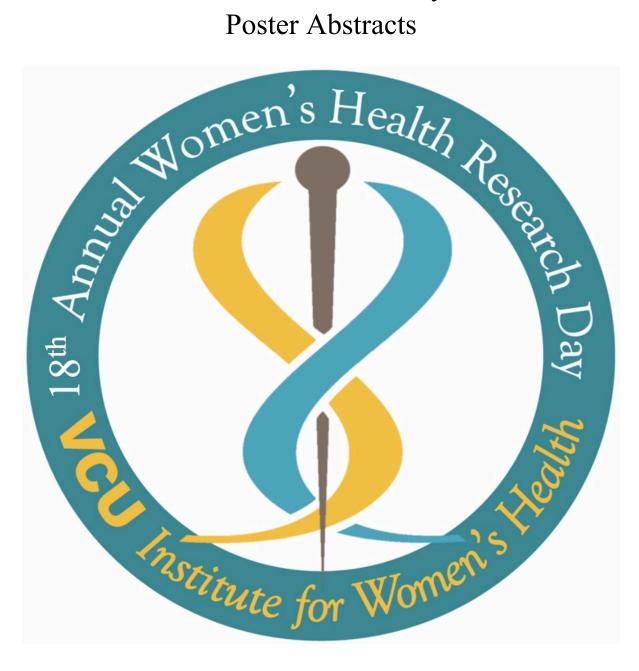# Institute for Women's Health 18th Annual Women's Health Research Day Poster Abstracts

1. Development of an Ex-vivo Porcine Model for Bladder Wall Micromotion

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Introduction: Bladder wall micromotion (BMM) may play a role in the pathophysiology of overactive bladder (OAB). Worldwide, OAB twice as common in women. However, BMM is inherently difficult to study in women undergoing urodynamics due to challenges distinguishing micromotion from normal cyclic physiologic processes. The goal to this study was to create a reproducible model of BMM using an ex-vivo perfused porcine model. Materials and Methods: Porcine bladders and vascular tree were harvested. The vesicular arteries were cannulated and ex-vivo bladder perfusion was performed using physiologic MOPS buffer solution. Using an urodynamics system, bladders were filled with saline to 300 mL and control pressures were recorded. The bladders were then flushed with a 0.001 M carbachol solution and intravesical pressure measurements were taken. Recorded rhythmic pressure wave forms induced by carbachol were analyzed. Results: BMM was observed as in 13/21 (62%) of harvested bladders. The average baseline pressure at which micromotion was observed was 22 cmH2O. Pig gender, weight, and ischemia time were not associated with the detection of BMM ($p>0.05$). BMM was not observed in the control period during any trial and was observed after carbachol instillation as rhythmic contractions. The frequency and amplitude were modeled as a sine wave with the average frequency of 0.017 cycles/sec (1.02 cycles/min) and the average amplitude was 1.02 cmH2O. Conclusions: BMM can be induced using instillation of carbachol in a perfused ex-vivo porcine bladder. The development of an ex-vivo porcine model for micromotion provides a reproducible method to study bladder micromotion and OAB in women.

2. Bladder Near Infrared Spectroscopy (NIRS) Identifies Potential Ischemic Changes in Women with OAB During Filling

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Objectives: Near infrared spectroscopy (NIRS) is a noninvasive technique that measures oxyhemoglobin (O2Hb) concentration. The aim of the current study was to use NIRS during bladder filling to compare bladder anterior wall O2Hb changes in female participants with and without urinary urgency. Methods: Female participants with and without elevated urgency completed a validated natural filling protocol with recording of bladder O2Hb using NIRS. Real-time sensation (0-100% fullness) was also recorded and data are reported during "high sensation." NIRS signal processing removed motion artifacts and physiologic noise and was expressed as a function of percent filling time. Results: Twenty-two female participants completed the study. Two studies were excluded as significant outliers, leaving n=10 with urinary urgency and n=10 controls. The control group was significantly younger and with lower BMI, $p<0.05$. Anterior bladder wall O2Hb during high sensation increased in controls but decreased in OAB participants. The change in O2Hb between baseline (first 10% of high sensation) and maximum capacity (last 10%), was significantly different between the groups (OAB 0.05 ± 0.46 vs. controls 0.95 ± 0.89, $p=0.01$). Regression analysis showed this trend continued when controlling for BMI and age. Conclusion: Bladder NIRS during filling is significantly different in urgency vs control participants. Specifically, bladder O2Hb in controls increased during the period of high sensation but remained relatively constant in urgency participants. These data support the hypothesis of partial filling-mediated bladder ischemia as a mechanistic source for OAB/urinary urgency. With additional research, bladder NIRS has potential to be a noninvasive diagnostic tool.

3. **Instantaneous Changes in Prefrontal Cortex Neuroexcitation and Bladder Hemodynamics Non-Invasively Detectable with Near Infrared Spectroscopy during Sacral Neuromodulation in Women**

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Background: Sacral Neuromodulation (SNM) is an effective treatment for women with urge urinary incontinence (UUI). However, the exact mechanism of action is not fully understood and has only been previously studied with costly fMRI and EMG. Objective: To test the hypothesis that non-invasive and cost-effective Near-Infrared Spectroscopy (NIRS) could be used to detect changes in anterior bladder wall hemodynamics and prefrontal cortex (PFC) neuroexcitation during sudden ON-OFF SNM signaling. Methods: Female participants previously treated with SNM for UUI underwent a standardized hydration filling protocol. Functional NIRS positioned over the PFC and standard NIRS on the anterior bladder wall continuously measured oxyhemoglobin (O_2Hb). The SNM unit was adjusted between ON-OFF for 3 minutes intervals. Results: Eight women completed the study with 14 device adjustment cycles. Participants had a mean age of 57 ± 15.2 years and mean BMI of 30 ± 9.4. The slope of O_2Hb over time measured over the anterior bladder wall acutely changed in 75% of SNM cycles indicating the detection of changes in bladder hemodynamics. The PFC similarly had a change in slope of O_2Hb over time representing a change in neutral excitation detected in all brain regions (Right 100%, Middle 70%, Left 80%) during cycling. Conclusions: This study demonstrates feasibility of using non-invasive NIRS to detect changes in O_2Hb in the anterior bladder wall and PFC induced by acute SNM adjustments. These findings suggest that SNM stimulation affects both the bladder and PFC control of voiding. Further studies may focus on applying similar methodology for optimizing SNM treatment.

4. Physical Activity Behaviors and Self-Reported Quality of Life Ratings among Female Veterans

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The purpose of this study was to describe the relationships between physical activity (PA) and quality of life (QOL) among female Veterans. Female-identifying Veterans (N=166, age: 41.9±9.3 years) were included from the Long-Term Impact of Military-Relevant Brian Injury Consortium—Chronic Effects of Neurotrauma Consortium study. Participants self-reported QOL via the Patient Health Questionnaire-9 (PHQ9), and Traumatic Brain Injury Quality of Life modules (anxiety, fatigue, pain interference, resilience, emotional & behavioral dyscontrol, general cognition concerns, executive function, social participation). Self-reported PA from the Behavioral Risk Factor Surveillance System questionnaire were binned by established guidelines: 1) Not meeting any PA guidelines; 2) Meeting only aerobic PA (150 mins moderate/75 mins vigorous PA); 3) Meeting only strength PA (≥2 days/week); 4) Meeting both PA guidelines. A multivariate analysis of variance (MANOVA) was fit to assess the relationship between PA groups and QOL T-scores (α=0.05; Tukey's post-hoc tests) due to correlated QOL outcomes. Half (50.0%) of the participants reported not meeting any PA guideline, and only 15.1% met both. The overall MANOVA was statistically significant (Pillai's Trace V=0.26, $F_{27,465}$=1.61, p=0.03); PA group differences existed for fatigue ($F_{3,161}$=3.63, p=0.01), executive functioning ($F_{3,161}$=2.63, p=0.05), resilience ($F_{3,161}$=4.31, p=0.01), social participation ($F_{3,161}$=4.59, p<0.01), and the PHQ-9 ($F_{3,161}$=4.56, p<0.01). Those not meeting PA guidelines had poorer T-score outcomes for these sub-domains compared to all other PA bins (p-range: <0.01-0.04). Engagement in PA that met current guidelines was low among female Veterans. Those that met one or more PA guidelines had better QOL. Interventions should focus on improving PA engagement.

5. Mental and Psychological Health Outcome Differences Between Female Service Members and Veterans with and Without Mild Traumatic Brain Injury History: A LIMBIC-CENC Study

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Mental and psychological health are significant health concerns after mild traumatic brain injury (mTBI). Females comprise 17% of the active-duty military population, but their post-mTBI health is poorly characterized. We evaluated differences in mental and psychological health outcomes between female Service Members and Veterans (FSMV) with and without mTBI history, and explored the mediating effect of cumulative mTBI frequency. FSMV in the Long-Term Impact of Military-Relevant Brian Injury Consortium—Chronic Effects of Neurotrauma Consortium cohort study were propensity score matched for a prior mTBI group (n=88; yrs since last mTBI: 11.9±10.1; median total lifetime mTBIs: 2) and a no mTBI group (n=88) on age, race, body mass index, education, and military status. FSMV completed the Posttraumatic Stress Disorder Checklist (PCL5), Patient Health Questionnaire-9 (PHQ9), Neurobehavioral Symptom Inventory (NSI), Satisfaction with Life Scale (SWLS), and Traumatic Brain Injury Quality of Life (TBI-QoL). General linear models evaluated mean differences (MD), 95% confidence intervals (95%CI), and Cohen's d effects between groups. The mTBI group had significantly greater PCL5 (MD=6.3, 95%CI=1.1-11.5; d=0.36), PHQ9 (MD=2.4, 95%CI=0.7-4.2; d=0.42), NSI (MD=9.3, 95%CI=4.9-13.8; d=0.63), and TBI-QoL anxiety (MD=5.7, 95%CI=2.1-9.3; d=0.56) scores versus the no mTBI group (p<0.05). No differences were observed for SWLS or TBI-QoL emotional-behavioral dyscontrol (p≥0.14). No associations were present between mTBI frequency and any outcome in the mTBI cohort (p≥0.27). Collectively, FSMV with ≥1 mTBI history reported greater mental health and psychological symptoms than those with none. Greater symptoms were not mediated by increased mTBI frequency, indicating a single mTBI may adversely impact health outcomes.

6. **Associations of Age at First Concussion and Sex with Long-Term Mood-Related Outcomes in Active-Duty and Veteran Military Service Members**

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Purpose: To examine the associations of sex and age at first lifetime concussion (AFC) with mood-related symptoms among military service members and Veterans (SMVs) in the Long-term Impact of Military-relevant Brain Injury Consortium – Chronic Effects of Neurotrauma Consortium study. Methods: Participants (n=1,344; n=144[10.7%] female; aged 42.7±9.8 years) reported lifetime concussion history via structured interview, including AFC, total number of concussions, and years since the most recent concussion. Mood-related symptoms were self-reported using the Patient Health Questionnaire-9 (PHQ9; depressive symptoms) and the Traumatic Brain Injury Quality of Life (TBI-QoL) anxiety and emotional-behavioral dyscontrol modules. Multivariable binary logistic regressions were used to calculate odds ratios (OR[95%CI]) for sex and AFC with exceeding clinical thresholds for depression (PHQ-9 total≥10), anxiety (T-Scores≥60), and emotional-behavioral dyscontrol (T-Scores≥60). Current age, total number of lifetime concussions, and time since most recent concussion were covariates in all models. Results: Identifying as female was associated with statistically greater odds of exceeding clinical thresholds for depression (OR=1.51[1.06,2.15]) and anxiety (OR=1.74[1.22,2.48]) when compared to males. Older AFC was associated with minimally higher odds of meeting screening criteria for depression (OR=1.03[1.01,1.05]), anxiety (OR=1.03[1.01,1.05]), and emotional-behavioral dyscontrol (OR=1.04[1.02,1.06]). Conclusions: Among SMVs with a history of one or more concussion, both sex and AFC were statistically significant predictors of meeting screening criteria for mood-related disorders; however, only minimally clinically meaningful effects were observed. Clinicians may not need to evaluate mood-related symptoms differently for sex or AFC. Still, these factors can be considered alongside other patient-specific factors to implement individualized care plans for SMVs.

7. Sex Differences in the Acoustic Startle Response of Adolescent Athletes Following Concussion

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Background: The acoustic startle response (ASR) is a cross-species reflex that may be a sensitive marker for concussion-related impairment. Sex differences are commonly observed following concussion, and while healthy females traditionally exhibit a larger startle response compared to males, it is unknown whether this difference persists after concussion. Objective: Our purpose was to examine sex differences in the ASR of adolescent athletes following concussion. Methods: We conducted a cross-sectional study on 26 adolescent athletes (14 females, 12 males) following concussion. Acoustic startle probes were administered through headphones. ASR was recorded via electromyography activity of the orbicularis oculi muscle. Measurement sessions consisted of twelve 103 decibel acoustic startle probes approximately 50 milliseconds in duration delivered 15-25 seconds apart. The outcome variable was mean startle magnitude (μV); biological sex (male/female) was the independent variable. We used an independent samples t-test to determine if ASR differed between sexes. Results: Male and female adolescents did not significantly differ in time since concussion (36.3 ± 15.8 v. 36.6 ± 18.0 days, p=0.96), respectively. No significant sex differences in ASR were observed in adolescent athletes following concussion (females: 80.4 ± 30.8 μV, 95%CI: 62.6, 98.2 μV; males: 74.4 ± 20.0 μV, 95%CI: 61.7, 87.1 μV, t(24)=-0.57, p=0.57). Conclusions: Our results provide no evidence of sex differences in the ASR of adolescent athletes following concussion, though this effect may be small. While not the primary focus, the ASR of both sexes was suppressed compared to healthy controls, suggesting concussions may result in psychophysiological dysfunction detectable by ASR.

8. Sex Differences in Persistent Visual Dysfunction Following Adolescent Concussion

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Context: Concussions impact the neural pathways associated with the visual system, affecting both vestibular and ocular function. The Vestibular/ Ocular Motor Screener (VOMS) and eye tracking assessments have successfully identified lingering post-concussion oculomotor abnormalities; however, sex-specific differences remain unclear. Our study investigates biological sex disparities in visual dysfunction (VD) following adolescent concussion. Methods: We included 18 adolescents (age:14.4 ± 1.8 years, 39.0% female) with diagnosed concussions approximately over the last month (M=33.87 ± 6.03 days). Participants completed VOMS and eye tracking assessments. During eye tracking, participants watched a 220-second video that moved clockwise around the screen. The BOX score, indicating pupillary disconjugacy, was then calculated, with scores >10 considered abnormal based on existing standards. Independent samples t-tests were conducted to examine sex differences in VD trajectories. Results: There were no significant differences in BOX scores based on biological sex $t(16)=2.91$, $p=.107$, despite males (M=7.35, SD=7.46) having higher BOX scores than females (M=4.30, SD = 4.71). However, VOMS scores were significantly different between sexes ($F(16)=18.16$, $p <.001$) with males (M=1.18, SD =2.99) reporting fewer symptoms than females (M=9.43, SD = 11.75). Conclusions: While no significant sex differences were noted in BOX scores, distinctions did emerge in VOMS. Visual assessments may potentially exacerbate symptoms in females compared to males. This suggests that female participants could face a higher susceptibility to prolonged recovery compared to males.

9. **Sex Differences in the Association Between Post-Concussion Acoustic Startle Response and Anxiety Scores in Adolescent Athletes**

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Background: Concussions cause various symptoms, including increased anxiety, and females often exhibit higher levels of post-concussion anxiety compared to males. The acoustic startle reflex (ASR) is a defensive response that can be influenced by anxiety. Concussion results in a prolonged suppression of the ASR, but it is currently unknown how anxiety may influence ASR in adolescent athletes following concussion. Purpose: To investigate sex differences in the association between post-concussion ASR and anxiety scores in adolescent athletes. We hypothesized that following concussion 1) higher anxiety scores in athletes will be associated with higher ASR magnitudes and 2) female athletes will demonstrate less suppression of the ASR. Methods: This is a cross-sectional study of 22 adolescent athletes (age: 15.0 ± 2.3 years; 55% female). ASR was administered to participants through headphones, and startle magnitude was measured via facial electromyography. Anxiety symptoms were measured with the PROMIS-29. We used a multiple linear regression to examine the association between mean startle magnitude and anxiety scores. The primary outcome variable was mean startle magnitude (μV), and the predictor variables were anxiety score and biological sex. Results: Neither anxiety scores ($\square = 0.41$, p= 0.59) nor biological sex ($\square = 6.83$, p= 0.64) were significantly associated with ASR $F_{(2,19)}=0.34$; $R^2= 0.03$, p=0.72. Conclusion: Anxiety and sex do not appear to significantly influence ASR following concussion. However, male athletes with higher anxiety had an elevated ASR; whereas, female athletes had a suppression in their ASR.

10. Deciphering the Neurocomputational Underpinnings of Risk-Taking in Women with Bulimia Nervosa: Preliminary Results and Future Directions

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Background: Bulimia nervosa (BN) is a devastating illness that disproportionately affects women and is associated with severe medical and psychosocial consequences. Recurrent engagement in high-risk bulimic behaviors is central to the morbidity and mortality of BN, yet the mechanisms through which the binge-purge cycle becomes entrenched remain poorly understood. Risk-taking is influenced by two independent computational processes: ambiguity tolerance (a tolerance for consequences with unknown odds) and risk tolerance (a tolerance for consequences with explicit odds). Objective: We applied computational models to lottery task data to test whether risk and ambiguity tolerance are altered in BN and correlated these parameters with symptom frequency. Methods: Nine treatment-seeking adults with BN and 19 controls completed a well-validated lottery task. Participants chose between a certain $5 or playing a lottery with varying monetary outcomes when the odds were explicit (risky) or ambiguous. Risk and ambiguity tolerance were compared across groups and correlated with past-three-month symptom frequency in BN patients. Results: There were no group differences in risk and ambiguity tolerance. In BN, risk tolerance did not correlate with symptom frequency. However, greater task-based ambiguity tolerance was associated with more frequent purging. Conclusions: These preliminary, cross-sectional findings indicate that individuals with BN may have a high tolerance for the potentially harmful outcomes of purging (e.g., cardiovascular sequelae). My ongoing BIRCWH project tests prospective associations between risk and ambiguity tolerance and their neural representations with bulimic behaviors in young women using task-based functional magnetic resonance imaging, computational models, and ecological momentary assessment.

11. Sex Differences in the Management of Dyslipidemia in a Cohort of Black Americans: Findings from the Jackson Heart Study

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Background: Dyslipidemia or abnormal lipid concentrations is a major risk factor for cardiovascular diseases. Statins and a healthy diet are considered the first-line therapy for dyslipidemia management. In the United States, women are less likely to achieve dyslipidemia control compared to men. Yet, the role of sex differences on dyslipidemia management among minority populations remain understudied. Objective: To examine sex differences in dyslipidemia management among Black men and women in the Jackson Heart Study. Methods: Demographic, clinical, dietary and lipid data from 3105 participants were evaluated. Dyslipidemia status was defined by the NCEP ATP III. We conducted regression and interaction analyses between a cardio-protective diet quality score and statin use on dyslipidemia, in both men and women. We adjusted for age, gender, physical activity and education level. Results: Dyslipidemia cases accounted for 68% (n=2125) of the sample, 62% of which were female and only 4% adhered to a healthy quality diet. Among dyslipidemia cases, more men (21%) reported taking statins than women (8%). Despite receiving statin therapy, 39% of women still had abnormal lipid concentrations compared to 24% of men. Adhering to a healthy quality diet score while being on statin therapy significantly lowered low-density lipoprotein concentration (β= -2.14 mg/dL; p-value= 0.03) and increased high density lipoprotein cholesterol concentration (β= 1. 01 mg/dL; p-value= 0.03). Conclusions: Statin therapy may be prescribed and less effective for dyslipidemia management among women. Adhering to a healthy quality diet may influence the effects of statin therapy on lipid phenotypes associated with cardiovascular disease risks.

12. Developing a Central Repository for Gender Outcome Programs in STEMM

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The lack of gender equity in STEMM leadership fields persists as a significant challenge despite increasing awareness and advocacy efforts. Women are consistently underrepresented in top positions across science, technology, engineering, mathematics and medicine sectors. This issue not only hampers the advancement of women in these fields but also deprives the scientific community of diverse perspectives and talents. To address this problem efficiently, there is a growing need to establish a central repository dedicated to coordinating and amplifying gender outcome programs in STEMM. Figure 1 illustrates the stark reality of the current gender disparity within the STEMM workforce. We have developed a repository with a web-facing front end to achieve this aim. Our repository leverages NextJS, a React framework. A user-facing component offers a user-friendly interface for searching and filtering papers. Users can employ keywords and filters to locate relevant documents, while administrators can narrow down searches based on specific school criteria such as location, population, and tuition. To streamline the process of populating the database, we integrate an API with PubMed to access a repository of papers, targeting database administrators with a backend component. Utilizing openAI's natural language processing (NLP), papers undergo evaluation receiving a score for relevance to our database's objectives. Papers deemed relevant are subjected to further analysis, wherein a language model extracts essential information for storage and easy retrieval via our user-facing component. By automating the search, evaluation, and extraction processes, we alleviate the arduous task of manual data entry, thereby augmenting the database's comprehensiveness efficiently

13. Donor Variability in the Response of Bone Marrow Stromal Cells to Osteogenic Stimuli

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Bone marrow stromal cells (MSCs) respond to osteogenic stimuli, including surface topography and osteogenic media (OM) by differentiating into osteoblasts. Previous studies indicate that biologic sex is a variable, but it is not clear if human variability may obscure differences due to donor sex. This study compared responses of young adult male and female MSCs cultured on 3D titanium-aluminum-vanadium (Ti6Al4V) substrates or on tissue culture polystyrene (TCPS) in OM to assess inherent donor variability and if biologic sex plays a role. MSC127 cells from a non-Hispanic white, 23-year-old female and MSC003 cells from a Hispanic white, 16-year-old male donor were cultured on 3D solid or porous Ti constructs or on TCPS in growth media (GM) or OM, with or without the addition of microRNA-145 (miR-145), an inhibitor of osteoblast differentiation. Outcome measures were total DNA content, alkaline phosphatase specific activity, and the production of osteopontin, osteocalcin, semaphorin 3a, bone morphogenetic proteins (BMPs) 2 and 4, and active/latent transforming growth factor-beta1 (TGFβ1). Cells from both donors displayed comparable differentiation into osteoblasts when treated with OM and when grown on solid and porous 3D constructs. DNA content was reduced and osteocalcin and osteopontin production increased in OM-treated cells. DNA content was reduced and BMP-2, BMP-4, osteocalcin, and TGFβ1 increased on the porous 3D constructs. MiR-145 inhibited osteogenic marker expression in both donors. These results support assessing multiple donors before asserting sex-dependent effects and suggest that biological sex accounts for minimal differences in osteoblast differentiation and osseointegration in young, healthy males and females.

14. Surface-Mediated Immunomodulation of Osteogenic, Inflammatory, and Angiogenic Factors Produced by Human Bone Marrow Stromal Cells

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Successful integration of an implant into a patient's bone requires not only the optimization of its osteogenic capacity but also relies on a favorable immune microenvironment to regulate bone-related pathophysiological processes. The study aimed to analyze the differential gene expression of human bone marrow stromal cells (MSCs) in response to different surface modifications of implants. MSCs were cultured for 14 days on tissue culture polystyrene (TCPS), polyether-ether ketone (PEEK), or titanium-aluminum-vanadium (Ti6Al4V) discs with different surface modifications: (anodized) [Anodized], machined smooth [Smooth], and micro/nanoscale [MN] surface technology. A customized gene array was developed to evaluate the osteogenic, inflammasome and angiogenesis-related target genes. The results showed that the MSCs cultured on micro/nanoscale (MN)-textured surfaces had robust osteogenic effects with significantly enhanced expression of osteoblast markers and factors responsible for modulating osteoblastic differentiation. MN surfaces promoted angiogenesis by stimulating an increased release of pro-angiogenic factors and cytokines, as well as downregulation of semaphorin 3A, an endogenous angiogenesis inhibitor. MN surfaces exerted immunomodulatory effects on the osteoimmune microenvironment promoted a phenotypic shift of macrophages toward an anti-inflammatory, pro-regenerative phenotype capable of suppressing inflammation, inducing angiogenesis, and promoting regeneration. Combining micro/nano-scale surface features represents an attractive strategy for improving long-term implant success in vivo, exerting its effects at the molecular, cellular, and tissue levels. Further studies are required to understand the complex biomaterial-mediated immune responses that regulate bone regeneration.

15. Disuse Differentially Affects Achilles Tendon Composition and Gene Expression in Male and Female DO Mice

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Hierarchical collagen fibers provide strength to tissues like tendons and ligaments; mechanical cues are necessary for the development and maintenance of these fibers. Disuse has been shown to reduce tendon mechanics, but the exact mechanism behind this is unknown. Additionally, most studies on tendon disuse utilize inbred mice or rats, limiting the translation of these results to genetically variable humans. This study investigated the response of Achilles tendons to disuse via single limb immobilization in genetically variable DO mice to better understand tenocyte response to unloading in males and females. The right hind limbs of 32 male and 32 female DO mice were immobilized in casts for 3 weeks with uncast left hind limbs serving as contralateral controls. Achilles tendons from cast and uncast limbs of each mouse were isolated and randomly divided for analysis of organization, mechanics, gene expression, and tendon composition. Neither male nor female DO mice showed morphometric differences in collagen fiber organization between cast and uncast tendons. However, cast tendons for both males and females showed decreased mechanics compared to uncast tendons. Interestingly, female DO mice significantly upregulated gene expression while males showed trends of genetic downregulation in cast tendons compared to uncast tendons. Further, female cast tendons showed increasing DNA, glycosaminoglycan, and collagen content while male cast tendons significantly decreased collagen content when compared to uncast tendons. These findings suggest that DO mice demonstrate sex differences in response to tendon unloading, indicating a potential need for separate rehabilitation protocols for male and female tendon injuries.

16. Sex Differences in Immune Response to Extracellular Matrix Nanoparticle Treatment of Endotoxin-induced Lung Injury

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Acute respiratory distress syndrome (ARDS) is a severe form of lung injury that leads to the breakdown of gas exchange in the lung. There is no cure and the current standard of care is merely providing respiratory support through mechanical ventilation. This study utilizes an electrically charged nanoparticle fabricated from lung extracellular matrix (ECM). Inhaled ECM has been explored in multiple ways for treatment of lung disease; however, organ-specific inhaled nanoparticles are a novel treatment. We hypothesize that ECM nanoparticles will improve the immune response to LPS injury. Male and female mice aged 12-20 weeks were injured with lipopolysaccharide or saline control and treated with ECM nanoparticles or saline control. Animals recovered for 24 hours then were sacrificed and samples including bronchoalveolar lavage fluid (BALF) and lung tissue were collected. Protein in BALF was analyzed. Lipopolysaccharide significantly increases total protein in BALF. With treatment, female mice show a significant decrease in lavage protein while male mice show no significant difference from positive control. ECM nanoparticle treatment significantly decreases total protein in BALF in female mice while there is no significant difference between sexes in positive control. It is known that male mice show a more exaggerated immune response to LPS injury than female mice, but sex differences in response to ECM treatment have not been explored. Future directions of this study include modulating the dose of nanoparticles and conducting further analysis of samples.

17. Extracellular Matrix Fiber Alignment Directs Protrusive Forces in Collective Cell Migration

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In vivo breast cancer metastasis studies demonstrate tumors migrate via collective migration rather than single cells. Collective migration is a process where groups of cells move as a coordinated unit. Prior work suggests that extracellular matrix architecture can affect migration direction. However, it is still largely unknown how collective clusters sense matrix architecture that results in migration. The objective of our project is to investigate how matrix fiber orientation regulates directional collective migration. We hypothesize that tumor cell clusters in aligned, parallel matrix fibers will generate protrusions in the direction of fiber alignment with increased matrix deformation compared to clusters in randomly-oriented fiber matrix. We designed, fabricated, and validated a set of microfluidic devices where we can modulate collagen fiber parameters (i.e. aligned or random orientation). We encapsulated primary murine breast tumor clusters in collagen 1, loaded into our microfluidic devices, and measured invasiveness and directionality of cell cluster protrusions. We quantified matrix deformation by encapsulating microbeads in the matrix and tracking bead displacement during migration. Bead displacement values were converted to matrix deformation rate using a custom MATLAB code. Our findings demonstrate aligned fibers promote tumor clusters to elongate and send protrusions in the direction of the fibers. Additionally, tumor clusters exert higher ECM deformation rates per protrusion in aligned matrices compared to random fiber matrices. This data suggests that aligned fibers contribute to metastatic potential through increasing cell-generated forces; in ongoing work, we are investigating force-sensitive mechanoreceptors and associated signaling pathways governing collective migration.

18. RSF1-H2Aub Interaction: A Potential High-Grade Serous Ovarian Cancer Therapeutic Target

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Ovarian cancer ranks among the most prevalent gynecological malignancies and constitutes the fifth leading cause of cancer-related mortality among women in the United States. Among ovarian cancers subtypes, high-grade serous ovarian carcinomas (HGSOCs) represent the most prevalent and lethal subtype. Remodeling and Spacing Factor 1 (RSF1) is crucial in chromatin remodeling, a fundamental process that governs chromatin structure and accessibility, thereby affecting DNA replication, repair, and transcription. Elevated levels of RSF1 have been correlated with poor overall survival and increased aggressiveness in HGSOCs. In this study, we observed that RSF1 overexpression enhances A2780 cell line growth, migration, and invasion relative to the presence of an in-frame deletion of the ubiquitinated H2A binding (UAB) domain. The subsequent loss of RSF1 expression led to reduction growth in HGSOCs, an effect reversible upon reintroduction of the full-length RSF1, other than the UAB domain deletion. In vitro pull-down assays revealed that the UAB domain specifically binds to Histone H2A ubiquitination (H2Aub) nucleosomes other than unmodified nucleosomes. Furthermore, the UAB domain can spontaneously localize to the nucleus and act as decoy peptides, disrupting the RSF1-H2Aub interaction in a dose-dependent manner, culminating in reduced proliferation of HGSOCs. Disturbing the RSF1-H2Aub interaction using UAB decreases the stemness of HGSOCs. Taken together, our findings suggest that reading the H2Aub epigenetic mark via its UAB domain is essential for the role of overexpressed RSF1 in promoting aggressiveness in HGSOCs, thereby presenting a promising target for ovarian cancer therapy.

19. Stromal Cells Modulate Chemo-mechanical Factors in the Tumor Microenvironment Affecting Leader Cell Driven Collective Migration

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Most breast cancer metastases occurs by collective migration where cells migrate as a cluster. Collectively migrating clusters contain heterogeneous populations, including cancer associated fibroblasts (CAFs). During collective migration, a group of cells, termed leader cells, polarize to the front to lead migration. Studies in vivo reveal knocking out collagen receptor, discoidin domain receptor 2 (Ddr2), in CAFs resulted in decreased metastasis and altered matrix mechanical properties, suggesting CAFs modulate the extracellular matrix (ECM) to affect migration. How CAF modulation of the ECM effects leader cell function and migration is still unknown. The objective of this project is to understand how CAFs alter ECM properties, leader cell mechanosensing, and collective migration. We hypothesize CAFs modulate ECM chemical composition which prevents leader cell adhesions to the ECM and collective migration. We generated decellularized ECM (dECM) from primary tumors of FSP-Cre;Ddr2f/f;PyMT (Ddr2-/- in CAFs) and wild-type (WT) PyMT mice . We cultured tumor clusters and dECM in 3D microfluidic devices generated by our lab. Findings reveal tumor clusters have decreased migration velocity and efficiency in FSP-Cre;Ddr2f/f;PyMT dECM compared to WT dECM. Further, collagen fibers in FSP-Cre;Ddr2f/f;PyMT dECM were more randomly-oriented and less organized than WT fibers. In a 3D invasion assay, tumor clusters in FSP-Cre;Ddr2f/f;PyMT dECM remain rounder with less protrusions, suggesting decreased cell spreading. Finally, we measured fewer and smaller focal adhesions (vinculin) in leader cells on FSP-Cre;Ddr2f/f;PyMT dECM. Our findings demonstrate CAFs remodel the ECM which alters leader cell adhesions that prevent collective migration, emphasizing the importance of CAF-leader cell interactions.

20. The Use of MRI Guided Hypofractionated Radiation to Improve Compliance and Minimize Toxicity in Locally Advanced Cervical Cancer

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Intro: The standard treatment for locally advanced cervical cancer is definitive radiation (RT) with a brachytherapy boost and concurrent chemotherapy. The treatment duration is prognostic for survival and it is recommended to complete treatment within 56 days. IMRT with daily image guidance and image-guided adaptive brachytherapy has shown improved outcomes with decreased toxicities. However, organ motion and treatment burden remain challenges. Targeting the cervix can be challenging due to its mobile nature, with inter and intra-fraction anatomical changes, requiring large margins, with resultant bowel toxicity. These women may also face significant treatment challenges and socioeconomic barriers to care. There are limited series evaluating hypofractionated RT in cervical cancer patients with an ongoing trial evaluating the feasibility of hypofractionated CT-based radiotherapy; however, MRI-guided hypofractionated pelvic RT has not yet been explored. The potential benefits of improved target coverage, reduced dose to organs at risk due to tighter margins, and increased treatment compliance due to reduced treatment time make MR-Guided Hypofractionated Pelvic RT an attractive approach. Methods: Eligible patients will be planned for concurrent MRI-guided EBRT with weekly Cisplatin, followed by an HDR brachytherapy boost. RT planning to include IMRT to a dose of 40Gy in 15fx, treated once daily over 3 weeks. Imaging sequences will be retrospectively evaluated for radiomic features. CTCs to be collected, assessing for indicators to predict treatment response. Acute and late toxicity will be assessed. Patient reported QoL questionnaires assessing bowel, bladder, vaginal metrics, financial toxicity to be completed. Discussion: This study constitutes the first prospective evidence of feasibility of MRI-guided hypofractionated pelvic RT, assessing if it will lead to smaller treatment volumes, decreased toxicity, improved compliance, and improved patient reported outcomes. Hypofractionation will decrease systemic treatment burden, potentially offsetting national chemotherapy shortages. Finally, it will evaluate radiomic tumor features and circulating tumor cells and then correlate to patient outcomes.

21. Breast Cancer Cells Produce Vitamin D3 Metabolites Locally VIA CYP24A1 and CYP27B1 Enzymes

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Due to low serum 25-hydroxyvitamin D3 [25(OH)D3] levels in breast cancer patients as well as high 25(OH)D3 levels associated with improved prognosis (but not incidence) in post-menopausal patients, clinicians are more commonly recommending vitamin D3 supplementation as a method of reducing the risk of cancer; however, data supporting this are inconsistent. These studies rely on measuring 25(OH)D3 systemically to indicate hormone status, but 25(OH)D3 can be further metabolized in the kidney and other tissues under regulation by several factors. We previously showed that the effect of the active metabolite 24R,25(OH)2D3 on breast cancer cell growth is highly dependent on the expression levels of estrogen receptor alpha (ERα) isoforms, specifically ERα66. The present study examined if breast cancer cells possess the ability to metabolize 25(OH)D3, and if so, whether the resulting metabolites are secreted locally and if this ability is dependent on ERα66 status. To address this question, ERα positive (MCF-7) and ERα negative (HCC38 and MDA-MB-231) breast cancer cell lines were examined for expression of ERα66, ERα36, CYP24A1, and CYP27B1, as well as for the local production of 24,25-dihydroxyvitamin D3 [24,25(OH)2D3] and 1,25-dihydroxyvitamin D3 [1,25(OH)2D3] after exposure to 25(OH)D3. The results showed that independent of ER status, breast cancer cells express the enzymes CYP24A1 and CYP27B1, which are responsible for converting 25(OH)D3 into its dihydroxylated forms. Moreover, these metabolites are produced at levels comparable to the levels observed systemically. These findings suggest that vitamin D metabolites produced locally can regulate the tumorigenicity of breast cancer via autocrine and/or paracrine mechanisms.

22. Nurturing Women's Health: Examining the Impact of Dietary AGEs during Puberty on Breast Cancer Risk

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Advanced Glycation End products (AGEs) are reactive metabolites that accumulate in tissues as we grow older. We consume copious amounts of AGEs as part of the modern diet from ultra-processed foods and those high in fat and sugar. A role for dietary derived AGEs in breast cancer is supported by our recent collaborative population studies that correlate a high intake of dietary-AGE with breast cancer risk, aggression and all-cause mortality. Puberty is a window of susceptibility within breast development and a time when breast cancer risk is established in women. Therefore, to assess the impact of dietary-AGEs on breast cancer risk, we developed a mouse model that mimics human dietary-AGE consumption and showed disruption of normal mammary gland development during the pubertal timeframe and pre-neoplastic lesions with increased stromal recruitment in adult mice. Fibroblasts from mice fed a high AGE diet had an activated phenotype similar to that observed in the tumor microenvironment. Co-culture assays showed that fibroblast RAGE (Receptor for AGE) was required for AGE-mediated effects on epithelial cell migration, significant as RAGE is required for tumor growth in vivo. Co-culture assays with fibroblasts genetically modified with shMYC constructs and found that MYC transcriptional programs are also required for AGE mediated epithelial cell migration. In conclusion, we have found that dietary AGEs induce a mammary microenvironment conducive to tumor growth through RAGE and/or MYC mediated crosstalk, highlighting the importance of dietary choices in women's well-being and suggesting a potential approach for breast cancer prevention by reducing dietary-AGE consumption.

23. Organotypic Culture to Model Interactions between Human Papillomavirus and Sneathia Vaginalis

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Preterm birth (PTB) and cervical cancer are medical conditions disproportionately affecting Black and Hispanic people. While Human papillomavirus (HPV) is the primary cause of cervical cancer, most infections resolve without cancer development. Factors driving oncogenesis remain uncertain. Similarly, most PTBs are idiopathic, with the doubled risk among Black mothers poorly understood. Sneathia vaginalis, a component of the vaginal microbiome, is significantly more abundant in Black and Hispanic people and significantly associated with PTB and HPV infection, suggesting that it plays a role in these health disparities. S. vaginalis is an as-yet poorly characterized anaerobic bacterial species with complex nutritional and growth requirements, making it hard to study in vitro. Currently, there lacks reports on models for in vitro analysis of interactions occurring between HPV and S. vaginalis . Having evidence that S. vaginalis invades epithelia and its toxin binds to human HRB/RIP/Rab, a protein involved in intracellular trafficking, we sought to confirm this interaction. Organotypic rafting of human cervical keratinocytes(HCK) can be used as a model to compare the effects of infection with S. vaginalis and HPV alone and together by recapitulating cervical tissue. HPV-infected and uninfected HCK rafts were challenged with S. vaginalis; the tissues were fixed, embedded, sectioned, and stained with Hematoxylin and Eosin. Bacterial challenge of the HPV-negative raft triggered complete sloughing of epithelial, while the HPV-positive rafts exhibited modest damage to superficial layers. These results suggest that HPV infection of epithelial cells may prevent sloughing and bacterial clearance, promoting the increase in S. vaginalis abundance in HPV-infected people.

24. Creating a Comprehensive Mouse Model to Study the Role of Endoplasmic Reticulum Aminopeptidase 2 in Preeclampsia

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Preeclampsia (PE) is a severe complication occurring in seven to ten percent of pregnancies, posing significant risks to maternal and fetal health. While various PE mouse models exist, they have yet to fully capitalize on leveraging the genetic contribution of endoplasmic reticulum aminopeptidase 2 (ERAP2). This peptide-trimming gene is crucial for inflammatory cytokine production, immune response modulation, blood pressure regulation, and critical PE pathophysiological characteristics. Notably, altered ERAP2 gene expression has been consistently observed in first-trimester placentas preceding PE development. This collective evidence highlights the promising potential of utilizing ERAP2 to create a comprehensive mouse model for PE translational research. Initial steps towards generating transgenic ERAP2 mice aim to validate their ability to replicate clinical features observed in human patients. Genotype and protein expression analyses have successfully integrated the human ERAP2 gene, mainly targeting placental tissue. Ongoing investigations employ diverse methodologies, including quantitative polymerase chain reaction (qPCR) to monitor placental growth factor (PlGF) levels in maternal blood, histological examinations of fetal organs to elucidate potential PE-induced growth restrictions, and maternal urine analyses to identify signs of kidney dysfunction associated with PE. Despite notable progress, challenges have arisen during transgenic ERAP2 mouse pregnancy experiments. Spontaneous miscarriages have been observed alongside elevated ERAP2 expression levels in the placenta. These adverse outcomes underscore the putative immune-related role of ERAP2 in PE pathogenesis. Nevertheless, preliminary findings offer promising insights into developing a robust mouse model accurately mirroring the complexities of PE, facilitating enhanced translational research endeavors.

25. Evaluation of the Mediating Role of Neighborhood Deprivation on the Relationship Between Racial Residential Segregation and Hypertensive Disorders of Pregnancy

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Background. Hypertensive disorders of pregnancy (HDP) occur in 5-8% of pregnancies in the United States. HDP can have lifelong and transgenerational consequences, including poor later-life cardiovascular health for mothers. Research on upstream social determinants of health, including racial residential segregation (RRS) and neighborhood deprivation, suggests that these factors substantially influence perinatal health. Objective. Therefore, this study evaluated the mediating role of neighborhood deprivation on the relationship between RRS and HDP. Methods. Birth certificate data from singleton births in Richmond, Virginia from 2011-2019 and neighborhood-level indicators from the U.S. Census Bureau's 2006-2010 American Community Survey and 1990 decennial census were utilized to examine these associations. Principal component analysis was conducted for neighborhood deprivation index development. Mediation was assessed using multilevel structural equation modeling. Results. In analyses stratified by race/ethnicity, the Index of Dissimilarity and the Interaction Index – measures of RRS – were associated with HDP among non-Hispanic White women (OR: 0.63, 95% CI: 0.46-0.88 and OR: 1.73, 95% CI: 1.37-2.17, respectively), and the Index of Dissimilarity was significantly related to HDP for non-Hispanic Black women (OR: 1.60, 95% CI: 1.17-2.19). Among non-Hispanic Black women, higher RRS was associated with increased likelihood of HDP; approximately 70% of this relationship was mediated by neighborhood deprivation. Non-Hispanic White women experienced reduced odds of HDP when RRS was higher. Conclusions. Findings indicate that RRS is detrimental to non-Hispanic Black women but beneficial for non-Hispanic White women regarding HDP likelihood. Future studies should continue to explore the impact of RRS on HDP among differing racial/ethnic groups.

26. Characterizing Cell Type Specific DNA Methylation Change Across Human Pregnancy

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Preterm birth (PTB) is a birth delivered at less than 37 completed weeks and is a significant contributor to prenatal morbidity and mortality. The prediction of women who are at high risk of PTB early in pregancy remains difficult despite known maternal risk factors (e.g., previous PTB, maternal age, smoking) and appreciable maternal and fetal heritability. Epigenetic pathways, particularly DNA methylation (DNAm), offer a plausible mechanism by which environmental factors could influence the expression of genes responsible for early birth. This study aimed to explore the relationship between the methylome and PTB and to specifically identify contributing cellular components in fetal umbilical cord blood specimens that could be used as features for future prediction tools. Various cell types comprising blood tissue (e.g., granulocytes, neutrophils, monocytes) potentially contribute differently to the regulation of genes through methylome changes across human pregnancy. Utilizing the cellDMC package in the R programming language, whole-genome DNA methylation data previously collected by the Pregnancy, Race, Environment, Genes (N = 124) was assessed for cell-type specific DNAm. While previous research suggested the influence of nucleated red blood cells, our findings, though lacking statistical significance, suggested cellular signaling associated with gestational age at birth that was consistent with prior results. Explanations for this difference included decreased statistical power due to smaller sample sizes and limited resolution for low-abundance cell types. Nonetheless, our study reaffirms the involvement of inflammatory and immune pathways in pregnancy, highlighting the need for further investigations to elucidate cell-specific DNAm patterns underlying birth timing regulation.

27. Establishing a Mouse Model to Observe the Ascending Infection of Sneathia Vaginalis

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Sneathia vaginalis (Sv), an anaerobic gram-negative bacterium, is linked to adverse reproductive outcomes, with its ability to traverse fetal membranes and harm epithelial cells via cytopathogenic toxin A (CptA). Establishing an in vivo animal model is crucial for comprehending Sv's transition from commensal flora to pathogen. Through experimentation, utilizing C57/BL6 mice and a double Sv inoculation with human low-density lipoprotein (LDL) supplementation yielded the most consistent results. Variations in uterine horn morphology and Sv presence in the reproductive tract correlated with the mouse estrous cycle that lacked neutrophils, implying Sv thrives in an immunologically benign environment. This model offers insights into Sv-host dynamics within the vaginal microenvironment and facilitates controlled investigations into Sv's impact during pregnancy. By optimizing mouse breed selection, bacteria administration methods, and other variables, this study paves the way for a deeper understanding of Sv-related reproductive complications.

28. SPAG17 Deficiency Promotes Accelerated Female Reproductive Aging and Fibrosis Leading to Reduced Fertility and Parturition Defects

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Advanced female age is associated with fibrosis in the reproductive tract causing uterine and cervical dysfunction. These changes lead to infertility, pregnancy complications and congenital defects in the offspring. As mean maternal age is increasing worldwide, there is a pressing need to prevent age-associated infertility and pregnancy complications. The molecular mechanisms underlying female reproductive aging and fibrosis are complex and currently not well understood. We have recently discovered a new mechanistic pathway implicated in aging and fibrosis via sperm associated antigen 17 (SPAG17) signaling. Our studies revealed different expression levels of Spag17 mRNA at various gestational ages (D6 to D18), and in the postpartum (2 to 48 h) period in mouse uterine and cervical tissues. Loss of function of this gene promotes accelerated aging in the female reproductive tract accompanied with constitutive activation of profibrotic signaling pathways. Moreover, increased collagen deposition, tightly packed extracellular matrix accumulation and increased stiffness was detected in the uterus and cervix of Spag17 knockout females compared to same age wild-type females. Importantly, loss of Spag17 showed reduced litter size and obstructed labor leading to maternal death. In conclusion, these results show that SPAG17 is an important regulator of aging and fibrosis and pharmacologic approaches targeting SPAG17 signaling may be a potential mechanism to prevent reproductive aging.

29. The Use and Perceptions of Hormone Replacement Therapy in Chemoradiation-Induced Premature Ovarian Failure

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Premature ovarian failure (POF) is the dysfunction of ovarian follicles resulting in amenorrhea before the age of 40. While etiologies of POF are not fully understood, it is estimated that 65% of identified causes are iatrogenic, of which chemoradiation is a known cause due to the cytotoxic effects of radiation on the ovary. The American College of Obstetricians and Gynecologists recommends hormone replacement therapy (HRT) for POF till age of natural menopause (age 50-51) to decrease the health risks and improve the symptoms associated with prolonged hypoestrogenism. However, due to varying recommendations and controversies regarding health risks of hormone use, attention has been paid to the use and perceptions of HRT in patients achieving normal menopause. While it has been found that women view HRT use favorably, it is suggested that the use of HRT in patients that would benefit remains low. It is uncertain if a similar paradigm exists for patients with POF that would benefit from HRT. We are performing an interview-guided study, in order to better understand the use and perceptions of HRT in radiation-induced POF. Our preliminary findings suggest a variety of concerns surrounding HRT, including side effects and cost.

30. Preoperative Ultrasound Estimate of Uterine Volume as a Predictor of Operating Time for Minimally Invasive Hysterectomy for Fibroid Uteri

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Purpose/Objective: Fibroids are the leading indication for hysterectomy worldwide. With recent surgical advancements, a minimally invasive (laparoscopic and robotic) approach is the gold standard. Planning for such surgery includes pelvic imaging, most typically an ultrasound. To optimize resources, an important consideration for surgical planning includes surgical duration estimation. We predict that there is a crucial relationship between increasing uterine volume on preoperative imaging and surgical duration.Methods: A retrospective cross-sectional study was performed using the electronic health records of patients over 18 years old who had a routine preoperative transvaginal ultrasound and subsequent minimally invasive (defined as laparoscopic, with or without robotic assistance) hysterectomy for fibroid uteri between January 2020 to June 2023.Results: Uterine volume was linearly related to operative time. Specifically, for an increase of one-centimeter cubed (cm3) in uterine volume, estimated operative time increased by 0.14 ([0.11 − 0.17], $p<0.0001$) minutes. Conclusion: Uterine volume on preoperative ultrasound can help predict operative time for minimally invasive hysterectomy performed for fibroid uteri.

31. NEXUS - NEXt Generation Health Through 2D & 3D Fetal UltraSound; Building Connections to Support Maternal-fetal Health Protocol Summary

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Objective: This study aims to address the disparate health outcomes experienced by pregnant women at high risk for substance abuse during the perinatal period. By integrating ultrasound-based intervention with motivational interviewing (MI) and coordinated care, the research seeks to improve engagement leading to increased frequency and access to prenatal care, and improved well-being. Additionally, the study aims to contribute to advancing interventions to reduce the impact of substance use on mother-infant dyads.Methods: This is an exploratory, mixed methods RCT involving 60 women at high risk for substance abuse. Participants are randomly assigned to the control or intervention group. Both receive two non-diagnostic ultrasounds during the latter part of their pregnancy. The intervention group additionally receives MI during ultrasounds. All participants are offered weekly/bi-monthly check-ins to connect with resources. Perinatal health outcomes (i.e. gestational length) are collected at birth. A standardized infant assessment (NNNS-2) is conducted at 6 weeks and measures on maternal-infant well-being (i.e. postpartum functioning, attachment) are collected at 6 and 12 weeks. Qualitative interviews are conducted to understand participants' study experience. Expected Results: We hypothesize that the intervention group will demonstrate increased attendance for prenatal care, lower substance use, and increased motivation and maternal-fetal attachment after the second ultrasound than participants receiving standard ultrasounds. Conclusion: Achieving our objective will supply data essential for larger-scale studies and the implementation of an innovative intervention for substance use in pregnancy. If deemed feasible, these procedures could supplement standard ultrasound protocols and will guide sustainability in the community. Funded by NIDA (PI Salisbury) R21DA058407"

32. Maternal Depression Screening in a Community Health Center

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Maternal mental health conditions, such as perinatal depression, are the most common complication of pregnancy and postpartum. It is estimated that as many as 1 in 5 women meet the criteria for perinatal depression and account for the one of the leading causes of death during pregnancy and the postpartum period. National obstetric and gynecological organizations universally recommend that every woman be screened for depression in pregnancy and postpartum. Yet, in studies reviewed the number of women screened is consistently low. The quality project aimed to increase depression screening in a community health OBGYN clinic through provider education and awareness, data collection and revised work-flow protocols. Qualitative and quantitative data was gathered through surveys and electronic medical record data collection. Preliminary results demonstrated an increase in provider comfort level and screening numbers.

33. Do Black Maternal ADHD Symptoms Predict Child Impairment?

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Introduction: Attention-Deficit/Hyperactivity Disorder (ADHD) is understudied in adult women. ADHD is hereditary and therefore runs in families (Faraone & Larsson, 2018.) Research has traditionally been conducted with White samples; thus, little is known about Black mothers' own ADHD and its relationship to their child's impairment at home. The specific aim of this study is to investigate whether Black maternal ADHD symptoms predict child's family-related impairment, controlling for child ADHD. Method: Participants were 70 Black mothers (Mage = 35.44 , SDage = 6.46, 86% high school graduate) of children with and without ADHD (Mage = 7.73, SDage = 1.38, 49% female). As part of a larger study on parenting in Black families of children with and without ADHD, participants completed measures of their own ADHD symptoms, their child's ADHD, and their child's family-related impairment (i.e., sibling, caregiver, and overall). Results: Results indicate that maternal ADHD symptoms significantly predict child impairment with siblings (B= .318, p= .007, R2= .251) and relationship with caregiver (B= .268, p= .02, R2= .299). However, maternal ADHD symptoms did not significantly predict child's overall family impairment (B= .228, p= .062, R2 = .214). Discussion: Maternal ADHD symptoms significantly contribute to child impairment with their sibling as well as with the mother herself, possibly through disorganized parenting. Maternal ADHD symptoms within Black families may be important to consider when evaluating child ADHD and when considering treatment options. Future research should include observations of parent-child interactions in Black families of children and mothers with and without ADHD."

34. Exploring Prenatal Health Behaviors and their Association with Depressive Symptoms in Black Women

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Introduction: There are significant disparities in the health outcomes for Black pregnant people (i.e., maternal mortality, preterm birth; Crear-Perry et al., 2021). Following prenatal health guidelines can help ensure a healthy pregnancy for Black pregnant people. Pregnant people may face a range of mental health concerns, such as depression. The specific aim of this study is to investigate whether depression relates to health behaviors in Black pregnant women. Methods: Participants were 150 Black pregnant women (Mage = 27.27, SDage = 5.75, 37% employed), who were on average 26.29 weeks pregnant (SD = 9.53). They were recruited from an urban obstetrics clinic and compensated for their involvement in the study. Participants completed measures of demographics, depression, and prenatal health behaviors. Results: Depression evidenced a significant negative relationship with good nutrition ($r = -.21$, $p=.027$) and taking a prenatal vitamin ($r = -.23$, $p=.015$) and a significant positive relationship with physical strain ($r = .20$, $p=.028$) and poor eating ($r = .19$, $p=.045$). When controlling for level of education, depression only significantly predicted physical strain ($B = .238$, $p = .022$). Discussion: Depression was related to several prenatal behaviors in Black pregnant women. The literature has indicated that Black women are more likely to overwork and strain themselves, which can lead to stress and depression. Level of education may be protective against depression for engagement in some prenatal health behaviors. Future research is needed on culturally responsive, strength-focused interventions that promote prenatal health behaviors in this population.

35. Maya Midwifery: A Vital Role in Community Healthcare

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Evidence-based practice (EBP) is the gold standard for delivering and achieving the best healthcare outcomes. As EBP drives healthcare practices and changes, practice-based evidence is frequently overlooked. Practice-based evidence includes ancestral knowledge and traditional healthcare practices. There is a five-thousand-year history of midwifery in Guatemala. Today, approximately 80% of indigenous Maya women in rural Guatemala receive care from a traditional midwife (comadrona). The midwives experience many challenges in their practice, such as caring for women with malnutrition, grand multiparity, poverty, and intimate partner violence. Maya Midwifery notes that traditional care approaches are accessible and practical. The midwife's strategies for effective and sustainable healthcare must not be overlooked. The care model of traditional midwifery encompasses prenatal counseling, delivery, and postpartum care. Not only do the midwives live in the communities they serve, but they also speak the Maya languages. Unfortunately, regional hospitals frequently fail to provide translation services to their indigenous clients. Traditional healing approaches, include plant-based remedies or involve the use of a sweat lodge (Temescal or Chuj). There is value in incorporating and recognizing the practice of the traditional midwifery philosophy and the vital role it plays in the community. This poster reflects on a service-learning trip exposing students to practice-based evidence illustrating some of the knowledge, attitudes, and practices of traditional Maya midwives in the Highlands of Guatemala.

36. Addressing Perinatal Addiction and Stigma in Myanmar(Burma): A Community-based Approach

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Introduction: Society perceives substance use as deviant misconduct amongst women as it is considered against conventional gender roles and societal expectations. Women may experience compounding stigmatization where they are stigmatized due to their substance use as well as because of their gender(Nguyen & Bellhouse, 2022). Perinatal addiction is characterized by substance use during the pre and post-natal period. Background: Women with perinatal addiction in Myanmar faced triple stigma; being a woman, being a substance use, and being a mother. The need for education and service delivery of targeted interventions on perinatal addiction is immense and lacking for clients. Stigma and lack of knowledge on perinatal addiction are barriers to implementation. Intervention Strategies: Best Shelter, a CSO working on women's health in collaboration with the Institute for Women's Health, VCU plans for the following strategies to address the issue: (a)Development of Perinatal Addiction Health Education Toolkit and pamphlets based on cultural, and social context, (b) ToT Training with 3 targeted stakeholders: Peers, CSOs, other stakeholders, (c) Community-based Health education and referral "for the peer by the peer" approach, (d) Service integration for women with perinatal addiction at existing Best Shelter's Women Who Use Drugs projects, (e) Research on Knowledge, Attitude, and Practices on Perinatal Addiction before and after the interventions. Conclusion: In conclusion, the community-driven approach to perinatal addiction education, and service integration at existing women's health clinics followed by the KAP survey will promote the health and well-being of mothers increasing their self-efficacy, ultimately reducing the stigma by the community.

37. Perinatal Cannabis Use in a U.S. Sample of Postpartum Women: Characteristics, Risks, and Prevention

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Aims: Prenatal cannabis use is a concerning trend. Understanding the risks and characteristics of cannabis-using pregnant women is crucial in preventing prenatal cannabis use. This present study examined the characteristics and risk factors associated with prenatal cannabis use in postpartum women. Methods: This secondary analysis used data from an ongoing study of postpartum women (n=98) recruited from a mother-infant unit in a tertiary hospital. Participants completed an anonymous survey on prenatal tobacco and cannabis use. Demographic variables, substance use, and perceptions of prenatal cannabis use were collected. Data were analyzed using chi-square ($\chi2$)-tests and t-tests. Results: Participants were predominantly white (50%) and Black (40%), with a mean age of 29.2 years. Slightly less than two-thirds (62.2%) never used cannabis. For the current pregnancy, 14.3% reported first-trimester use, and 11.2% reported third-trimester use. Cannabis-using women were more likely than cannabis-non-using women to agree that the benefits of prenatal cannabis use include helping with morning sickness and nausea (92% vs. 68%, p=.034) and increasing maternal appetite (96.3% vs. 69.6%, p=.010). Those with less education believed cannabis did not affect the infant's development (p=.015) or brain (p=.010). Also, participants using cannabis were younger than non-users (p =.038) and more likely to be single/never married (p=.001). Conclusions: Understanding the misconceptions, including cultural and individual characteristics, aids in developing tailored interventions, targeted education, access to resources, community-based initiatives, and support mechanisms tailored to their specific needs. Enhancing awareness regarding the risks of prenatal cannabis use and providing appropriate healthcare resources can help with informed decision-making during pregnancy.

38. Perceptions of Cannabis Use in a Sample of U.S. Postpartum Women: Implications for Prevention and Harm Reduction Education

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Aims: Despite cannabis use association with adverse outcomes, perinatal cannabis use is increasing. Comprehensive assessments of perceptions of cannabis use in postpartum women is critical for the adaptation of culturally relevant prevention and harm reduction education strategies. This study examined postpartum women's perspectives about cannabis use in general and during pregnancy. Methods: Secondary data analyses used data from a perinatal cannabis study of postpartum women (n=193) recruited from a Mother-Infant unit. Participants completed an anonymous survey of demographics, and cannabis use perceptions and risk in general and during pregnancy. Descriptive statistics were used. Results: Participants were white (51%) and Black (39%) with a mean age of 29.3 years. Participants strongly agreed/agreed that cannabis is a natural herb (47%); is not a real drug because it is made of natural substances (23.3%); is healthier than cigarettes (55.4%); reduces pain (64.2%) and reduces stress (65.3%). Participants either disagreed or did not know that cannabis use during pregnancy: can lead to a smaller baby (45%); can affect the baby's development (27.9%); is not safe to use during pregnancy (27.9%); may affect mother's ability to attach or bond with her baby (52.6%) or could affect a baby if in the breast milk (40%). In addition, 26.9% either did not know or agreed cannabis is OK to use during pregnancy. Conclusions: Findings emphasize the need for on-going assessment of cannabis use perceptions. Understanding perceptions supports the tailoring of culturally appropriate evidence-based prevention/harm reduction education messages and implementation of targeted interventions to address specific needs of this population.

39. Preliminary Data on the Relationship Between Reported Cannabis Use and Peripartum Mood Disorders

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Maternal mental health remains an underrecognized and unaddressed issue. Although up to 1 in 4 women meet diagnostic criteria for a psychiatric disorder during the peripartum period, only about 5 to 14% seek treatment [1]. Studies have shown that untreated mental health disorders can have significant effects on both mother and child, including poor maternal nutrition, breastfeeding, and bonding, as well as delayed cognitive and social development of the newborn [2, 3, 4]. Recently, the legalization of cannabis in Virginia on July 1, 2021, opened a new area of research. Prior to legalization, patients were likely to withhold or underreport cannabis use to healthcare providers. However, following legalization, patients became more forthcoming, offering a new opportunity to study the effects of cannabis use [5, 6, 7]. Utilizing the research platform TriNetX, we report preliminary data on the incidence and prevalence of reported cannabis use and postpartum mood disorders among pregnant mothers in the two years prior to and two years following legalization. In preliminary data analysis for this project, the incidence proportion of cannabis use remained stable between 1.28% and 1.46% over the four year range of this study, while overall prevalence steadily increased from 4.01% in 2019 to 7.12% in 2022. Similarly, incidence of peripartum mood disorders remained stable between 1.39% and 2.17% over the four year range, while prevalence steadily increased from 4.15% to 8.92%. We plan to continue this research to investigate whether there may be a link between reported cannabis use and peripartum mood disorders.

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40. Project BETTER: A Randomized Feasibility Trial of a Technology-Delivered Intervention Among Pregnant People Receiving Medication for Opioid Use Disorder

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Aim: This randomized feasibility trial aimed to 1) assess methodology for a subsequent efficacy trial and 2) examine the usability and acceptability of Project BETTER's hybrid technology-delivered educational intervention for pregnant people receiving medication for opioid use disorder within a perinatal addiction treatment clinic. Method: Participants were randomized to the technology-delivered educational intervention or standard practice control (brochure). Project BETTER's intervention offers three modules (pregnancy-to-postpartum transition, Neonatal Opioid Withdrawal Syndrome, child welfare interactions) via Computerized Intervention Authoring System (CIAS 3.0). Inclusion criteria were: ≥18 years of age, <34 weeks pregnant, currently receiving medication for OUD, and had engaged in care ≤10 weeks during their current pregnancy. Baseline and follow-up study visits included an online survey, brief interview, and medical record review. Mean perceived helpfulness scores were compared by study condition using independent samples t-test. Results: Participants (n=29) were reproductive age [M = 30.0 years (SD = 4.4)], 66% white and 31% Black with a median estimated gestational age of 24 weeks. Most participants (69%) received buprenorphine. The screening process identified 49 potential participants, n=31 (63%) of whom were recruited. Twenty-nine participants were randomized (intervention: n=16, control: n=13). Study completion rate was 83%. Most participants completed study components remotely. Among participants in the intervention group, 56% completed at least one module. Participants perceived the intervention to be as helpful as the brochure (intervention: 5.28 ± 0.98, control: 5.39 ± 0.56, p=0.387) and highly acceptable. Conclusion: Scale up to a larger clinical trial is feasible and acceptable with some protocol modifications.

41. A Case Report Following Low Dose Buprenorphine Induction During Pregnancy

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Buprenorphine is recommended for pregnant patients with opioid use disorder. Traditional buprenorphine initiation requires moderate withdrawal symptoms to prevent precipitating withdrawal. Low-dose buprenorphine initiation is newly emerging and does not require withdrawal prior to initiation.Case 1 is a 30-year-old pregnant patient with opioid use disorder. Inpatient rapid buprenorphine initiation precipitated withdrawal. Low-dose buprenorphine initiation was started twice, 1 outpatient and 1 inpatient with nonprescribed opioid use between. Case 2 is a 28-year-old pregnant patient with opioid use disorder. The patient started an inpatient low-dose buprenorphine initiation and planned its completion at home after discharge. Neither patient experienced precipitated withdrawal during their low-dose initiations. These buprenorphine initiations in pregnant patients guided by a low-dose initiations protocol using only split buprenorphine-naloxone films represent an alternative opioid use disorder treatment method with potentially high acceptability. Future work is warranted to advance the evidence base informing clinicians on how to optimally individualize buprenorphine initiations in pregnancy.

42. Labor and Delivery Pain Expectations and Experiences in Pregnant People Receiving Buprenorphine

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Background: Pregnant people with OUD often report anxiety in anticipation of labor and delivery pain and concerns about opioid use during the postpartum recovery period. This study describes pre-birth expectations and postpartum experiences of labor and delivery pain in an OUD treatment sample. Methods: This is an a priori secondary analysis from a longitudinal study investigating recovery among postpartum people with OUD receiving buprenorphine. Participants enrolled in their third trimester and completed surveys at baseline, 2-days and 2-weeks postpartum. Surveys assessed labor and delivery pain intensity and daily interference (0-10 scale) adapted from the Brief Pain Inventory short form. Postpartum pain management satisfaction was assessed (0-10 scale). Clinical factors were abstracted from the medical record. University institutional review board approved the study (HM20017030). Results: Participants (N=26) were reproductive age (31.0±5.6 years) and predominantly white (73.1%). Median gestational age at delivery was 39 weeks (range:33-41). Deliveries were vaginal (68.4%) and cesarean (31.6%). Most participants received analgesics during labor (epidural=78.9%, spinal=5.3%, IV medication=15.8%, opioids=21.2%). Worst pain expectations were similar to patient-reported pain experiences (baseline 8.9±2.2 vs. postpartum 2-days 8.0±2.3, 2-weeks 8.1±2.4). Participants were satisfied with pain management (mean=7.2±2.8). Participants expected to have greatest pain interference with sleep (5.5±2.9) but reported greatest interference with walking (2-days: 4.6±3.6) and mood (2-weeks: 4.1±3.1). Pain interference for postpartum bonding and infant feeding was low. Conclusions: In a sample of pregnant people with OUD receiving buprenorphine, pre-birth expectations for labor and delivery pain were high yet realistic when compared to postpartum patient-reported experiences. Qualitative investigations are warranted to better understand patient perspectives.

43. Post-Traumatic Stress in the Pregnancy-to-Postpartum Transition Among Birthing People with OUD

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Background: Postpartum people with opioid use disorder (OUD) face unique challenges; posttraumatic stress may trigger substance use recurrence and disrupt the parent-infant dyad. However, the impacts of traumatic stress in the pregnancy-to-postpartum transition for birthing people with OUD are not well investigated. Our study characterizes posttraumatic stress after birth among people in OUD treatment during the fourth trimester. Methods: This a priori secondary study uses longitudinal data investigating recovery among postpartum people with OUD receiving buprenorphine. Participants were enrolled during the third trimester and assessed within two weeks postpartum. Scores >29 on the PTSD Checklist-Civilian at 2-weeks postpartum identified posttraumatic stress. Other measures included: maternal attachment, perceived control in childbirth, trauma history questionnaire, and child welfare involvement. Results: Participants (N=19) were predominantly white (74%). Most (94.7%) endorsed a traumatic event history before delivery of this infant. Eight (42%) met criteria for posttraumatic stress postpartum and identified birth (n=2), infant medical issue (n=3) or an unrelated event (n=3) elicited the posttraumatic stress response. Of these, approximately 25% experienced food insecurity and limited healthcare transportation. These participants reported high levels of maternal attachment [28.1 (SD=4.8)] and perceived control in childbirth [44.3 (SD=6.3)]. Most participants reported postpartum child welfare involvement. Conclusions: Nearly half of our sample experienced posttraumatic stress symptoms after birth, and 2/3rd attributed symptoms to a traumatic birth or infant medical issue. Qualitative investigations are warranted to better understand the patient perspective of these experiences and their unique intersections with OUD treatment and recovery to ultimately improve trauma-informed care strategies.

44. Influence of Postpartum Opioid Prescription on Buprenorphine Continuation Among Patients with Opioid Use Disorder

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Introduction: Medications for opioid use disorder (OUD) are life-saving, yet patient outcomes vary widely, indicating the need for targeted improvements in treatment quality. One such target, pain, is associated with substance use recurrence and treatment discontinuation, yet how pain management correlates with postpartum OUD outcomes is poorly understood. This study assessed the association of opioid prescription receipt at hospital discharge with buprenorphine continuation rates in postpartum people with OUD. Methods: This study included a secondary analysis of a retrospective cohort of pregnant patients receiving buprenorphine for OUD at delivery between January 2017 and March 2020. The exposure was receipt of opioid prescription upon hospital discharge, and the outcome was week of buprenorphine discontinuation through 52 weeks postpartum. Kaplan-Meier survival curves and Cox proportional hazard models compared time to buprenorphine discontinuation following delivery by receipt of opioid prescription at discharge. Results: Among our sample (N=142), 51 (34%) continued buprenorphine through 52 weeks postpartum and 91 (64%) discontinued before 52 weeks. Thirty-seven (26%) received an opioid prescription at discharge following delivery. Time to buprenorphine discontinuation was shorter among patients prescribed an opioid compared to patients who did not (Wilcoxon-Breslow-Gehan test, p=0.0334). However, after adjusting for covariates, opioid prescription receipt was not associated with time to buprenorphine discontinuation, whereas psychiatric comorbidity was associated with a longer buprenorphine duration. Conclusions: Our findings highlight how tailoring pain management after delivery may be a potential intervention target to ultimately improve OUD treatment outcomes through the vulnerable postpartum period. Future investigations are warranted.

45. PTSD Symptomatology is Associated with Insomnia Severity Among Women Receiving Buprenorphine for OUD Treatment

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Relapse and OUD treatment discontinuation rates remain high (~60%) among individuals receiving medications for opioid use disorder (MOUD). Tailoring treatments to individuals' needs is an avenue to improve outcomes. PTSD and sleep disturbances, especially insomnia (difficulty falling asleep or staying asleep), are incredibly common among individuals receiving MOUD, and women are more likely to develop both PTSD and insomnia. As these co-morbidities are associated with negative OUD treatment outcomes (e.g., relapse), elucidating related targets may be an avenue to advance OUD therapeutics. This study takes a first step towards achieving a better understanding of this intersection among a sample of women receiving buprenorphine in outpatient OUD treatment. The study's primary aim was to identify differences in insomnia symptom severity by presence of PTSD symptomatology; we also explored the association between degree of PTSD symptomatology and insomnia severity. We focus on women given the known disproportionate impact of OUD, PTSD, and insomnia on women that warrants investigations through a sex/gender-informed lens.

46. Perspectives and Experiences with Sleep and Recovery Among Women Receiving Buprenorphine for Opioid Use Disorder

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Objectives: Among individuals receiving medication for opioid use disorder (MOUD), poor sleep health increases the risk for negative OUD outcomes. However, little is known about experiences with sleep among women with OUD. This mixed-methods study explored sleep and recovery among women in OUD treatment. Methods: This is an analysis from a cross-sectional survey and interview study investigating the relationship between sleep and OUD recovery. The study enrolled non-pregnant women between 18-65 years of age stabilized on buprenorphine from an outpatient program (February 2022-September 2023). Participants (n=54) who endorsed clinically significant insomnia symptoms on the Insomnia Severity Index (ISI) (≥10 score) were included in the current study analyses. A sub-sample (n=11) who met this threshold completed semi-structured interviews. Results: Participants reported engagement of sleep health behaviors, which were grouped into four domains: positive sleep related cognitions, sleep environment, sleep restriction, and reducing stimulating activities. Respondents highlighted the multidimensional and cyclic relationship between sleep and health, including their OUD. Women also described how sleep evolves through addiction into recovery, and how good sleep health reduces risk of return to substance use. Women also shared about the positive and negative impacts that buprenorphine has on their sleep. Conclusions: We found that sleep health is a multidimensional and dynamic process among this sample of women receiving MOUD. Findings can be incorporated into future investigations aiming to develop and evaluate sleep interventions (both pharmacologic and behavioral) that are in line with patient-reported experiences for women in OUD treatment.

47. Chronic Adolescent Stress Attenuates Morphine-induced Antinociception and Central Amygdala Activity in Adult Male and Female Rats

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Stress exposure during critical developmental periods has been shown to increase the risk for an array of psychological and physiological pathologies in adulthood, including substance use disorder and chronic pain. Although incompletely understood, studies have suggested that stress alters opioid responses which in turn is associated with increased nociceptive and decreased antinociceptive responsivity. Studies demonstrating stress-induced attenuation of morphine antinociception have been conducted in male rodents and used stress exposure models that resulted in physical injury limiting generalization of the available findings. The aim of the current study was to characterize the effects of chronic adolescent psychosocial stress on morphine-induced antinociception and neuronal activation in adult male and female rats. Male and female Wistar rats were exposed to chronic adolescent stress and tested for either antinociceptive response to morphine or morphine-induced expression of cFos in the central nucleus of the amygdala and periaqueductal grey in adulthood. Antinociceptive response to morphine was assessed with the tail-withdrawal test and morphine-induced cFos expression was assessed with immunohistochemistry. A history of chronic adolescent stress attenuated morphine-induced antinociception and neuronal activation in the central amygdala and these effects did not differ between males and females. Future studies will attempt to identify the role of the central amygdala mu opioid receptor system in these processes in efforts to identify more effective targets for pain management in individuals with stress histories.

48. Antinociceptive Effects of Morphine and the Kratom Constituent Mitragynine in an Assay of Pain-Depressed Locomotion in Mice

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Background: Kratom is a tree indigenous to southeast Asia, and kratom products are sometimes consumed with the intent of relieving pain. Mitragynine, which is the primary alkaloid in kratom leaves, acts as a weak agonist at mu opioid receptors (MOR), but the potential of mitragynine to produce clinically relevant analgesia remains unclear. The present study compared effects produced by oral administration of mitragyine and the prototype MOR analgesic morphine in a validated preclinical assay of pain-related behavioral depression. Methods: Adult male and female ICR mice were tested in locomotor boxes with two compartments separated by a doorway obstructed by a 1-inch-tall wire-mesh barrier. Photobeams were spaced at 3-cm intervals in each compartment. Before 15-min test sessions, mice were treated with PO morphine, mitragynine, or vehicle ± IP administration of dilute lactic acid as a noxious "pain" stimulus. Locomotion was quantified as Crosses (# crosses between compartments) and Movement (# photobeam breaks). Data were analyzed by ANOVA followed by post hoc tests ($p < 0.05$). Mitragynine was provided by Dr. Chris McCurdy, University of Florida. Results and Conclusions: IP acid alone produced a pain-related and concentration-dependent decrease in both Crosses and Movement. Neither morphine (3.2-100 mg/kg) nor mitragynine (10-180 mg/kg) altered locomotion when administered alone. PO morphine (3.2-100 mg/kg) significantly alleviated IP acid-induced depression of both Crosses and Movement, whereas mitragynine (10-100 mg/kg) did not. Dose x Sex interactions were not significant for either drug on any endpoint. These findings do not support the hypothesis that mitragynine produces significant or MOR-mediated analgesia.