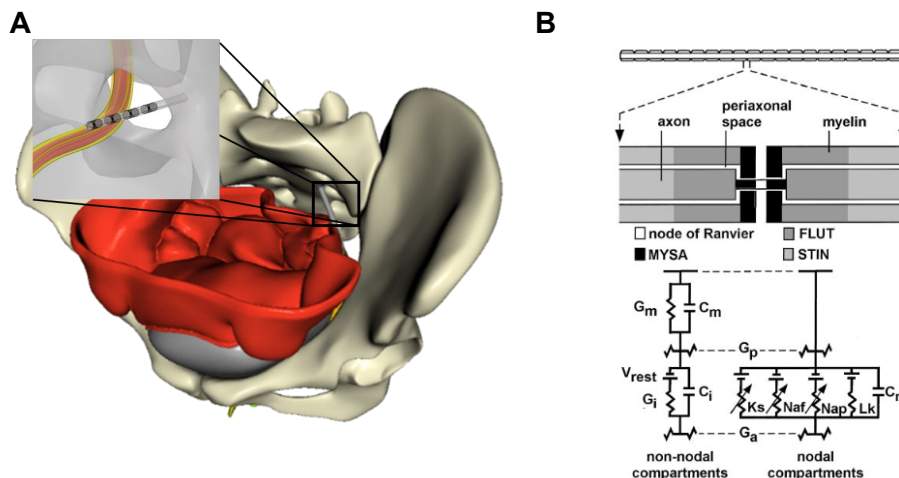


Figure 1:
Modeling setup. A) Geometric model of the pelvic organs, S3 nerve, and stimulation lead. **B)** MRG multi-compartment model (McIntyre et al. 2002, PMID: 11826063) of mammalian myelinated axons.

Results: Lead positioning had a strong effect on activation thresholds of S3 fibers; responses varied the most when the lead was moved or rotated lateromedially. Closely spaced bipolar configurations required the highest amplitude to activate S3 fibers, followed by monopolar stimulation, and highly spaced bipolar configurations had the lowest required amplitude. Different sacrum geometries and nerve paths changed the overall excitability but not the relative excitability of fibers within S3. Our novel lead designs enabled the activation of S3 at lower stimulation amplitudes than the standard clinical lead while enabling greater control over the nerve fiber populations activated by stimulation.

Conclusion: This study presents the first computational model of SNS incorporating both pelvic organs and sacral nerve geometry derived from histology and provides an innovative tool for understanding and improving SNS treatment. Our findings highlight the critical role of lead placement and configuration, offering potential opportunities for enhancing SNS efficacy and patient responsiveness. Our novel lead designs have the potential to provide fine control over the effects of SNS. Future research should focus on developing novel leads for clinical testing, as well as patient-specific modeling of SNS to examine and improve therapeutic outcomes.

Acknowledgments: This work was supported by a grant from Boston Scientific Urology.

Research Area: Overactive Bladder, Neurourology, Innovative technologies

P-25

Prevalence of urge incontinence after urethral hydrogel injection in patients with mixed urinary incontinenceJenkins, Nicole P¹; Vurture, Gregory W¹; Jacobson, Nina¹; Smilen, Scott¹¹ Department of Obstetrics and Gynecology, Division of Urogynecology, Hackensack Meridian Health - Jersey Shore University Medical Center, Neptune, New Jersey

Introduction: Mixed urinary incontinence (MUI) is a complex syndrome defined by the presence of both stress urinary incontinence (SUI) and urgency urinary incontinence (UUI). Treatment of MUI requires targeted therapy of both the SUI and UUI components. Urethral Hydrogel injection was recently approved by the United States Federal Drug Agency as a treatment for SUI. The objective of our study is to analyze UUI in patients with MUI who underwent successful treatment for concurrent SUI with urethral hydrogel injection.

Methods: All women older than 18 years old who underwent urethral hydrogel injection between January 2021 to December 2023 at a single academic institution were retrospectively reviewed. All patients underwent urethral hydrogel injection in an ambulatory surgery center. Only patients who had an ICD-10 diagnosis of MUI were included in the present study. Patients with concurrent neurogenic bladder or had received third line overactive bladder (OAB) therapy within the past year were excluded. Means and standard deviations were reported for continuous variables and proportions for nominal variables. Univariate analysis using Fisher exact test or chi-2 test for nominal variables and Mann-Whitney test for continuous variables were performed.

Results: Sixty nine patients met inclusion criteria (n=69). Sixty seven patients (97.1%) presented for their 2 week post-operative visit of which 42 patients (62.7%) reported resolution of UUI. Fifty-nine patients (85.9%) presented for their 6 week post-operative visit of which 29 patients (49.2%) reported resolution of UUI. Eight patients who had resolution of their UUI symptoms at 2 weeks reported recurrence of UUI at the 6 week visit (21.6% vs 78.4%, p<0.0001). All 22 patients who reported continued UUI at 2 weeks, reported persistence at 6 week visit (p<0.0001). Twenty-nine patients (43.3%) ultimately underwent treatment of their OAB symptoms after hydrogel injection.

Conclusion: Urethral hydrogel may provide some benefit to UUI in those with MUI. However, this benefit may be temporary given a recurrence rate of approximately 22% at 6 weeks postoperative and a large number of patients undergoing subsequent treatment for OAB symptoms. Nonetheless, reassessment of UUI after urethral bulking may be beneficial to guide subsequent treatment. Ultimately, further prospective and randomized study is required to further elucidate the mechanisms of urethral hydrogel on UUI.

Research area: Female Pelvic Medicine, Overactive Bladder, Mixed Incontinence

P-26

Young female Ehlers-Danlos Syndrome mice have increased bladder contraction and sensitivity to muscarinic stimulation

Kamath, Soumya; Readyoff, Andrew; Williamson, Nick; Minchew, Everett; Spangenberg, Espen E; Hannan, Johanna L

Department of Integrative Physiology and Metabolism, Brody School of Medicine at East Carolina University, Greenville, North Carolina, United States of America

Introduction/Objective: Ehlers-Danlos syndrome (EDS) is an inherited connective tissue disorder characterized by collagen abnormalities, leading to tissue fragility. Individuals with EDS often experience urinary incontinence, pelvic pain, and sexual dysfunction, with a higher prevalence in female (73-89%). Classic EDS (type 1) arises from mutations in the collagen type V (COL5A1) gene. Collagen V plays a pivotal role in the regulation of fibrillogenesis. The goal of our study is to determine the role of collagen V in smooth muscle function in the bladder and vagina of female mice. *We hypothesized that decreased collagen V in the EDS mice would lead to decreased contractility of the genitourinary tissue as well as more frequent voiding.*

Methods: We assessed 16-week old wild-type (WT; Col5a1 +/+) and heterozygous (EDS; Col5a1 +/-) mice (n=13-14). Bladder function was evaluated with void spot assays, and tissue bath experiments were conducted on bladder and vaginal strips. Contractions were induced by high potassium to assess tissue viability, followed by concentration-response curves to carbachol and norepinephrine in the bladder and vagina, respectively. Bladder electric field stimulated (EFS) contractions, with or without atropine (cholinergic antagonist) and PPADS (purinergic antagonist), were measured. Additionally, relaxation curves to DEA NONOate and EFS were assessed in the vagina.

Results: At 16 weeks, body and bladder weights between genotypes were unchanged. Young female EDS mice had no change in voiding frequency (WT: 2.59±1.0, EDS: 2.00±0.8; p=0.0536). Similarly, no differences were observed in the total void area or primary void size. At lower carbachol concentrations, EDS bladders demonstrated higher contractions compared to WT mice (p<0.05) which was also reflected in the significantly increased EC50 (WT: -6.8±0.4, EDS: -7.3±0.6; p<0.05). Overall EFS-mediated bladder contractions were similar, but EDS mice exhibited greater cholinergic inhibition of EFS-mediated contractions. Vaginal contractions to high potassium and norepinephrine, and vaginal relaxation to DEA NONOate and EFS were not different between groups (p>0.05).

Conclusions: Young female EDS mice demonstrate greater bladder contraction and sensitivity to cholinergic stimulation. In contrast, EDS did not impact vaginal smooth muscle physiology. Ongoing studies will assess bladder, vaginal and pelvic floor muscle morphology, and pelvic floor muscle contractility. Our preliminary data demonstrate a preclinical model of EDS that can be used to advance our understanding of urinary dysfunction.

Research Area: Voiding Dysfunction/Urinary Retention, Sexual Dysfunction

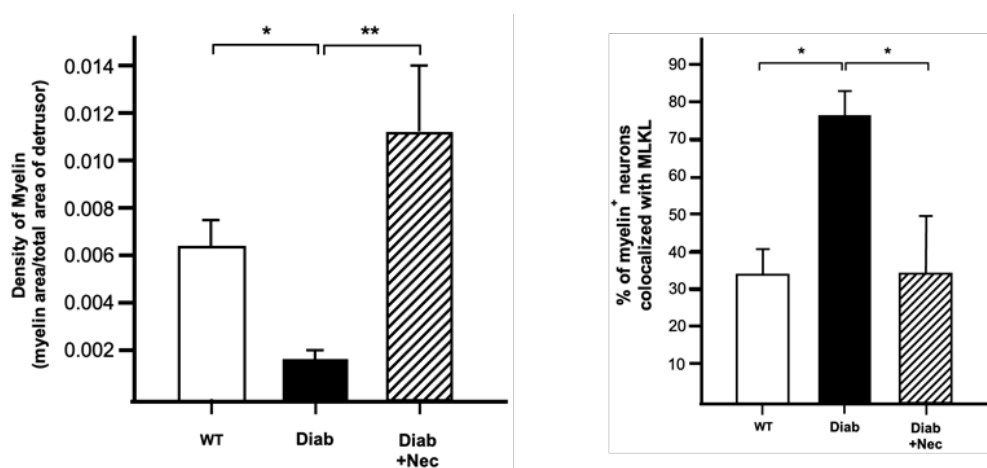
P-27

Necroptosis of Schwann cells as a possible mechanism underlying Diabetic Bladder DysfunctionGultekin, Aydin A.¹; Purves, J. Todd¹; Jin, Huixia¹; Odom, Michael R.¹; Hughes, Jr., Francis M.¹¹Duke University Medical Center, Department of Urology, Durham, NC.

Introduction/Objectives: Diabetic Bladder Dysfunction (DBD) is a prevalent issue that around 50% of diabetic patients face. It may present as an overactive or underactive bladder phenotype. Our lab has previously shown that in the female Akita mouse model of type-1 diabetes, which experiences overactive bladder, the phenotype is caused by inflammation. However, this is not the case for males, which have an underactive phenotype. There, diabetic neuropathy appears to play the most important role, as a net decrease in efferent cholinergic signaling was demonstrated. New research shows that necroptosis of Schwann cells, which are responsible for the regulation of myelin sheath and Ranvier nodes, leads to peripheral neuropathy in diabetes. The necroptosis pathway is driven, in part, through the RIPK1/MLKL pathway. Thus, we hypothesize that RIPK1/MLKL-dependent necroptosis is responsible for neuropathy in male Akita mice detrusor, which eventually causes DBD.

Methods: Male wildtype (control) and Akita (diabetic) mice were aged to 15 weeks. Beginning at 6 weeks of age, one group of diabetic male mice were given an inhibitor of RIPK1/MLKL-dependent necroptosis daily; Necrostatin-1 (Nec-1, 1.65 mg/kg/day, i.p.). Bladders were harvested, fixed, paraffin embedded, sectioned (5 μ m), and stained for Myelin Basic Protein (MBP, a marker of Schwann cells) and MLKL. Using image analysis software, MBP density and MBP/MLKL colocalization in the detrusors were quantitated.

Results: Diabetic male Akita mice demonstrated a significant decrease in the density of MBP in the detrusor compared to Wildtype group, demonstrating a loss of Schwann cells. This loss was completely prevented with Necrostatin-1 treatment, clearly signifying this death process in the loss of Schwann cells. In addition, diabetic bladders showed significantly higher rates of MBP and MLKL colocalization compared to control group. Necrostatin-1 injected Akita group showed colocalization rates significantly lower than the diabetic bladders, and the mean rate wasn't significantly different than control.



Conclusion: There is a decrease in Schwann cell density in detrusor of diabetic male mice. This is caused, in part, by elevated rates of RIPK1/MLKL-dependent necroptosis. Schwann cell necroptosis drives other examples of peripheral neuropathy in the body, suggesting that this mechanism may underlie DBD in male Akita mice.

Research Area: Diabetes, Neurourology

P-28

Chronic monitoring of neurogenic bladder function in rats with spinal cord injuriesAbbott, Em¹; La, Priscilla¹; Xu, Cindy¹; Young, Zachary¹; Grill, Warren¹¹Duke University, Biomedical Engineering, Durham, NC

Introduction/Objective(s) Spinal cord injury (SCI) disrupts intricate autonomic and somatic neural control often resulting in Neurogenic Bladder (NGB) dysfunction. Restoring bladder and bowel function is crucial for improving the quality of life for individuals living with SCI. Therefore, our objective is to conduct chronic in vivo studies to deepen our understanding of post-SCI bladder function and ultimately develop effective therapies.

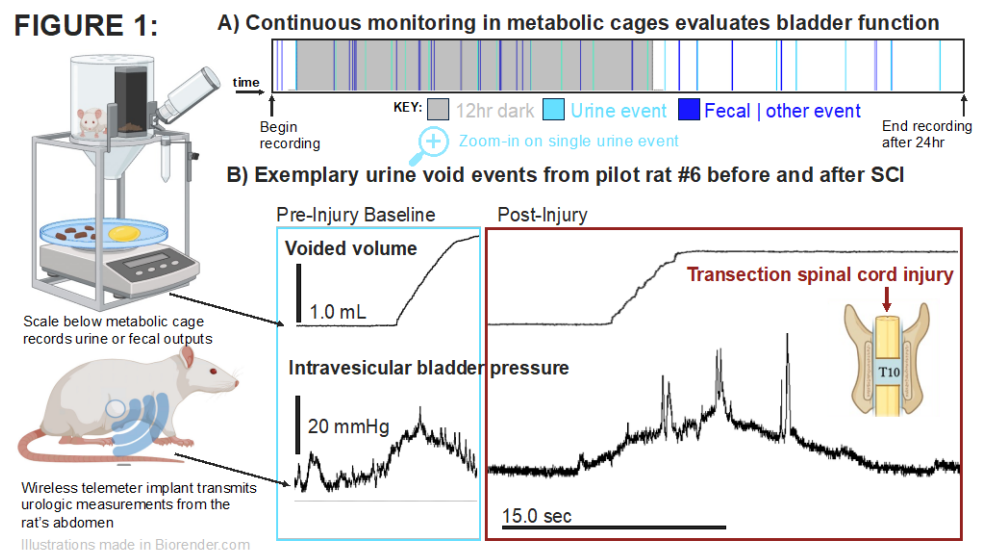
Methods For metabolic recordings, female Sprague-Dawley rats were housed in a metabolic cage set over a scale for 24hrs with ad libitum access to food and water, under a 12-hr light-dark cycle. Output events were characterized by scale increases in weight, determined to indicate urine output, fecal output or other incident type. Following two baseline recordings, rats underwent surgical implantation of a wireless device (Stellar Telemetry, TSE Systems) including a probe inserted into the bladder dome to measure intravesicular pressure and an electrode secured to the ventral side of the external urethral sphincter (EUS) to measure muscle activity. Data were transmitted via custom radio frequencies (Stellar Commander v3.3.0.1) to our data acquisition system (Instem, NOTOCORD-hem 4.4.0.3). After a four-week recovery, rats underwent spinal cord transection at T9 and weekly recordings continued after bladder reflexes returned. Rehabilitation was quantified using weekly open field tests (Basso Beattie Bresnahan (BBB) scale). Bladder size estimated from rat weights before and after bladder expression.

Results Intact rats had an average baseline urine void volume of $1.44\text{mL} \pm 0.24\text{mL}$ (light cycle) or $0.97 \pm 0.2\text{mL}$ (dark cycle) while intact rats that recovered from implanted telemeter devices showed an average urine void volume of $1.42 \pm 0.16\text{mL}$. Post-SCI rats exhibited similar void volumes with enlarged bladders ($9.68 \pm 3.42\text{mL}$) which demonstrates decreased voiding efficiency. Post-SCI rats also demonstrated classic neurogenic bladder symptoms such as detrusor overactivity (Figure 1).

Conclusion(s) We successfully monitored intravesicular pressure, external urethral sphincter (EUS) activity, and voiding behavior in awake, behaving rats. Post-SCI rats exhibited tolerance to the telemeter instruments, which is encouraging considering the frequent manual bladder expressions required during the post-SCI acute recovery period. Building on this feasibility, we are eager to explore the promising potential of epidural electrical stimulation as a potential treatment for NGB.

Funding: CDMRP Award SC200190.e001; NIH KURe K12DK100024

Research area voiding dysfunction



P-29

Selective neurokinin 2 receptor agonist, DTI-117, induces bladder and colorectal responses without producing hypotension in adult and aged F344 rats

Pati, Dipanwita; Cook, Jason B; Piatt, Raymond; Thor, Karl B; Marson, Lesley

Dignify Therapeutics LLC, Research Triangle Park, North Carolina

Introduction: Bladder and bowel dysfunction are among the most common clinical complications in the elderly population. Current therapeutic agents to induce voiding have limited efficacy with often severe side effects resulting in poor patient compliance and reduced quality of life. Neurokinin 2 receptor (NK2R) agonists directly contract detrusor and colorectal smooth muscle and are potential candidates for the treatment of underactive bladder and functional defecation disorders. Historically, one limitation of NK2R agonists is the concurrent activation of NK1Rs resulting in off-target effects, such as transient hypotension. This study examined the efficacy of two NK2R agonists, AMN-NKA and DTI-117, to induce bladder, colorectal, and blood pressure responses in anesthetized aged and young adult rats. The study also assessed the effect of DTI-117 on urination and defecation behaviors in awake, aged rats.

Methods: Male and female young adult (4-6 months) and aged Fischer 344 (F344, ~15-20 months) rats were obtained from the National Institute of Aging rodent colony. Voiding cystometry, colorectal manometry, and blood pressure were measured in urethane anesthetized rats in response to ascending doses of AMN-NKA and DTI-117. Effects of twice daily administration of DTI-117 on urination and defecation behaviors in awake, aged rats were recorded in metabolism cages across a 14-day treatment period.

Results: Adult and aged male rats had larger bladder capacities than adult females, and aged male rats had larger bladder capacities than aged females. There were no differences in baseline voiding pressure between groups. Intravenous administration of AMN-NKA or DTI-117 (0.3-10 $\mu\text{g}/\text{kg}$) induced rapid-onset, short-duration increases in bladder and colorectal pressure in a dose-dependent manner. There were no dose-related differences in bladder and colorectal peak pressure responses between adult and aged rats. While AMN-NKA produced transient hypotension at the highest doses tested, the more selective agonist, DTI-117, did not. DTI-117 when administered intramuscularly (10-300 $\mu\text{g}/\text{kg}$, IM), also produced dose-dependent increases in bladder and colorectal pressures in aged and young adult rats with no effect on blood pressure. In awake, aged rats, DTI-117 (100 $\mu\text{g}/\text{kg}$, IM) induced reliable and consistent urination and defecation across the 14-day treatment regimen.

Conclusions: These data demonstrate that despite underlying changes in the bladder and colorectum that occur with aging, NK2R agonists are equally efficacious at inducing bladder and colorectal contractions in young adult and aged F344 rats. Furthermore, these results suggest that DTI-117 may be a safe and efficacious clinical candidate for future treatment of underactive bladder and functional defecation disorders in the elderly without causing undesirable side effects such as hypotension.

Acknowledgments: This work was funded via an NIH grant AG055169. The authors thank Integrated Laboratory Systems for the use of their facility.

Research area: Aging, Voiding Dysfunction/Urinary Retention, Therapeutic Development

P-30

Sex hormones contribute more to the development of diabetic bladder dysfunction than the severity of hyperglycemia in type 1 diabetic Akita mice

Michael R. Odom, Francis M. Hughes Jr., Huixia Jin, J. Todd Purves

Department of Urology, Duke University Medical Center, Durham, NC

Introduction/Objectives: Diverse symptoms of diabetic bladder dysfunction (DBD), ranging from overactive bladder (OAB) to underactive bladder (UAB), manifest in half of all patients with diabetes. While the cause of such symptom variation is unknown, clinical evidence suggests sex hormones influence the presentation of DBD symptoms. Preclinical models like the type 1 diabetic Akita mouse support this notion as Akita females develop OAB while, for unknown reasons, Akita males develop UAB. It has been proposed the more severe hyperglycemia in males is responsible for UAB development rather than the OAB observed in females; however, the same genetic mutation is responsible for inducing diabetes in both sexes and the only critical variable responsible for differences in the severity of hyperglycemia and DBD phenotype appears to be levels of sex hormones. Therefore, we hypothesize sex hormone levels differentiate the development of diabetic OAB vs. UAB.

Methods: Both male and female type 1 diabetic Akita and non-diabetic C57BL/6J mice were either gonadectomized at 8 weeks of age or remained gonadally intact. Blood glucose was measured weekly from 8-15 weeks of age in all groups (n= 9-15 per group). At 15 weeks, awake-restrained cystometry was performed in all groups (n= 9-11 per group) to determine void volume and void frequency. Statistical significance defined as $p < 0.05$ was calculated using a two-way analysis of variance with Tukey post hoc for all groups of blood glucose data and a one-way analysis of variance with Tukey post hoc was used for all groups of either male or female cystometry parameter data.

Results: In gonadally intact mice, blood glucose is significantly higher in male diabetics (520 mg/dL) than female diabetics (258 mg/dL), and blood glucose of male and female diabetics is significantly higher than non-diabetics of both sexes (128-155 mg/dL). Compared to respective non-diabetics of each sex, male diabetics develop a significant increase in void volume and decrease in voiding frequency consistent with signs of UAB, while female diabetics develop a significant decrease in void volume and increase in voiding frequency consistent with signs of OAB. Within 7 weeks following a gonadectomy, blood glucose of gonadectomized male diabetics significantly decreases to levels comparable to female diabetics (235 mg/dL), while blood glucose of gonadectomized female diabetics significantly increases to levels comparable to male diabetics (490 mg/dL). Surprisingly, despite significant fluctuations in blood glucose, both groups of gonadectomized male and female diabetics fail to develop any discernable signs of DBD as their void volumes and frequencies significantly differ from their gonadally intact counterparts but are not significantly different than non-diabetics of each respective sex. Gonadectomies do not significantly alter the blood glucose and voiding parameters of non-diabetics from either sex.

Conclusions: Sex hormone levels have a greater impact on the development of DBD than the severity of hyperglycemia. Hormone-dependent mechanisms responsible for the development of DBD may serve as potential therapeutic targets to delay or prevent DBD development and possibly treat existing DBD.

Research areas: diabetes, urodynamics, voiding dysfunction / urinary retention



Scott Bauer, MD, MS

Assistant Professor of Medicine, Urology, Epidemiology & Biostatistics
University of California, San Francisco and the San Francisco VA

Dr. Bauer is a general internist, translational epidemiologist, and clinician investigator with a primary care practice based at the San Francisco Veterans Affairs Medical Center. He is also a member of the Baker Aging Research Institute and the Kidney Health Research Collective at the University of California, San Francisco. His academic focus is to understand the mechanisms underlying urologic aging and to define clinical phenotypes and biomarkers for older adults with debilitating urologic conditions. Dr. Bauer's areas of research expertise include geriatric urology, lifestyle and age-related risk factors, and longitudinal assessment of biomarkers, functional outcomes, and quality of life. His research is funded by a K76 Paul B. Beeson award from the NIA and an R01 from the NIDDK, for which he leads a randomized clinical trial testing an exercise intervention for urinary symptoms in sedentary older men with benign prostatic hyperplasia.



Mary F. Barbe, PhD

Professor of Anatomy and Cell Biology
Temple University School of Medicine

Dr. Barbe is Professor of Anatomy and Cell Biology at Temple University School of Medicine. For the past 17 years, Dr. Barbe's research has focused on examining the effects of overuse injury on musculoskeletal tissues, specifically the effects of repetition and force on tissues as a consequence of an upper extremity Work-Related Musculoskeletal Disorders (a type of overuse injury), using a novel operant rat model developed in the laboratory. She is currently exploring inducers of tissue fibrosis and degeneration occurring with overuse, as well as effective interventions for the inflammatory and fibrotic tissue changes as well as associated behavioral declines. She is currently examining means of successful reinnervation of bladder and urethral sphincter targets after spinal root injury in collaboration with Dr. Michael Ruggieri of the Department of Urology, The Lewis Katz School of Medicine at Temple University. They have shown that functional reinnervation (using electrophysiology) and recentralization (using neuroanatomical tract tracing) of the bladder can occur using a number of surgical strategies, including homotopic reconnection of severed sacral roots innervating the bladder and heterotopic reconnection using genitofemoral or femoral nerves that originate from more rostral spinal cord segments.



Matthew D. Barber, MD, MHS, MSOD

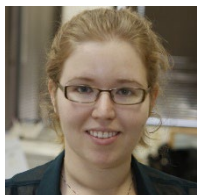
W. Allen Addison Distinguished Professor and Chair
Department of Obstetrics and Gynecology
Duke University Medical Center

Dr. Barber is W. Allen Addison Distinguished Professor and Chair of the Department of Obstetrics and Gynecology at Duke University Medical Center. Dr. Barber earned his medical degree from Jefferson Medical College of Thomas Jefferson University, a master's degree in Health Science in Clinical Research from Duke University School of Medicine and recently a master's degree in Positive Organizational Development and Change from Case Weatherhead School of Management. He completed residency training in obstetrics and gynecology and a fellowship in urogynecology and pelvic reconstructive surgery at Duke University. His clinical practice focuses on the full spectrum of diagnosis, prevention and medical, behavioral, and surgical treatments for women with pelvic floor disorders (PFDs). Dr. Barber's research focus is the conduct of randomized clinical trials for the treatment of gynecologic conditions, particularly surgical trials for PFDs. He is an internationally recognized expert in developing, validating, and assessing research outcomes in PFDs, particularly health-related quality of life and patient reported-outcomes. He is currently Chair of the Urogynecology and Reconstructive Pelvic Surgery Division of the American Board of Obstetrics and Gynecology and is the Associate Editor of the journal *Urogynecology*. He is the co-editor of the 5th and 6th editions of *Walter & Karram Urogynecology and Reconstructive Pelvic Surgery*.

**Zach Danziger, PhD**

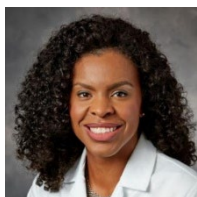
Associate Professor, Department of Rehabilitation Medicine - Division of Physical Therapy
Emory University

Dr. Danziger is Associate Professor at Emory University in the Departments of Rehabilitation Medicine and Biomedical Engineering. His research focuses on understanding how the nervous system controls the body at the level of systems physiology. This includes mapping the complex web of reflexes that regulate the lower urinary tract and its dysfunction in aging and disease, and how primary motor cortex organizes high-dimensional operation of complex systems such as brain-computer interfaces. Dr. Danziger's approach is to use model systems (human, animal, and computational) to deepen our mechanistic understanding of how neural control is achieved, and how to reverse its disruption caused by disease.

**Nicole De Nisco, PhD**

Assistant Professor, Biological Sciences
The University of Texas at Dallas

Dr. De Nisco is Assistant Professor of Biological Sciences at the University of Texas at Dallas and an Adjunct Assistant Professor in the Department of Urology at the University of Texas Southwestern Medical Center. Dr. De Nisco earned her PhD in Molecular Biology at MIT in 2013 and completed her postdoctoral training at the University of Texas Southwestern Medical Center. Her laboratory studies host-pathogen-microbiome interactions that underlie recurrent urinary tract infection (UTI). The De Nisco lab seeks to inform new therapies for recurrent UTI by interrogating the metabolic relationship between the urinary microbiota and the human host. Additional ongoing collaborative projects in the De Nisco lab focus on developing novel UTI vaccine strategies and new UTI diagnostic tools.

**Ekene Enemchukwu, MD, MPH, FACS, FPMRS**

Associate Professor of Urology
Stanford University

Dr. Enemchukwu is Associate Professor of Urology at Stanford University School of Medicine and serves as the Medical Director of the Stanford Multidisciplinary Pelvic Health Center. She graduated from Duke University and earned her combined degree in Medicine (MD) and Public Health (MPH) at the University of North Carolina School of Medicine and Gillings School of Global Public Health. She completed her urology training at Vanderbilt University Medical Center and a fellowship in Female Pelvic Medicine & Reconstructive Surgery at NYU Langone Medical Center. Dr. Enemchukwu is an NIH-funded researcher whose interests are in the areas of urinary incontinence, overactive bladder, and patient-centered care. Her research focuses on improving health care delivery, and patient access, engagement, and adherence to therapies for urinary incontinence. She also serves on the editorial boards for the *Journal of Urology*, and *Neurourology and Urodynamics*.

**Alison Huang, MD, MAS**

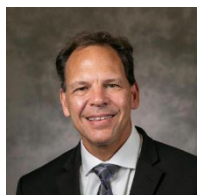
Professor of Medicine, Urology, and Epidemiology & Biostatistics
University of California, San Francisco

Dr. Huang is Professor in the Departments of Medicine, Urology, and Epidemiology & Biostatistics at the University of California, San Francisco. She serves as Director of Research for the Division of General Internal Medicine at UCSF Health and Director of the UCSF Women's Health Clinical Research Center. Dr. Huang is a clinical scientist dedicated to advancing understanding and improving management of the impact of aging on genitourinary health and women's health. She has designed and led multiple NIH-funded randomized trials of pharmacologic, behavioral, and integrative health interventions for lower urinary tract syndromes in older women of diverse backgrounds, including the CURE trial of device-guided slow-paced respiration for female overactive bladder syndrome, the LILA trial of a therapeutic pelvic yoga program for ambulatory older women with urinary incontinence, and the TRIUMPH trial to compare the multisystem effects of pharmacologic treatment strategies for urgency-predominant incontinence in older women. She directs NIH-funded research training programs for postgraduate research trainees and junior faculty, including the NIDDK-funded Urological Epidemiology Junior Faculty K12 Program at UCSF, and is an author of the *Designing Clinical Research* 5th edition textbook (Wolters Kluwer). She has also developed and validated self-report measures of genitourinary and sexual function used in clinical studies of women with pelvic health conditions in the US and internationally.

**Teresa Liu, PhD**

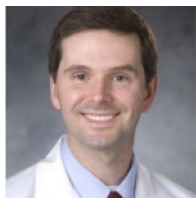
Assistant Research Professor, Department of Urology
University of Wisconsin – Madison

Dr. Liu is Assistant Research Professor in the Department of Urology at the University of Wisconsin – Madison. She was an NIDDK K12 Scholar from 2015-2020. Dr. Liu's research currently focuses on the underlying aging mechanisms driving benign prostatic hyperplasia and the accompanying lower urinary tract symptoms. Using an aging mouse model to recapitulate human disease, she is identifying molecular pathways that are critical to disease progression and treatment resistance. In particular, she is interested in the epigenetic regulation of the steroid hormone milieu through normal aging. Additionally, she is examining interventions, including aerobic exercise, that could improve quality of life.

**David Page, PhD**

James B. Duke Distinguished Professor, Biostatistics & Bioinformatics,
Division of Biostatistics
Duke University

Dr. Page is Chair of the Department of Biostatistics and Bioinformatics at Duke University. He completed his PhD in Computer Science at the University of Illinois at Urbana-Champaign, where his dissertation focused on theoretical aspects of machine learning. He became involved in biomedical applications of machine learning while a postdoc at Oxford University. During his 20 years at the University of Wisconsin-Madison, Dr. Page supervised 17 PhDs and 3 postdocs who went on to become scientists at Google, Amazon, Facebook, Yale, and the Carbone Cancer Center, as well as faculty at Carnegie-Mellon, Catholic University of Leuven, Michigan, Case Western, UCLA, Minnesota State, and Wisconsin. He has also supervised multiple master's students, including now-current PhD students at Duke, Princeton, and MIT.

**Jonathan C. Routh, MD, MPH, FAAP**

Chief, Duke Center for Children's Surgery
Paul H. Sherman, M.D. Distinguished Associate Professor of Surgery
Associate Professor of Urology, Pediatrics and Population Health Sciences
Duke University School of Medicine

Dr. Routh is a pediatric urologist and health services researcher at Duke University School of Medicine, where he serves as the Chief of Children's Surgery and is the Paul H. Sherman Distinguished Associate Professor of Surgery, Pediatrics, and Population Health Sciences. His clinical and research interests include minimally-invasive surgery, complex urologic reconstruction (particularly in children with spina bifida and neurogenic bladder), surgical and non-surgical management of children with disorders of sex development, and pediatric urologic oncology. He is currently an Associate Section Editor for the *Journal of Urology*, the Chair of the Steering Committee for the Urologic Management to Preserve Initial Renal Function Protocol for Young Children with Spina Bifida (UMPIRE) study, and the co-PI at Duke for both UMPIRE and the National Spina Bifida Patient Registry (NSBPR). Dr. Routh has extensive experience as a mentor and currently serves as a formal mentor for Duke's KURe K12 and the UrogynCREST R25 programs; his list of mentees includes 4 undergraduate students, 10 medical students, 10 urology residents, 2 post-doctoral researchers, and 6 junior faculty members. In addition, he serves on the Advisory Committee for the Duke Urology K12 program and is the Co-Director of the Duke Research Development Course for Trainees.

**Maryrose Sullivan, PhD**

Research Health Scientist, VA Boston Healthcare System
Assistant Professor of Surgery, Brigham and Women's Hospital
Harvard Medical School

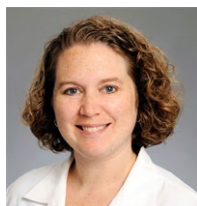
Dr. Sullivan's scientific interests have focused primarily on benign disorders of the bladder, including those related to outlet obstruction, diabetes, spinal cord injury and Parkinson's disease. Her research is aimed at uncovering mechanisms responsible for bladder function/dysfunction and urinary incontinence, with the ultimate goal of identifying targetable pathways for intervention and alleviating lower urinary tract symptoms. As a research scientist and biomedical engineer, her research projects exploit a number of multidisciplinary approaches to interrogate these pathways at the cellular, tissue and whole animal levels and include imaging, in vitro, ex vivo, and in vivo techniques. With funding from the Department of Veterans Affairs and NIDDK, she has published numerous original articles, chapters and reviews on topics related to urinary incontinence, bladder contractility, bladder outlet obstruction, neurogenic and non-neurogenic detrusor overactivity, and diabetic bladder dysfunction. She has been fortunate to be involved in mentoring and supervising many urology residents, post-docs, medical students and junior faculty. Dr. Sullivan is also an active member of the AUA, SUFU, SPR and ICS, and is a member of the editorial board of several urology focused journals. Dr. Sullivan serves on the KURe Advisory Board.



Anne-Catrin Uhlemann, MD, PhD

Associate Professor of Medicine, Division of Infectious Disease
Columbia University Irving Medical Center

Dr. Uhlemann is Associate Professor of Medicine in the Division of Infectious Diseases at Columbia University Irving Medical Center, where she also directs the CUIMC Microbiome & Pathogen Collaborative Center and the Columbia University O'Brien Center for Benign Urology. She completed her medical training at the Eberhard-Karls-University in Tübingen, Germany and received her PhD from the University of London, UK. Dr. Uhlemann completed her residency in internal medicine and fellowship training in infectious diseases at Columbia University Irving Medical Center in New York. Dr. Uhlemann's research focuses on the mechanisms and evolution of resistance to antibiotics, in particular in Gram-negative bacteria. This includes investigations into carbapenem-resistant Enterobacterales infections, which are considered an area of highest priority research by the CDC. Using combined large-scale genomic and genetic engineering approaches, her group has characterized the emergence of resistance to novel treatment regimens, including the highly polygenetic nature of polymyxin resistance in *Klebsiella pneumoniae* and the impact of antimicrobial resistance on bacterial virulence and fitness. Other ongoing studies are investigating the role of the gut microbiome in urinary tract infections and the contributions of the microbiome to chronic diseases.



Camille P. Vaughan, MD, MS

Associate Professor of Medicine
Emory University School of Medicine

Dr. Vaughan is a geriatrician and clinical investigator focused on optimizing the care of older adults with multiple chronic conditions. Dr. Vaughan has a joint appointment as Division Director for Geriatrics & Gerontology in the Department of Medicine at Emory University and as the Atlanta Site Director for the Department of Veterans Affairs Birmingham/Atlanta Geriatric Research Education and Clinical Center. As in many areas of geriatrics, she works collaboratively and in a leadership capacity with diverse teams of investigators to carry out multi-site clinical studies evaluating new interventions to enhance health care for older adults. With funding from VA, AHRQ, and NIA, Dr. Vaughan's recent projects involve evaluating behavioral therapy for treatment of common urinary symptoms in people with Parkinson disease, testing virtual delivery of evidence-based treatment and prevention strategies for common geriatric conditions such as incontinence, and evaluating integrated behavioral treatment for older adults with coexisting nocturia and insomnia.



Philip J. Walther, MD, PhD, MBA, FACS

Professor of Surgery/Urology
Associate Professor of Experimental Pathology
Duke University

Dr. Walther received his MD-PhD at Duke, his urologic residency at UCLA, an American Cancer Society junior faculty fellowship at Duke; and subsequently an MBA from Duke's Fuqua School of Business (health care management). His lab research interests have been: 1) Developmental GU oncotherapeutics using human xenograft-supported GU tumors (primarily bladder) 2) the genomic elucidation of the role of oncogenic HPV genotypes with lower GU cancers (bladder, penis, and urethra). He served as Chair, GU Surgery Subcommittee of the NIH-funded cooperative study group-CALGB. Dr. Walther was the Site PI at Duke for the first NIH-sponsored multi-institutional study of immune-therapeutics of renal cancer using high-dose interleukin-2, and served as PI of a R21-funded grant to initiate an institutional research program in prostate cancer. He was PI of a VA-based epidemiologic effort with Community Medicine in the study of race-related genomic differences associated with prostate cancer occurrence. Finally, he served on the Study Committee of a 7 year NIH-sponsored nutritional intervention prostate cancer prevention study. Dr. Walther serves on the KURe Advisory Board.

**Lenaine Westney, MD**

Professor in Department of Urology
University of Texas MD Anderson Cancer Center

Dr. O. Lenaine Westney is Professor in the Department of Urology at the University of Texas MD Anderson Cancer Center. Her areas of clinical expertise are postprostatectomy incontinence, neurogenic voiding dysfunction, post-radiation urinary tract reconstruction, and urinary diversion. In her role as the primary urologic reconstructive surgeon in the department, she has emphasized clinical and research collaborations with Colorectal, Gynecologic Oncology and Plastics Surgery with the goal of improving management and outcomes of urinary tract structural and functional disorders in patients with pelvic malignancy. She is certified in Female Pelvic Medicine and Reconstructive Surgery and directs the MDACC Urinary Tract and Pelvic Reconstruction fellowship program. Additionally, Dr. Westney has authored articles and chapters dealing with the management of incontinence in high-risk patient populations. Her current research focuses on the long-term sexual and voiding dysfunction in colorectal cancer patients, the progression of voiding symptoms in hypoestrogenic states, and post-prostatectomy urinary complications. Dr. Westney is an active member of many local, national, and international surgical societies.