Medical Residents' Perspectives on Palliative Medicine During Residency

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Abstract

Background: Palliative medicine is an important part of health care and increasingly needed, yet medical schools have placed a limited emphasis on end-of-life education. The purpose of this qualitative study was to gain insight into medical residents' education and training experiences in palliative medicine during residency.

Methods: Using a case study approach, seven residents were recruited from a southern osteopathic medical school to participate in individual interviews. The data were analyzed using NVivo 12 Pro software and a constant comparison approach. Four major themes emerged: confidence, preparedness, physician wellness, and the culture of medicine.

Results: Osteopathic medical residents experience education and training in palliative medicine; however, the frequency and depth vary according to gender, specialty, and year of residency. Medical residents attribute life experiences, shadowing, and mentoring opportunities to higher levels of confidence and preparedness in palliative medicine. The overarching culture of medicine often instills a counter-intuitive response as training is naturally more focused on curing disease and saving lives. Residents regularly experience unresolved emotional distress, as well as feelings of being unprepared to communicate effectively with suffering and/or dying patients and their families.

Conclusions: These findings suggest palliative medicine curricula need standardization and further development, including dedicated time for debriefing and reflection during clinical rotations and residencies for medical students to be optimally prepared for practice in this area of medicine.

Keywords: palliative medicine, medical education, medical residency, end-of-life care

Patient Perceptions in Receiving LGBTQIA Culturally Competent Health Care

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Background: There is a large amount of documented evidence demonstrating that health care providers are caring for diverse populations. This warrants a level of cultural competence (CC) when making health care decisions. Traditionally, Race and ethnicity have been the focus in CC. However, criteria such as sexual orientation and gender identity are often forgotten, or left out altogether. Because of this, patients whose sexual orientation or gender is a minority, may often receive inadequate treatment. This is in part due to the health care providers lack knowledge in this type of CC or present sexual prejudices. Because of this, research is needed to investigate the perceptions of patients that identify as lesbian, gay, bisexual, transgender, queer/questioning, intersex, ally (LGBTQIA) when receiving health care.

Methods: Cross-sectional design consisting of 140 participants (male=78, female=50, transgender=5, other=7; heterosexual=16, gay/lesbian=72, bisexual=43, other=9, mean age=26.97 ± 7.67). Participants were recruited using a snowball sampling method via email and list-serves. A modified version of the Gay Affirmative Practice (GAP) (reliability $\alpha = 0.962$), was delivered online to participants to determine need of LGBTQIA cultural competent treatment by health care providers. Means and standard deviations were calculated for each variable (gender, sexual orientation), as well as an overall GAP score (out of 150). Two, single one-way ANOVAs (gender and sexual orientation) were performed with GAP score as the dependent variable.

Results: Calculated GAP scores: All=128.82 ± 18.48, male=128.49 ± 15.60, female=130.35 ± 17.10, transgender=129.80 ± 9.31, other=143. 57, heterosexual=129.33 ± 17.12, gay or lesbian=128.25 ± 15.85, bisexual/omni/pansexual/queer/non-monosexual=132.79 ± 14.99, other=131.38 ± 20.37. ANOVA results were modified with Kruskal-Wallis adjustments due to violation of normality and homogeneity of variance, and now are represented by Chi Squares. Gender was the single significant outcome, (X2(3) =8.01, p <0.05). Post hoc testing of gender demonstrated statistical significant in comparing males vs. other.

Conclusions: Patients do find it necessary for health care providers to have specific training and/or knowledge in LGBTQIA CC. A majority of results demonstrate strongly agree that health care providers need better CC in LGBTQIA. In comparison of GAP scores in gender, the category of other demonstrates a great need for CC in LGBTQIA in health care providers. Males demonstrated a much lower score, indicating a low priority for LGBTQIA CC in health care. With an increasing LGBTQIA patient population, patients feel the ever increasing need for health care providers to provide knowledgeable, competent, and fair treatment/care.

Keywords: multiculturalism, diversity, patient perceptions, LGBTQIA, health care

Perceived Stress and Coping Skills Observed in Osteopathic Medical Students

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Background: Medical school is one of the most trying times in the lifetime of a physician. Stress can be unrivaled compared to the general population. This increase in stress can take a toll physically and mentally. In order to mitigate stress, coping skills (CS) are used. Although there are considerable studies on perceived stress (PS) and CS in medical students separately, there are few studies that investigate the correlations of both in osteopathic medical students.

Methods: Cross-sectional design with current students enrolled in a College of Osteopathic Medical School (COM) (N=82). COM students completed a 30-minute online survey that contained basic demographic information, the Perceived Stress Scale (PSS) (reliability α=0.78) to measure PS and the Coping Orientation to Problem Experience Inventory (COPE) (reliability α=0.73) to measure CS. One-Way ANOVA's were calculated for demographic variables and Pearson Correlation analysis was used to calculate significate coping skills.

Results: COM students experience a moderate level of CS (mean=16.9) ANOVA results demonstrate greater levels of PS in females than males (F(1, 80)=5.444, p=0.02). Age and school year were not significant. Negative correlations in stress (indicating that as the use of the CS increases, stress decreases) were found with positive reinforcement (r= -0.49, p=0.00), active coping (r= -0.37, p<0.01), and planning (r= -0.45, p=0.00). Positive correlations with stress, (indicating that as the CS increases, stress increases) were revealed with mental (r=0.42, p=0.00) and behavioral disengagement (r=0.46, p=0.00), venting (r=0.52, p=0.00) and substance use (r=0.26, p=0.02).

Conclusions: Results suggest that female COM students experience more PS than males. Although COM students do have a significant amount of CS that alleviate stress, a greater percentage of COM students use CS that cause greater stress. Results from this study can assist COM students, professors, and administrators in acknowledging and developing strategies that better mitigate stress.

Keywords: Coping Mechanisms, Emotion-Focused Coping, Medical School, Perceived Stress, Problem-Focused Coping

Can Self-Efficacy Predict First Year Medical Students' Academic Success?

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Background: Self-efficacy (SE), the ability for an individual to believe in their own capabilities, has been connected to an individual's ability to succeed, deal with resistance and failures, and cope with challenges, all skills that are essential for competent physicians. SE has been found to have a positive impact on college student academic performance, but has not been evaluated in medical students. The purpose of this study was to measure first year medical students' SE and to determine what characteristics impacted their academic success in their first semester of medical school.

Summary of Work: 61 (29 male, 32 female) first year medical students at a single osteopathic medical school were asked to complete the SE scale and additional demographics. Data was combined with undergraduate (UG) GPA, MCAT score, first semester GPA, and class rank. Basic descriptives, means, standard deviations, and Pearson correlation values were calculated.

Summary of Results: Four variables were found to be significantly correlated with first semester GPA (level of athletic performance of UG r=.311, p=.015; number applications submitted r= -.414, p=.000; UG GPA r=.488, p=.000; science GPA r=.467, p=.000) and three with class rank (number applications r=.355, p=.005; UG GPA r= -.483, p=.000; science GPA r= -.495, p=.000). General SE was significantly correlated to the size of hometown (r=.256, p=.049).

Discussion & Conclusions: This study determined that medical students' first semester academic success was better predicted by academic preparation rather than a student's self-efficacy. This is in contrast to current undergraduate literature that demonstrates a significant impact on GPA and retention. Self-efficacy may therefore be more applicable to astute clinical skills rather than pre-clinical academic performance.

Take Home Message: While this study did not find SE to be a predictor of first year medical student academic performance, the ability to control thoughts, feelings, and actions in stressful situations is critical to overall success as a physician. Academic programs should seek out options to assess and improve these skills prior to entering the clinical setting.

Keywords: academic excellence, self-efficacy, academic performance

An Evaluation of Board Preparation Resources

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Medical licensing examinations are a three-part test that begins after the second year of medical school. Students are always searching for premier preparation resources that will help them score high on these exams. In this study, a team of four professionals and a medical student developed a survey and administered it to Oklahoma State University College of Osteopathic Medicine Class of 2022 asking them to evaluate how board preparation resources aided their study for COMLEX-USA Level 1. The study showed results of an average of the questions completed and months spent preparing by students, while also shining a light on which resources they found most useful and valuable. This work can aid future classes in providing a start of which resources to consider in preparation for medical licensing examinations.

Keywords: COMLEX-USA Level 1, board preparation resources, usage, and value

Exploration of the Effect of Protease Inhibitor Activity on Snake Venoms

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Envenomation by snakes is a worldwide health crisis. Anti-venom, the current treatment standard, is a costly and imperfect treatment. Without proper ID of the snake species, the treatment provider is guessing at which anti-venom to use. Many snakes are also able to control venom release as they age, so not every bite by a venomous snake is envenoming. Treatment by anti-venom has the potential of severe side effects so treating a snake bite that hasn't resulted in envenoming could cause more problems than withholding treatment. Can protease inhibitors be used to block or decrease the gelatinase activity of snake venom? Established baseline venom activity and dose dependence of inhibition. Activity was measured with a fluorescein-labeled gelatin. NNGH is the enzyme inhibitor that was used. In dose-response experiments, there is significant gelatinase activity and over 50% inhibition by NNGH in Agkistrodon contortrix and complete inhibition in Crotalus atrox. We also see 50% inhibition of Cerastes cerastes venom by NNGH but the species has near half the initial gelatinase activity of C. atrox. These results provide substantial support that venoms of Crotalinae species, pit vipers, are inhibited by the protease inhibitor NNGH, supporting future research endeavors.

Keywords: antivenom; gelatinase; protease inhibitor

Experience of Graduate Students in Stem Outreach Classes Employing Different Strategies

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Scientists and the general public both benefit from improved communication about scientific research and from integrating scientists into educational outreach for different age groups. However, most outreach efforts are conducted by faculty and graduate students on a volunteer basis, and support for these events may be limited by the time people can devote to them. We at Oklahoma State University Center for Health Sciences Biomedical Sciences Graduate Program have employed different strategies for science outreach. One strategy focused on elementary school students and involved weekly science activities for a semester, followed by poster presentations at a mini-science fair. The other strategy focused on several large events throughout the semester and included different age groups and delivery modalities. For example, several panel discussions were conducted to enlighten local undergraduate students about graduate school/medical school in terms of requirements, applications including dos and don'ts, and answering their questions. We also did a two hour 'Science Blowout' for elementary students in an after-school program during which we had several stations with different science activities (e.g. exercise and heart rate, comparing rat and sheep brains, sheep hearts, brain models and microscopic analysis, dry ice vs regular ice, pipetting and vortexing solutions, and making genetic monsters). Both strategies had advantages and disadvantages. The semester-long strategy was longer in duration and included related activities conducted by a graduate student mentor for every two elementary students; thus, the elementary students engaged with us, and their progress throughout the semester was evident. However, inconsistent attendance by the elementary students was challenging as were external situations that sometimes made it harder for them to focus on the experiments.

With the second strategy, college students chose to come or not, based on their interests. As a result, attendance was difficult to predict, and this was complicated by fairly short time allotted (typically, limited to an hour or so). On the other hand, the ones who attended got specific information and tips they could not easily find elsewhere. With the Science Blowout, disadvantages were that the kids were very loud, and often preferred to stay at particular stations longer than others. These made it challenging to keep things on schedule. Nonetheless, the engagement the kids showed with the experiments may mean they could start thinking of a future for themselves as scientists, which was rewarding. Both of these strategies require time and advance planning, though the first strategy required more. Nevertheless, our experiences with both have allowed us to make better choices for outreach, depending on several factors: 1) goals of the 'target' groups; 2) the goals of faculty and students; and 3) the time commitment involved.

Keywords: service learning, outreach, STEM, Graduate Student Perspective

Sweet Reward: Sucrose Intake Effects in the Adolescent Prefrontal Cortex, Is Brain Derived Neurotrophin Factor the Answer?

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Sugar intake is a natural stimulus, like sodium or stress, and activates similar neural circuits involved in mediating reward. Sugar intake may lead to a sensitization of the reward system, changing the response to subsequent rewarding experiences. BDNF plays an important role in the survival, maintenance and growth of many types of neurons and is expressed abundantly in the nucleus accumbens (NAcc) and prefrontal cortex (PFC). Rodents maintained on energy-rich diets containing high levels of sugar show impaired learning and memory performance, and recent evidence indicates that such deficits may be related to the effects of these diets on the regulation of brain-derived neurotrophic factor (BDNF) in the brain. Nevertheless, it is not clear how sucrose intake translates into decreased BDNF levels in brain reward areas. The specific aim of this study, therefore, addresses the lack of information on the role of sugar intake, as a natural reward, in BDNF expression in the PFC and NAcc. Hypothesis: Animals pre-exposed to sucrose intake in early adolescence are more likely to maintain elevated levels of sucrose intake which is related to changes in BDNF levels in PFC and NAcc.

Methods: 1) We have determined preferred sucrose concentration in adolescent rats using a chronic intermittent sucrose intake model. 2)We have determined if early sucrose intake affects adult sucrose intake and examined changes in BDNF levels of expression in the PFC and NAcc. On PND28, (pre-adolescents period) rats were assigned to sucrose (5% or 15%) or tap water groups. From PND28 (adolescent period) to PND32 rats had 2hr access to sucrose or water each day. After 8 weeks, rats were re-exposed to sucrose or water and after the last sucrose intake session, animals were sacrificed. Brains were extracted and prepared for immunoassay analysis (ELISA) for identifying Pro and Mature BDNF levels.

Results: Adolescent rats showed significantly higher levels of sucrose intake at the 5% concentration than the 15% concentration. Both ProBDNF levels and Mature BDNF levels in the PFC showed statistically significant differences among the groups, whereas there is not any statistically significant change among groups in NAcc.

Conclusion: Our study demonstrated for the first time that sucrose ingestion affects BDNF levels in PFC but not in NAcc in the brain when adolescent rats are pre-exposed to sucrose intake.

Keywords: BDNF, PREFRONTAL CORTEX, SUCROSE, ADOLESCENT

Assessment of transparent and reproducible research practices in the psychiatry literature

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Objective: Reproducibility is a cornerstone of scientific advancement; however, many published works may lack the core components needed for study reproducibility. In this study, we evaluate the state of transparency and reproducibility in the field of Psychiatry using specific indicators as proxies for these practices.

Methods: An increasing number of publications have investigated indicators of reproducibility, including research by Harwicke et al., from which we based the methodology for our observational, cross-sectional study. From a random five-year sample of 300 publications in PubMed-indexed psychiatry journals, two researchers extracted data in a duplicate, blinded fashion using a piloted Google Form. The publications were examined for indicators of reproducibility and transparency, which included availability of: materials, data, protocol, analysis script, open-access, conflict of interest, funding, and online pre-registration.

Results: This study ultimately evaluated 296 randomly-selected publications with a 3.20 median impact factor. Only 107 were available online. Most primary authors originated from the United States, United Kingdom, and Netherlands. The top three publication types were cohort studies, surveys, and clinical trials. Regarding indicators of reproducibility, 17 publications gave access to necessary materials, four provided in-depth protocol, and one contained raw data required to reproduce the outcomes. One publication offered its analysis script upon request; four provided a protocol availability statement. Only 107 publications were publicly available: 13 were registered in online repositories and four, ten, and eight publications included their hypothesis, methods, and analysis, respectively. Conflict of interest was addressed by 177 and reported by 31 publications. Of 185 publications with a funding statement, 153 were funded and 32 were unfunded.

Conclusions: Currently, Psychiatry research has significant potential to improve adherence to reproducibility and transparency practices. Thus, this study presents a reference point for the state of reproducibility and transparency in Psychiatry literature. Future assessments are recommended to evaluate and encourage progress.

Keywords: Reproducibility, Psychiatry, Transparency, Replicability, Evidence-based medicine

Acute effects of social defeat on neuroinflammatory signaling in mice

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Background: Psychosocial stress negatively affects both physical and mental health; and stress-related psychiatric disorders are more common in women. Interestingly, preclinical studies have predominately studied the effects of psychosocial stress on male mice. These studies suggest that adverse effects of psychosocial stress are due in part to the disruption of inflammatory signaling; however, the extent to which these findings translate to females remains unclear. In the few instances where the effects of social defeat have been studied in female mice, a male mouse was used as the aggressor. There is still much to learn about the effects of psychosocial stress on inflammatory signaling in female mice, particularly in the context of female-mediated aggression. Our working hypothesis is that social defeat impacts stress and inflammation in a sex-dependent manner.

Methods: To test our working hypothesis, we investigated the effects of a single, 2 h bout of social defeat on biomarkers of stress and inflammation in male and female C57BL/6J mice: importantly, the CD-1 aggressor mice were the same sex as the subject mice. Plasma corticosterone (CORT) levels were measured using an enzyme-linked immunosorbent assay (ELISA) and used a biomarker of stress. Levels of the proinflammatory chemokine, monocyte chemotactic protein-1 (CCL2), were measured in plasma and brain by ELISA. The inflammatory signaling protein, transforming growth factor beta activated kinase 1 (TAK-1), and glial fibrillary acidic protein (GFAP), a marker of astrocyte activation, were assessed in the brain by western blot analysis.

Results: Two-way analysis of variance revealed that social defeat elevated plasma CORT and CCL2 in males, but not in females. The levels of CCL2, TAK-1, phospho-TAK-1, and GFAP in the brain were not significantly affected by social defeat; neither in males nor in females.

Conclusions: A single bout of social defeat induces stress and increases circulating levels of CCL2 in a male-specific manner. The biomarkers of inflammation in the brain and astrocyte activation were not significantly impacted in males or females by a single bout of social defeat. These novel insights into the sex-dependent effects of acute psychosocial stress on inflammatory signaling warrant further investigation. Future investigations will assess additional inflammatory mediators and the effects of repeated bouts of social defeat. Together, these findings are expected to be instrumental in efforts to advance the development of novel therapeutic strategies to combat the detrimental effects of psychosocial stress.

Keywords: Psychosocial Stress, Inflammation, Chemokine

Inferior epigastric artery injury during laparoscopic surgery: Is there a superior method of repair?

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Background: Vessel trauma at the time of trocar placement can be a source of significant intraoperative and postoperative complications of laparoscopic surgery. Limited research has been done investigating how best to manage a trocar-related IEA injury. As such, no single technique has been proposed as the gold standard. This was a literature review in which analysis of interventions for IEA injury were evaluated.

Methods: We employed a highly sensitive search strategy that involved a large number of false positives to ensure important studies were not missed. We sought to investigate for comparisons among methods, surgical procedures, interventions used for IEA repair, outcomes and measurements used for outcomes. We also analyzed outcomes occurring after the primary intervention was employed. Outcome review tables were created in association with each intervention. All primary and secondary outcomes reported in the literature were summarized and quality of evidence was measured.

Results: The results of our study identified that although an inferior epigastric artery injury is uncommon, the complications of the injury can be significant, including stroke and death. No recommendations as to a superior method have been identified. Of the case studies that are published, inferior epigastric artery injury was treated with balloon tamponade (1/18 cases), full thickness suture (4/18), isolation and ligation (6/18), thrombin injection (5/18), and expectant management, with IR embolization being the most commonly reported secondary intervention following a failed first attempt at control.

Conclusion: Our findings indicate a low level of published research in regard to topics considered for the study. Our results would advocate for the need for evidence-based guidelines for repair of inferior epigastric artery injury at the time of trocar placement. With the current published data, it appears that the preferred post-operative diagnostic modality for an IEA favors CT scan, and the preferred mechanism of repair favors IR embolization. Given the low quality and quantity of available evidence, we believe the implementation of expert opinion-based recommendations from a surgical society would expedite future research specific to this topic.

Keywords: Epigastric artery, Laparoscopic, Trocar, Arterial injury, Repair

Gender gap in surgery

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Objective: To determine if the creation of integrated surgical programs has increased the recruitment of women into surgical residencies.

Summary Background Data: Historically, there have been disproportionately lower numbers of women entering surgical residency programs compared to the percentage of women physicians. Per the ACGME, in 2017, women comprised 45.8% of all residents in training but just 29.9% of surgical residents. We sought to determine if certain factors, specifically integrated surgical programs, have made an impact on the number of women in surgical specialties.

Methods: Data regarding surgical residents and physicians was extracted from the Accreditation Council of Graduate Medical Education (ACGME) Data Resource Books and ACGME Association of American Medical Colleges (AAMC) Physician Specialty Data Reports from 2007-2018.

Results: Overall, integrated surgical programs consistently report increased percentages of women compared to non-integrated surgical programs.

Conclusions: The creation of integrated surgical programs has increased and will likely continue to increase the proportion of women in surgical residencies.

Keywords: Surgery, Women, Gender Gap

Rural men who have sex with men's experiences and preferences for health programming

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Background: Rural populations in particular regions of the United States make up a significant, if not the majority, of a state's total population. Therefore, there is a need for research in how to effectively engage and recruit individuals from rural populations to participate in health services. Rural men who have sex with men (MSM) are especially vulnerable for missing out on health opportunities due to barriers specific to rural communities. Rural MSM are most at risk for HIV/STI infections, though the majority of outreach efforts to reach MSM have been focused on urban populations. More attention is needed to study effective ways of reaching rural MSM, yet little is known about their preferences; particularly as studies show significant differences in the behaviors and perceptions of rural versus urban MSM.

Methods: Our study uses a qualitative instrument to gauge what outreach methods are most effective from the perspective of 40, rural MSM via a semi-structured interview. Participants were recruited via flyers placed in venues affirming to the LGBT community. The interviews were recorded, transcribed, and analyzed to identify themes. Methods used included open and axial coding as well as SPS Statistical Software.

Results: Outreach facilitators included online marketing, emphasizing rural areas, tailored for social media platforms, while outreach barriers included traditional forms of print media/advertising, or anything that may jeopardize anonymity.

Conclusion: Recruiting for rural MSM should be largely web based, and on platforms geared towards the LGBT community. Advertisements should emphasize accessibility to services based on location.

Keywords: Rural, MSM, Healthcare Barriers

Examining profiles of latinx sexual minority youth associated with suicide risk

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Background: Latinx youth have been shown to be at elevated risk for suicidality compared to other ethnic groups. Further, recent studies show that rates of youth suicide have been steadily rising while reports of discrimination (a strong suicide predictor) against Latinx individuals have sharply increased since 2016. Fewer studies, however, have focused on a within groups context about specific factors that make lesbian, gay, or bisexual (LGB) youth of color at greater odds than other LGB youth for suicide ideation, as opposed to more traditional studies which compare homosexual and heterosexual youth. In order to address these limitations, we take a unique mixture-modeling approach by creating profiles of Latinx, LGB youth based on suicide risk factors used in previous investigations (bullying, alcohol, sleep, social media, and poor grades). We then use these profiles in a logistic regression to investigate suicide risk. Using large nationally represented data, the current study uses latent profile analysis to better understand how dimensions of youth behavior that are typically associated with suicide group together in Latinx LGB youth, creating identifiable risk profiles that are more practical and helpful to assimilate by mental health professionals, therapists, practitioners, and educators.

Methods: Data were collected through the 2015 and 2017 Youth Risk Behavior Surveillance System (YRBSS), a bi-annual, nationally representative survey on adolescent health in grades 9th through 12th. A total of 686 LGB Latinx youth were used in a latent profile analysis (LPA) which yielded four distinct profiles. Five variables that are associated with suicide risk from the YRBSS were used: bullied, alcohol use, poor academic performance, electronics use, and sleep hours. We used mixture modeling, latent profile analysis (LPA) to establish identity profiles across these variables. We then used logistic regression to investigate how group membership in these profiles are associated with attempts of suicide.

Results: Class 4 represented the highest risk, with high rates of bullying, alcohol, poor grades and social media, while Class 3 represented the lowest risk with low rates of bullying and alcohol. Classes 1 (high alcohol) and 2 (high bullying) represented moderate risk. Results show Class 4 had the highest rate of suicide ideation and Class 3 with the least. Class 2 had the next highest risk, followed by Class 1.

Conclusions: Our results speak to the need for holistic public health programming which addresses the array of issues impacting LGB youth; highlighting the strong association that both bullying and alcohol have with suicide ideation. Because high risk classes in our study had multiple factors contributing to associations to suicide, programming aimed at attenuating youth suicide among LGB youth may benefit from addresses multiple issues simultaneously (i.e., substance use and bullying). This would be a departure from more traditional programs for LGB youth which are predicated on one specific risk behavior, such as coping with bullying or substance use separately.

Keywords: Latinx, youth, minority, suicidality, LGB

Effects of outer membrane permeabilizer compound 48/80 on pseudomonas aeruginosa and serratia spp.

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BACKGROUND: Our laboratory has focused on the effects of outer membrane permeabilizer compound 48/80 on gram-negative bacteria intrinsically resistant to hydrophobic antibacterial agents. We first determined the extent to which two disparately responding species of Serratia were resistant to compound 48/80, as compared to Pseudomonas aeruginosa. To study gene expression changes potentiated by compound 48/80 in S. marcescens, RNAseq data were mined to select genes for future targeting by qPCR in order to elucidate the mechanism of action of compound 48/80.

METHODS: Previous work indicated some species of Serratia were more susceptible to permeabilizing concentrations of compound 48/80 than others. A conventional macrobroth dilution bioassay was employed to determine minimal inhibitory and bactericidal concentrations (MICs and MBCs, respectively) of compound 48/80 for P. aeruginosa, S. marcescens, and S. odorifera. In order to further study the mechanism of action of compound 48/80 on S. marcescens, PCR primers were created for three genes (slyB, phoP, and phoQ) whose expression was increased 50 fold by compound 48/80 treatment. Primer sets against pigment and quorum sensing genes were used to pilot the PCR optimization process on genomic DNA before using the newly-made primers.

RESULTS: Compound 48/80 MICs for P. aeruginosa, S. marcescens, and S. odorifera were 16, 128, and 2.0 µg/mL, respectively. MBCs for the same species were 64, > 512, and 8.0 µg/mL, respectively. Primer sets for slyB, phoQ, and phoP were tested on genomic DNA and results are pending.

CONCLUSION: These data suggest that while S. marcescens is highly resistant to compound 48/80, S. odorifera is relatively susceptible with respect to P. aeruginosa, which is moderately resistant. Analysis of the PCR data is ongoing at present.

Keywords: Compound 48/80, Serratia spp., Pseudomonas aeruginosa, PCR primers

Evaluation of bacterial isolates from cystic fibrosis patients

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Gram-positive Staphylococcus aureus, gram-negative Pseudomonas aeruginosa, and Burkholderia cepacia are bacterias that can cause infections in cystic fibrosis (CF) patients. The purpose of this study was to assess the colonial and cellular morphology of clinical isolates that were collected from northeastern Oklahoma CF patients. Colonial and cellular morphology were assessed by conventional methods. The P. aeruginosa isolates were similar to colorless and mucoid colonies. One S. aureus isolate was slightly mucoid while the other was butyrous. The B. cepacia isolates were the most diverse with 53% of the isolates being butyrous while 47% were mucoid. Additionally, 75% of the isolates were colorless and 25% of the isolates were yellow in color. This data supports the conclusion that the B. cepacia isolates had the most diverse colonial morphology while P. aeruginosa and S. aureus isolates had similar morphology among their species.

Keywords: Colonial and Cellular Morphology of Bacterial Isolates, Staphylococcus aureus, Pseudomonas aeruginosa, Burkholderia cepacia, Cystic Fibrosis patients

Antibacterial properties of novel eumelanin-inspired phenylene indolyne derivatives

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BACKGROUND: The eumelanin core represents a novel compound having the intrinsic ability to act as scaffolding for functional groups which may possess antibacterial properties. The purpose of this study was to investigate the antibacterial potential of eumelanin-inspired phenylene indolyne (EIPE) derivatives EIPE-1 and EIPE-HCl which are hydrophobic and hydrophilic, respectively.

METHODS: A standardized disk agar diffusion bioassay was employed to determine the susceptibility and resistance levels of 12 gram-positive and 13 gram-negative bacteria to nonpolar and polar EIPE derivatives. The bioassay was performed by dissolving the compounds in dimethyl sulfoxide and impregnating filter paper disks which were placed onto Mueller Hinton agar plates spread inoculated in a standardized manner to obtain even cell lawns after incubation for 18±1 hours at 37°C. Zones of growth inhibition were measured with the aid of electronic calipers.

RESULTS: Five strains of Staphylococcus aureus, plus Bacillus subtilis and Staphylococcus epidermidis were all found to be susceptible to the hydrophobic derivative EIPE-1, while other gram-positive and all gram-negative organisms exhibited resistant phenotypes at potencies tested. The more polar EIPE-HCl derivative failed to inhibit growth of any of the organisms examined, regardless of gram reactivity.

CONCLUSION: Hydrophobic EIPE derivative EIPE-1 clearly possesses a gram-positive antibacterial spectrum, although only certain organisms are susceptible at the potencies employed for this study. The susceptibility of two methicillin-resistant S. aureus strains (SFL 8 and SFL 64) to EIPE-1 suggests that its mechanism of action does not involve the penicillin-binding proteins of peptidoglycan biosynthesis targeted by mainstream β-lactam antibiotics. The uniform resistance of 13 phylogenetically disparate gram-negative bacteria supports the notion that intrinsic outer membrane exclusion properties may play a role in the mechanism underlying their phenotypic resistance to the molecule. The more polar EIPE-HCl possesses no antibacterial properties at the potencies examined here. Future work will include performing minimal inhibitory concentration bioassays to quantitatively describe susceptibly in selected gram-positive bacteria. In addition, batch culture growth kinetics assays will be crucial to learning the cellular and molecular mechanisms responsible for susceptibility and resistance to EIPE-1.

Keywords: Eumelanin derivatives, Antibacterial properties, Bacterial susceptibility

Reflex syncope in the situation of deglutition: a case study

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Background: Deglutition syncope was first identified by Thomas Spens in 1793 as a rare form of neurally-mediated transient loss of consciousness secondary to an atypical vasovagal reflex during swallow-induced esophageal dilation. Due to the lack of validated diagnosing criteria, detailed history is imperative to guide timely evaluation and management.

Case: A 58-year-old male with a past medical history of bipolar disorder, PTSD, anxiety, cocaine and methamphetamine use presented after a syncopal episode. He reported multiple syncopal episodes over the past five years associated with swallowing. During the most recent incident, the patient reported consuming food when he started feeling fullness in his throat, associated with lightheadedness and diaphoresis prior to a syncope episode. Patient's ED course was unremarkable with stable vitals without orthostasis, negative troponin, chest radiography and ECG. Patient was admitted for further syncope work up.

Decision-making: Modified barium swallow study and CT chest were performed to evaluate dysphagia and anatomical abnormality, which revealed mild esophageal reflux and normal anatomy respectively. The patient was allowed to eat. He was placed on continuous telemetry. Patient had several witnessed syncopal events while eating. Corresponding telemetry strips demonstrated bradycardia with a low of 10 bpm along with a 3 second pause.

Echocardiogram revealed EF of 35-40% with no significant structural abnormalities. Left heart catheterization revealed normal coronaries. Given his symptomatic bradycardia associated with swallowing, a permanent pacemaker device was suggested as the definitive treatment. Patient requested time to consider the decision, but ultimately decided to leave the hospital against medical advice.

Conclusion: This case demonstrates the broad differential for syncope and lack of validated diagnostic criteria for situational syncope. We have excluded esophageal and structural pathology. Patient's symptoms were corresponding to telemetry findings. His psychiatric illness and substance dependence made management challenging, but detailed history and high clinical suspicion guided our diagnosis.

Keywords: Cardiology, Bradycardia, Vasovagal, Deglutition, Sycnope

PAM-2 decreases both neuropathic pain in mice and cytokines release from human astrocytes and microglial cells

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Background: More than # people worldwide suffer from neuropathic pain, and indicated medications are often either not effective or induce tolerance and abuse. Therefore, there is an urgent need to identify additional therapeutic options to treat this form of pain. Nicotinic acetylcholine receptors (nAChRs), particularly α7 nAChRs, have been implicated in pain signaling. Therefore, this study was designed to investigate the extent to which the selective positive allosteric modulator (PAM) of α7 AChRs, PAM-2, modulates neuropathic pain. The working hypothesis, that PAM-2 inhibits inflammatory signaling and neuropathic pain, was tested using animal and cellular models.

Methods: The anti-neuropathic pain activity of PAM-2 was assessed in two independent murine models of neuropathic pain. Briefly, neuropathic pain was induced in adult, male CD-1 mice (n=10/condition) via i.p. administration of either streptozotocin (STZ) or oxaliplatin (OXA). After 14 days, when neuropathic pain was present, mice were administrated with PAM-2 (1.0 or 3.0 mg/kg, p.o.) or vehicle. The pain threshold was subsequently determined by the cold plate test before and 15, 30, 45, and 60 min after treatment. In addition, C20 human microglial cells were exposed to interleukin (IL)-1β (20 ng/ml) or vehicle alone, and in combination with nicotine (3 μM), PAM-2 (1-100 μM), or nicotine + PAM-2 for 24 h. After 24 h, cytokine/chemokine levels in the culture media were measured by ELISA.

Results: A single dose of PAM-2 (3.0 mg/kg) decreased both STZ- and OXA-induced neuropathic pain in mice. Repeated treatment with an inactive dose (1.0 mg/kg) of PAM-2 showed anti-pain activity in OXA-treated mice after 14, but not 7, days of treatment. Additionally, methyllycaconitine blocked the anti-pain effects elicited by PAM-2, supporting the view that α7 AChRs are instrumental in the anti-pain actions of PAM-2. Cellular experiments revealed that nicotine minimally inhibited IL-1β-induced IL-6 and interferon-gamma-induced chemotactic protein 10 expression in C20 human microglial cells, and that this inhibition was potentiated by PAM-2 (100 μM). However, we cannot rule out the possibility that PAM-2 was cytotoxic in this cell culture model.

Conclusions: These findings indicate that α7 AChRs are involved in neuropathic pain signaling and that α7-PAMs may potentially be used therapeutically. The extent to which these protective effects involve reduced neuroinflammation remains to be determined.

Keywords: a7 Nicotinic receptor; positive allosteric modulator, neuroinflammation, cytokines, astrocytes and microglial cells

The impact of social defeat on NF-KB P-65 activation in liver: A study in C57BL/6J male mice

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An increase in mood and anxiety disorders causes a demand to invent new medications and treatment strategies to reduce neuroinflammation in the brain and liver. The drug of interest, β-funaltrexamine (β-FNA) has shown to reduce jauntiness behavior in mice from a previous experiment. We currently are determining if Social Stress increases when a different strain or the same strain of mouse is introduced into the community of mice. This project, Repeated Social Defeat (RSD) has 2 test groups, Single Bout of Social Defeat and RSD to analyze different stress levels through NF-kB p65 Activation levels. This activation level was determined by using Western Blot Analysis. The Results of this experiment showed that the community of mice had increased stress levels regardless of the strain of mice. This experiment will be a footstep for the upcoming implementation of β-FNA) as a therapeutic drug.

Keywords: Repeated Social Defeat, NFKB p-65 Activation, β-funaltrexamine, & Western Blot Analysis

Interest in otolaryngology-head and neck surgery residency: Can google trends be a predictive tool?

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Google Trends, an online internet search tool, was used to evaluate the association between the U.S. senior applicant pool for Otolaryngology-head and neck (Oto-HNS) residency programs and internet search queries for Oto-HNS residency. Retrospective analysis was performed on the relative search interest for Oto-HNS residencies using Google Trends. Google Trends data was compiled and compared to the National Residency Match Program (NRMP) data. Analysis demonstrated a recent decrease in relative search volume interest in Oto-HNS residencies. The Google Trends analysis mirrored the data from the NRMP which reported a relative decrease in the number of medical school graduate applicants in the field of Oto-HNS. These results suggest that online search tools such as Google Trends may be a useful tool providing insight into the interests of medical school graduates in Oto-HNS residency.

Keywords: google trends, residency match, otolaryngology

Suspected vaping associated lung injury in a 16-year old female

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Background: In the summer of 2019, there were multiple reports of young people falling ill, diagnosed with a severe lung disease without any apparent infectious cause after extensive radiographic imaging studies and laboratory tests. The common link being history of recent electronic cigarette (e-cigarette or vaping) use. This new illness is defined as Vaping Associated Lung Injury (VALI) and is affecting young people in the United States. Multiple early studies involving vaping and lung injury show a pattern of diffuse lung injury on imaging and severe respiratory symptoms leading to respiratory failure and even death in some cases.

Case Presentation: A 16-year old female with worsening bilateral pneumonia failing outpatient treatment presented to the pediatric emergency center. The patient was hypoxic on presentation requiring supplemental oxygenation. History was significant for regular and recent e-cigarette use—including recent use of illicit tetrahydrocannabinol (THC) in her e-cigarette. She was initially treated on the general pediatric floor with pulmonary toileting and broad-spectrum antibiotics. She rapidly declined requiring intensive care admission for BiPAP and eventually intubation with mechanical ventilation and escalation to high frequency oscillatory ventilation. Infectious disease and pulmonology specialist were consulted for a comprehensive infectious work up which ultimately was negative. Imaging, including chest x-ray and chest CT consistently showed diffuse bilateral interstitial and ground glass infiltrates. With extensive supportive care, patient eventually improved and infectious work up did not yield any positive results.

Conclusions: Every single day, the number of reported cases of VALI increases with more questions arising about the cause and how to get a handle on the situation. Since this study, new information has emerged as to the cause including excess levels of vitamin E and illicit THC vaping cartridge operation originating in the mid-west. Quick action needs to be taken by scientist, investigators, law makers, public health officials, and the tobacco industry to better understand the long-term and short-term consequences of the increased popularity of vaping in the United States.

Keywords: Vaping, e-cigarettes, pulmonary disease, lung injury,

Relationship between susceptivity to triclosan sensitization by outer membrane permeabilization and cell surface hydrophobicity properties in opportunistically pathogenic serratia species

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BACKGROUND: The nosocomial opportunists Pseudomonas aeruginosa and Serratia marcescens are atypically resistant to the hydrophobic biocide triclosan due largely to outer membrane impermeability properties for hydrophobic substances. However, we have recently shown that the degree of cell envelope impermeability for triclosan differs dramatically among other opportunistically pathogenic Serratia species. Moreover, susceptivity to sensitization to triclosan by outer membrane premeabilization also differs among other intrinsically resistant species. The purpose of the present study was to determine if cell surface hydrophobicity (CSH) properties underlie susceptivity to triclosan sensitization by outer membrane premeabilization in selected species as we further characterize their cell surface properties in anticipation of their propensities to form in vitro biofilms.

METHODS: Three Serratia species (marcescens, fonticola, and odorifera) exhibiting disparate degrees of susceptivity to triclosan sensitization by outer membrane premeabilization were examined to determine their susceptibility levels to mechanistically-disparate hydrophobic molecules and their CSH properties. Intrinsic resistance to hydrophobic antibacterial agents was assessed using a standardized disk agar diffusion bioassay. CSH was determined using conventional crystal violet binding, hydrocarbon adherence, and 1-N-phenylnapthylamine uptake assays routinely employed in this laboratory.

RESULTS: S. marcescens and S. fonticola were intrinsically resistant to all mechanistically-disparate hydrophobic antibacterial agents examined to include triclosan, while S. odorifera was susceptible. The CSH properties of all these differed only slightly, despite the disparate susceptivities of the two triclosan-resistant species to triclosan sensitization.

CONCLUSION: These data suggest that phenotypic differences seen in three opportunistic Serratia species with regard to intrinsic resistance to hydrophobic antibacterial agents in general, and triclosan specifically are at least due in part to disparate abilities of their outer membranes to exclude hydrophobic substances. Moreover, susceptivity to triclosan sensitization by outer membrane premeabilization in the triclosan-resistant species S. marcescens and S. fonticola appears not to be influenced by differences in cell surface hydrophobicity properties.

Keywords: Serratia species, triclosan, cell surface hydrophobicity

Delayed anticonvulsant hypersensitivity syndrome in an elderly female

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Anticonvulsant Hypersensitivity Syndrome (AHS) is a rare, drug-induced, multiorgan syndrome characterized by fever, rash, eosinophilia, and other multiorgan abnormalities. AHS typically appears one to four weeks after the initiation of therapy with an aromatic antiepileptic drug, such as Phenytoin, Phenobarbital, or Carbamazepine.

The objective of this clinical case report is to highlight this unusual syndrome in a patient twenty-six years after the initiation of phenytoin. The goal of this case report is to raise awareness of delayed AHS, allowing for prompt diagnoses and monitoring in elderly patients. The method included a systemic literature review analyzing similar cases and proposed mechanisms of action. Similar cases have shown this clinical picture within weeks of exposure to antiepileptic drugs. We herein report a rare presentation of Anticonvulsant Hypersensitivity Syndrome after 26 years of exposure to antiepileptic drugs in an 81 year old female.

The patient presented with a diffuse, pruritic, confluent, maculopapular rash with leather-like texture changes involving the entire body, including palms and soles. Pathology results showed perivascular lymphocytic infiltrate and inflammatory changes suggested of an erythema multiform-like eruption/Stevens Johnsons Syndrome – consistent with Phenytoin Toxicity. This was likely due to the inability of the patient to metabolize Phenytoin. Shared decision making resulted in the patient discontinuing all prescribed medications and was empirically treated for a drug-induced hypersensitivity reaction with oral Prednisone. Features of this case are discussed together with its implications, including our conclusion, of the need for increased monitoring and dosing adjustments of Phenytoin levels in elderly patients.

Keywords: Delayed Anticonvulsant Hypersensitivity Syndrome, Phenytoin

A systematic review and meta-analysis of frequency of acute kidney injury following intravenous contrast administration

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Purpose: To update a systematic review and meta-analysis of controlled studies examining the incidence of acute kidney injury (AKI) after exposure to intravenous contrast media compared to AKI after imaging without contrast media (control). The original meta-analysis was published in the Journal of the American College of Radiology in 2013 and is the basis for guidelines for the American College of Radiology and the American College of Family Physicians. Although this meta-analysis concluded there was no association between contrast exposure and AKI, most guidelines still provide recommendations to avoid contrast media under certain conditions for fear that it could theoretically cause AKI. The original meta-analysis called for additional studies to use a non-contrast control group, and the ACR guidelines call for more matched studies. This study attempts to collate the studies conducted on this issue in attempt to strengthen the evidence base behind clinical recommendations related to CIN.

Materials and Methods: EMBASE, Scopus, and Medline via PubMed's interface were searched using the same search criteria as the 2013 meta-analysis with the time period of interest changed from before 2011 to 2011 to present. Abstract screening was performed using the same inclusion criteria. The full text review was completed using the same exclusion criteria. The included studies were further screened by a clinician to ensure representation of clinical expertise. Data extraction was completed independently using a Google form and conflicts between researchers was resolved by a clinician. The same data points — baseline SCr or eGFR , contrast type, AKI definition, incidence of AKI, dialysis, and mortality — as the previous meta-analysis were recorded. Data extracted from the previous meta-analysis was combined with our updated data, and all data were analyzed and relative risks were calculated. Relative risk was calculated for incidence of AKI in both groups. A relative risk of less than 1.00 was indicative of a higher incidence of AKI in the non-contrast medium group.

Results: There were 8,358 studies identified. Of those, 34 (0.004%) were deemed to have met inclusion criteria; this represented 30,053,234 patients (1,731,241 receiving IV contrast and 28,321,993 not receiving contrast). There was 30 retrospective studies, 13 on which were propensity matched. There were only 4 prospective studies and 2 of those were propensity matched. The risk of AKI in the contrast medium group of the retrospective studies (RR= 0.9805; 95% confidence interval [CI]: 0.97, 0.99; p=0.0000000015) and prospective studies (RR= 1.009; 95% confidence interval [CI]: 0.81, 1.26; p= 0.934) was similar to the non-contrast medium group. The combination of retrospective and prospective studies with the previous meta-analysis findings also showed a similar risk (RR= 0.9806; 95% confidence interval [CI]: 0.97, 0.99; p= 0.0000000016) between contrast medium and non-contrast medium groups.

Conclusion: The meta-analysis from 2013 stated there was no difference in incidence of AKI between contrast exposure groups and control groups. Our data support this finding. Guidelines should be updated to reflect current research.

Keywords: Contrast, Nephropathy, AKI, CIN, Kidney

Public awareness of health issues after the surgeon general tweets: An analysis

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Health information distributed on social media may benefit public health by aiding in disease management and increasing awareness, however, not all information disseminated on social media is reliable. Therefore, a need exists for credible, evidence-based information that is accessible by the public. In the United States, the Surgeon General serves as the highest public health official and could serve as a solution to this need. In our study, we used Google Trends to evaluate the search interest of topics related to tweets sent out by the Surgeon General. We then used an autoregressive integrated moving algorithm to determine whether the tweets were associated with search volumes that were greater than the expected search volumes without the tweet. Thirteen tweets were analyzed and a significant positive mean search interest was found for only 2 tweets. One of the significant tweets had a mean search interest increase of 7.50% (95% CI, 0.8 - 14.2), which was a tweet the Surgeon General retweeted from another account. Given the public's limited engagement with the Surgeon General's current Twitter account, strategies to increase the number of followers is greatly needed if the Surgeon General is to make effective use of these outlets. One viable solution to the Surgeon General reaching a greater audience may be through celebrity partnerships.

Keywords: Surgeon General; awareness; Twitter; Google Trends; public health

A cross-sectional analysis of psychiatry residency graduate peer-reviewed publication trends

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Background: Scholarly activity through research is widely considered to be an integral component of medical training, and residency or fellowship match success. However, the rate of these scholarly practices in psychiatry residency graduates is relatively unknown. Here, we aim to (1) describe factors associated with scholarly research activities, as measured by peer-reviewed publications, among psychiatry residency graduates, and (2) determine if an association exists between publication rates before, during, or after psychiatry residency.

Methods: We employed a cross-sectional study design analyzing research output by psychiatry residency graduates in relation to future publications and academic accomplishments from a random sample of 50 psychiatry residency rosters. Data were extracted for each graduate and analyzed using STATA 15.1 and Microsoft Excel. A protocol is publicly available here: https://osf.io/pwa6d/.

Results: We identified 249 residency programs of which we randomly sampled 50. Among the 50 programs, 7 were included, totalling 122 graduates from psychiatry residencies to be analyzed. Of the 122 graduated residents, 57% (69) produced no publications. Of the graduates who pursued a fellowship, 25.4% (31/67) entered into Child & Adolescent Psychiatry. Of the 53 published graduates, most of their publications were received before residency, making up 68 of the 183 publications (37.2%). Compared to before residency, the total number of publications during residency reduced by 29.4% (20/68).

Conclusion: While a majority of psychiatry graduate's publications were pre-residency, many publications occurred post-residency and the average number of publications was lowest during residency training.

Keywords: Psychiatry, Academic, Residency, Peer-Reviewed, Trends

A cross-sectional review of publication trends among OBGYN graduates

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Objective: Research and other scholarly activities are essential components to medical training and may predict (i) success for matching into residency or fellowship programs and (ii) a future in academia. Despite this importance, little is known about the research outputs of obstetrics and gynecology residency graduates. In this cross-sectional analysis, we explored the characteristics of published, peer-reviewed publications of obstetrics and gynecology residency graduates and publication rates before, during, and after residency.

Study Design: We employed a cross-sectional study design using a random sample of 50 obstetrics and gynecology residency programs found on the 2019-2020 Doximity residency navigator.(Doximity Residency Navigator) Data were extracted for each graduate of the included programs with a pilot-tested Google Form and then analyzed using STATA 15.1 and Microsoft Excel. A protocol is publicly available.(Publication Trends Among Medical Resi...)

Results: We identified 281 residency programs, from which we randomly sampled 50. Among the 50 programs, 15 were included, totalling 303 obstetrics and gynecology residency graduates available for analysis. Of the 303 graduates, a total of 111 (36.6%) produced no publications, 137 (45.2%), produced 1-5 total publications, 28 (9.2%) produced 6-10 publications, 15 (5.0%) produced 11-15 publications, and 12 (4.0%) produced 16-20 publications. Of the graduates we analyzed, 79 (79/303, 26.1%) pursued a fellowship, with most in maternal and fetal medicine (23/79, 29.1%). Academia was pursued by 46/303 (15.2%) of graduates. The mean number of publications per resident was 2.9 (SD). Our results showed an increase of publications during the progression of training with a mean of 0.38 publications prior to residency, 0.8 during residency, and 1.75 after residency.

Conclusion: Our results showed that the majority of obstetrics and gynecology graduates do not go on to pursue a fellowship or career in academia. According to the ACGME, the average number of research experiences (poster or abstract presentations, publications, etc.) for matched residents as a whole was 3.3 while matched obstetrics and gynecology residents averaged 3.4 research experiences1. While matched obstetrics and gynecology residents only averaged slightly more research experiences than the average resident, publications throughout obstetrics and gynecology training trended upward as training progressed. The highest average of publications was seen post-residency, which suggests there may be an opportunity for residents to increase their scholastic activity while in training. We propose that one way to increase the scholarly activity while in training is to encourage collaborative research involvement between medical students, residents, and attending physicians. This joint effort will not only increase resident scholarly activity but will also facilitate teaching research principles to medical students early in medical training and provide opportunities for networking and knowledge sharing.

Keywords: Obstetrics and Gynecology, scholastic activity, residency

Bare bones basics: Homology outreach for children from medical students

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Dinosaurs are frequently used as ambassadors of science for children and adults, garnering major attention at museums and within popular culture. A new mentorship opportunity at Oklahoma State University Center for Health Sciences (OSU-CHS) utilizes the association of dinosaurs and science learning to provide research experience as well as education and outreach training opportunities for medical students. Cadaver-based Human Gross Anatomy is a foundational course in the first-year medical school curriculum, providing the framework on which more advanced system-focused courses are based. During the summer between the first- and second-year curriculum, two OSU-CHS College of Osteopathic Medicine (COM) students participated in a dinosaur fossil excavation in the badlands of Montana as part of an OSU-CHS faculty mentor-student mentee research fellowship. Students were tasked with making field identifications of excavated fossils by applying their human gross anatomy training, and in turn, this actively explored the concept of skeletal homology: that the bones in the human skeleton share a common ancestral origin with the bones of all other vertebrates, including dinosaurs (e.g., the human arm and T. rex arm are comprised of the same suite of bones). During the following fall semester, the COM students developed a bone homology outreach activity for children at Eugene Field Elementary, a Title 1 Partner in Education with OSU-CHS. Skeletal homology is frequently taught by visual aid worksheet comparisons of the bones in the arm of humans and animal exemplars such as bats, horses, and birds, with students color-coding the equivalent (homologous) bones in each animal limb. The COM students elaborated upon this activity, showing children the humerus first on a human skeleton and themselves, then subsequently passing around the humeri of a mouse, deer, turtle, and armadillo, and having the students illustrate the animal from which they thought it came from based on bone size, shape, and a few animal behavior clues. The children began to understand that similar to themselves, animals have a humerus. Finally, a two-foot-long dinosaur humerus excavated from the Montana site was passed around, and the children were thrilled to learn from the COM students that even dinosaurs had the same kind of bones in their arm as the kids have. The OSU-CHS faculty mentor-student mentee fellowship provided COM students an opportunity to 1) assist with faculty data collection in the form of fossil excavation by applying anatomical knowledge from the classroom concretely in a scientific capacity, subsequently honing critical thinking and deduction skills; and 2) translate their experiences and understanding of bone homology into an elementary school activity, thereby practicing the role of science communicators. Most importantly, the STEM activity developed by the COM students uses children's fascination and excitement toward dinosaurs to teach them about the medical profession, and the activity is appropriate for the Oklahoma fourth-grade science standard 4-LS1-1.

Keywords: Outreach, Dinosaurs, Fossils

A pharmacological inhibition strategy for finding novel therapeutic targets for treating chronic inflammatory pain

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Glutamate functions as the major excitatory neurotransmitter for primary sensory neurons and has a crucial role in sensitizing peripheral nociceptor terminals producing sensitization. Glutaminase (GLS) is the synthetic enzyme that converts glutamine to glutamate. GLS-immunoreactivity (-IR) is significantly elevated in dorsal root ganglion (DRG) neuronal cell bodies during chronic peripheral inflammation, but the mechanism for this GLS elevation is yet to be fully characterized. It has been well established that, after nerve growth factor (NGF) binds to its high-affinity receptor tropomyosin receptor kinase A (TrkA), a signaling endosome is formed. This endosome is labeled with late endosomal marker Rab7GTPase and is retrogradely transported via axons to the cell soma located in DRG. This complex is responsible for regulating the transcription of several critical nociceptive genes. Here, we show that this retrograde NGF signaling mediates the expression of GLS in DRG neurons during the process of peripheral inflammation. We disrupted the normal NGF/TrkA signaling in adjuvant-induced arthritic rats by pharmacological inhibition of TrkA or blockade of Rab7GTPase, which significantly attenuated the expression of GLS along with neuropeptide calcitonin gene-related peptide (CGRP) in DRG cell bodies. These results indicate that NGF/TrkA signaling is crucial for the production of glutamate and has a pivotal role in the development of neurogenic inflammation. Also, our data suggest that Rab7GTPase can be a potential therapeutic target for treating peripheral inflammatory pain.

Keywords: Inflammation, Chronic pain, Glutamate, Glutaminase, Nerve growth factor (NGF)

Evaluating weight gain with the initiation of antiretroviral therapy: a comparison of integrase strand transfer inhibitors to other antiretrovirals

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Background: Existing research has observed a potential association between antiretroviral therapy (ART) exposed individuals and a high prevalence of weight gain and obesity. However, the impact of these metabolic changes imparted by integrase strand transfer inhibitor based regimens in particular remains unclear. The objective of this study is to evaluate weight change in treatment-naive patients with newly initiated ART in a Ryan White Clinic.

Methods: This IRB-approved, retrospective chart review study utilized EMR records to identify patients aged 18 years or older with a diagnosis of HIV-1, who are treatment-naïve or have been without ART for >6 months, initiated on ART between January 1, 2013 and January 1, 2018, maintained therapy for ≥24 months, had weight values recorded at least twice during the study period, and were initiated on any three-drug NNRTI, INSTI, or PI-based regimen. The following data was collected, recorded without patient identifiers, and maintained confidentially: patient regimen, age, gender, ethnicity, AIDS status, plasma HIV-1 RNA (viral load), CD4+ T-cell count, weight, BMI, and BMI categories. Patient weight, BMI, and BMI categories were evaluated at baseline, 6 months, and 18 months on ART.

Results: Of the 3,054 patients identified, a total of 200 patients were included in the final analysis. The patient population consisted primarily of Caucasian (55.0%) males (81.0%) with an average age of 38.3 years. At initiation of treatment, the median CD4+ T-cell count = 356.2 cells/μL, HIV-1 RNA viral load = 481,801 copies/mL, weight = 80.8 kg, and BMI = 26.2 kg/m2. For all classes evaluated, the highest percentage of patients at baseline fell within BMI category indicating normal weight (18.5-24.9 kg/m2). A total of 42 (21.0%), 50 (25.0%), and 113 (56.5%) patients were initiated on NNRTI, PI, and INSTI-based regimens, respectively. Of the 113 patients who were initiated on an INSTI-based regimen, 82 (72.5%) patients began regimens containing doultegravir, 25 (22.1%) patients began regimens containing elvitegravir, and 6 (5.3%) patients began regimens containing raltegravir. All 6 patients who were initiated on raltegravir were also on concomitant darunavir. At 18 months of therapy, a median increase in weight of 2.2 kg and BMI of 0.5 kg/m2 was associated with NNRTI-based regimens, compared to a 3.9 kg and 1.3 kg/m2 increase associated with PI-based regimens. Of the INSTI-based regimens, use of dolutegravir was associated with a 4.3 kg and 1.7 kg/m2 increase, elvitegravir a 1.1 kg and 0.4 kg/m2 increase, and raltegravir a 7.7 kg and 2.5 kg/m2 increase in weight and BMI, respectively. At 18-months, 37.8% and 50.0% of patients initiated on dolutegravir and raltegravir-based therapy, respectively, were considered obese with an associated BMI of ≥ 30 kg/m2.

Conclusions: Treatment naïve patients with HIV-1 initiating therapy with dolutegravir-based regimens were associated with a higher incidence of increase in weight and BMI at 18-months than those initiating elvitegravir, NNRTI, and PI-based regimens. Those initiating raltegravir-based regimens, which also contained the PI darunavir, were associated with the highest incidence of increase in weight and BMI at 18-months compared to all other regimens. Further study is recommended.

Keywords: HIV; integrase inhibitor; antiretroviral; antiretroviral therapy; weight gain; BMI

Polyethylene component thickness in robotic versus conventional total knee arthroplasty

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Background: Evidence currently supports robotic assisted unicompartmental knee arthroplasty's (UKA) role in improving patient outcomes. The aim of our study is to provide evidence regarding the role of surgical technology in affecting polyethylene thickness, thereby potentially improving patient function after total knee arthroplasty (TKA). The decreased polyethylene size in robotic assisted UKA is well documented and serves as one of the many examples of advancements that robotics offers UKA. The purpose of our study is to determine if robotic assisted TKA leads to a decrease in polyethylene size when compared with conventional TKA.

Methods: We retrospectively compared the distribution of polyethylene insert sizes implanted during conventional and robotic assisted TKA procedures between January 1, 2015 to March 31, 2019 at a single hospital. Robotic assisted total knee arthroplasties utilized the Stryker Mako system. Statistical analysis was performed utilizing a Mann-Whitney-U test.

Results: 316 patients were originally identified for the study. Ultimately 132 patients received 133 robotic assisted total knee arthroplasties, and 136 patients received 150 traditional total knee arthroplasties. Average polyethylene component size was 10.6767 mm for robotic and 12.7200 mm for traditional with a difference of 2.0433 mm. Mann-Whitney-U test was completed and the results were found to be significant.

Conclusion: Our retrospective study established that robotic assistance in total knee arthroplasty leads to decreased polyethylene component size as compared to mechanical TKA. The importance of polyethylene size in total knee arthroplasty remains a controversial topic in the joint arthroplasty community.

Keywords: Robotic-assisted total knee arthroplasty, polyethylene size

An analysis of the Michael Douglas Effect on awareness of HPV-related head and neck cancer

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Background: In June 2013, celebrity actor Michael Douglas announced that he had received a diagnosis of throat cancer, which he attributed to the human papillomavirus (HPV). HPV is the most common sexually transmitted disease, however the HPV vaccination rates are lower than other vaccines. Given the health disclosure of Michael Douglas's cancer, we queried whether this event had an effect on public awareness for HPV-related head and neck cancers (HNCs) or its prevention.

Methods: Using Google Trends and Twitter, we retrospectively analyzed search trends and Tweets for the keywords throat cancer, oral cancer, hpv vaccine, and human papillomavirus infection. We extracted data and compared it to an expected forecast found using an autoregressive integrated moving algorithm (ARIMA).

Results: During the week of disclosure, Google Trends data demonstrated an increase of 62.5% in hpv infection inquiries, 47.0% in hpv vaccine inquiries, 47.0% in oral cancer inquiries, and 81.5% in throat cancer inquiries above the expected. Tweets referencing hpv increased 127.2%; tweets referencing hpv (vaccine OR vaccination) increased 98.8%; tweets referencing hpv awareness increased 778.4%; tweets referencing oral cancer increased 1038.7%; and tweets referencing throat cancer increased 811.7% compared to the rest of 2013.

Conclusions: Data from Google Trends and Twitter indicated that Michael Douglas's disclosure of HPV-related HNC resulted in a substantial increase in public awareness and prevention methods for HPV-related HNC. Celebrity health disclosures may thus prove to be a cost-effective strategy to advocate for public health literacy, and positively influence public interest of specific health issues.

Keywords: Michael Douglas; HPV; head and neck cancer; Google Trends; public health

Evaluation of spin in the abstracts of systematic reviews regarding the treatment of acne vulgaris

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Background: Spin is the misrepresentation of study findings which may positively or negatively influence the reader's interpretation of the results. Little is known regarding the prevalence of spin in abstracts of systematic reviews – specifically systematic reviews pertaining to management and treatment for acne vulgaris.

Objective: Our primary objective was to characterize and determine the frequency of the most severe forms of spin in systematic review abstracts, and to evaluate whether various study characteristics were associated with spin.

Methods: Using a cross-sectional study design, we searched PubMed and Embase for systematic reviews focusing on the management and treatment of acne vulgaris. Our search returned 316 studies, of which 36 were included in our final sample. To be included, each systematic review must have addressed either pharmacologic or non-pharmacologic treatment of acne vulgaris. These studies were screened and data were extracted in duplicate by two blinded investigators. We analyzed systematic review abstracts for the 9 most severe types of spin.

Results: Spin was present in 11 of 36 abstracts (30.56%). Twelve examples of spin were identified in the 11 abstracts containing spin, with one abstract containing two instances of spin. The most common type of spin, selective reporting of or overemphasis on efficacy outcomes or analysis favoring the beneficial effect of the experimental intervention, was identified 5 times (5/12, 41.67%). Sixteen of the 36 (16/36, 44.44%) studies did not report a risk of bias assessment. Of the 11 abstracts containing spin, 6 did not report a risk of bias assessment or performed a risk of bias assessment but did not discuss it (6/11, 54.55%). Spin in abstracts was not significantly associated with a specific intervention type, the use of a medical writer, funding source, journal impact factor, or PRISMA/PRISMA-A journal requirements.

Conclusions: Abstracts with evidence of spin have the potential to influence clinical decision making. Therefore, further research is needed to evaluate what types of spin have the greatest influence on clinical practice. To help address the misrepresentation of study findings, we offer recommendations to better educate and improve peer-reviewers' and editors' awareness of, and ability to identify, spin in abstracts of systematic reviews.

Keywords: Acne vulgaris; spin; abstracts; dermatology

Cloning and sequencing of the depolymerase-like gene from bacteriophage J25

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Bacteriophage are viruses that infect, replicate and kill bacteria. Salmonella and EHEC food poisoning are caused by Salmonella and E. coli bacteria. Bacteriophage can be used to prevent food poisoning by application to food products or processing machinery. Bacteriophage J25 specifically infects Salmonella and E. coli bacteria. We cloned fragments of the J25 genome, sequence the DNA and used bioinformatics to identify J25. We used genome data from similar bacteriophage in Genbank to design primers to amplify the depolymerase-like gene. We amplified and cloned this gene. When expressed, the gene product will be test with bacteriophage food treatment where it should augment bacteriophage killing.

Keywords: Bacteriophage, cloning, depolymerase, Salmonella

Cloning, sequencing, and identification of phage 16, an unknown salmonella or ehec (enterohemorrhagic e. Coli) bacteriophage

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Bacteriophage are viruses that infect, replicate and kill bacteria. Salmonella and EHEC food poisoning are caused by Salmonella and E. coli bacteria. Bacteriophage can be used to prevent food poisoning by application to food products or processing machinery. Bacteriophage P16 specifically infects Salmonella and E. coli bacteria. We cloned fragments of the P16 genome, sequence the DNA and used bioinformatics to identify P16. Phage P16 is a Salmonella phage similar to Stitch. A phylogenetic tree inferring relationships of P16 and other bacteriophage was created.

Keywords: Bacteriophage, cloning, bioinformatics, Salmonella

Localization of NeuN for automation with immunohistochemistry during naïve and inflammatory conditions

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The dorsal root ganglion (DRG) contain primary afferent neurons located along the spinal column of vertebrates, projecting sensory nerves into peripheral epithelial tissues. A common method of measuring biomolecules within DRG neurons is fluorescent immunohistochemistry (IHC). Optimally this process requires manual hand tracing of neuronal boundaries, which is laborious, error-prone and can require several weeks to collect the appropriate sample size with a mouse or pen-input display monitor. The goal of the current report was to identify and characterize a reliable neuronal cytoplasmic reporter, exclusive to the DRG neuronal soma, in a semi-automated algorithm-based approach of Image Cytometry in Rat Dorsal Root Ganglia (IC-DRGs).

The foundation inlying IC-DRGs processing relies upon strict requirements of size, shape and pixel-intensity criteria to eliminate error and provides redundancy for multiple opportunities of accurate identification. Critical to this strategy, a reliable neuron-specific, non-axoplasmic, cytoplasmic fluorescent reporter was required. IC-DRGs script version 1.41 contains algorithms designed to exploit the presence of a reliable neuronal cytoplasmic reporter. These series of processes automatically assign demarcations of rat DRG neuronal cytoplasmic and nuclear membrane boundaries.

Neuron-specific nuclear protein (NeuN) was identified as a consistent neuronal cytoplasm reporter in rat DRG neurons and thoroughly evaluated and qualified as a tool for use within the IC-DRGs script. 4′,6-diamidino-2-phenylindole, DAPI, a commonly used fluorescent stain which binds to DNA, was chosen as a pan-neuronal nuclear reporter. The resulting output images consist of binary neuronal nuclear and cytoplasmic masks of DRG neurons; which are then processed in CellProfiler for measurement of CGRP. Based on sixteen images per group for NeuN-IR and DAPI, IC-DRGS identified 1,136 neurons with 97.4% lenient and 94.2% conservative accuracies. We successfully show a novel approach of automated neuronal cytoplasmic and nuclear demarcations, reliable in naïve and AIA conditions, for measurement of DRG neurons using a robust FIJI script, overcoming morphological and IHC artifacts native to imaging frozen tissue sections processed with IHC.

Keywords: NeuN Automation Rat Dorsal Root Ganglia Novel Image Cytometry

The combined bisulfite restriction analyses (cobra) assay for methylation profile of gls promoter in tnbs-induced colitis in rats

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The glutaminase enzyme is key for the synthesis of glutamate, a neurotransmitter that is major molecule in signaling pain. In order to reduce the signaling of pain, transcription of the glutaminase gene must be reduced. It has been noticed, contrary to common belief, that the increase in methylation leads to the increase in gene expression due to increased levels of transcription; therefore, decreased methylation in the promoter region of the glutaminase gene will lead to the decrease in pain. In the study that was done, inflammatory pain in the Colon was examined. To cause the test subjects, the rats, a form of inflammatory colitis 246 trinitrobenzene sulfonic acid (TNBS) was administered. Since 5-Azacytidine (Aza) is a known substance that causes demethylation, it was hypothesized that 5- Azacytidine can counteract the effects of the TNBS induced colitis. Methylation commonly occurs within CpG dinucleotides. These CpG sites were targeted to observe if methylation increases in the TNBS treated rats. In order to put all of these aspects of methylation's influence on gene expression together, the Combined Bisulfite conversion and Restriction enzyme analysis method was used. This allowed for the study to section of a portion of the Glutaminase promoter region. Using the Bisulfite Conversion method, all the unmethylated cytosines were converted thymine, and the methylated cytosine remained cytosine. This then allows for the restriction enzymes to differentiate between methylation and unmethylation in the DNA strand and further provides us the degree of methylation in the DNA. With this procedure, rats with different treatments can be analyzed to examine the methylation in their glutaminase promoter region.

Keywords: Colitis, DNA Methylation, Glutaminase, Neuroinflammation, Azacitidine

Azacitidine treatment impairs DNA methylation in 2,4,6-trinitrobenzenesulfonic acid-induced colitis

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Over five million people worldwide suffer from some variety of Inflammatory Bowel Disease (IBD) including Crohn's Disease and Ulcerative Colitis. This aggressive inflammation of the digestive tract causes an outstanding amount of abdominal cramping and pain. This lab focuses on epigenetics causes for these symptoms – with modification of gene expression of Glutaminase through DNA methylation. Glutamine, an important amino acid within a cell, gets converted to Glutamate, the most abundant excitatory neurotransmitter in the vertebrate nervous system, with the use of the Glutaminase enzyme (GLS). Various studies from the lab have shown that in inflammatory pain, GLS protein is overexpressed. Similarly, in 2-4-6 trinitrobenzenesulfonic acid (TNBS)-induced colitis, another model of inflammatory pain, GLS expression is altered. Thus, we are targeting GLS expression to regulate inflammatory pain using epigenetic techniques. Previous studies from the lab have shown that GLS protein overexpression is due to increased transcription and this is due to augmented DNA methylation in GLS gene promoter region. We are targeting TNBS-induced hypermethylation to understand the epigenetic modulation and if this hypermethylation is reduced by the use of an FDA-approved drug Azacytidine (AZA). Therefore, in this current research, we are proving the DNA methylation using different epigenetic techniques like Methylated DNA Immunoprecipitation (MeDIP), bisulfite conversion, quantification of 5-methyl cytosines (5mC) and DNA sequencing. This project will give us better understanding of DNA methylation of GLS gene promoter region to target GLS gene transcription in neuro-inflammatory pain.

Keywords: Neuroinflammation, Colitis, DNA Methylation, Glutaminase, Azacitidine

Assessing the extraction efficiency of fentanyl and fentanyl analogs from household surfaces

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Illicit use of the potent opioid fentanyl and its analogs (fentanyls) is on the rise in the United States, leading to an epidemic of overdose deaths in opiate users. Fentanyl is effective at low doses, and as the illicit use increases, more locations are subject to being contaminated through the synthesis, mixing, and preparation for use. Because of the public health issues surrounding fentanyl-contaminated locations, a method for collecting, identifying, and quantitating these fentanyls from surfaces is needed. This research developed and optimized a surface swab extraction method for 17 fentanyls and 11 common fentanyl adulterants from a non-porous surface. Drug recovery ranged from 34.1 (+/-2.6) – 82.5 (+/-9.6)% with this methodology. Following optimization, the surface swab extraction method was used to recover drug from 11 commonly encountered household surfaces; total recovery ranged from 1.3 (+/-0.6) – 73.2 (+/-13.7) %. While legislation has yet to be implemented regarding remediation levels for fentanyl-contaminated locations, when such legislation is drafted, this method can be implemented to determine the extent of fentanyl contamination at these locations, before and after decontamination has occurred.

Keywords: Fentanyl, Surface Wipes, LC-MS/MS, Decontamination

Publication trends among anesthesiology graduates and its relationship with future academic success

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Purpose: Research during medical training is widely considered to be an integral component of residency and fellowship match success, with many residency programs encouraging residents to engage in scholastic activities, such as serving as authors on peer-reviewed publications. However, the degree to which these scholarly practices continue beyond residency is unknown. Here, we investigate publication trends among graduates of anesthesiology residency programs as part of a larger initiative to examine publication trends and academic achievement across medical specialties.

Methods: We employed a cross-sectional study design analyzing research output by graduates of anesthesiology residencies in relation to future publications and academic accomplishments from a random sample of 50 anesthesiology residency rosters using Doximity. For each graduate, we extracted from Scopus the number publications, H-index score, fellowship attainment, and post-graduate practice setting.

Results: We identified 153 anesthesiology residency programs, of which 50 were randomly selected. Fifteen programs provided rosters, consisting of 390 graduates. The majority of graduates (197/390, 50.5%) had 1 or more publications, while 193 (49.5%) had zero publications, with an average of 2 publications per graduate and a median H-index score of 1.2. Most graduates pursued a fellowship (227/390, 58.2%), however, less than one-quarter (101/390, 25.9%) currently practice in an academic setting. Pearson correlation test demonstrated a positive correlation between the number of publications before residency and H-index (0.84), as well as during (0.33) and after residency (0.39). Graduates that had higher mean total publications were more likely to go into academic medicine (M = 3.8, SD 0.6) and pursue a fellowship after residency (M = 3.1, SD 0.4) than those that did not (M = 1.4, SD 0.3) (t390=-4.2, p <.001) and (M = 0.5, SD 0.1) (t390=-5.2, p <.001), respectively. Male graduates (M = 2.4, SD 0.4) had a higher mean publication total than female graduates (M = 1.3, SD 0.2) (t390=-2.0, p <.05).

Conclusion: Despite scholastic activity being a requirement of graduate medical education, few graduates of anesthesiology residency programs are publishing research. We believe that promoting greater physician involvement in the research process will strengthen confidence in the interpretation and application of research findings.

Keywords: cross-sectional; publication trends; anesthesiology

Publication trends in family medicine graduates: a cross-sectional review

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Purpose: The ACGME emphasizes the importance of research throughout residency as it establishes the basis of evidence-based medicine. As future physicians practicing evidence-based medicine, it is crucial that physicians in training are able to both interpret and produce quality research. Currently, the long-term impact of active research participation is unknown in this population. In this study, we aim to (1) explore research activity as measured by peer-reviewed publications among family medicine residency graduates and (2) determine if an association exists between publication rates before, during, or after family medicine residency.

Methods: We utilized a cross-sectional study design analyzing research output by family medicine residency graduates in relation to future publications and academic involvement from a random sample of 50 family medicine programs. Data were extracted for each graduate and analyzed using STATA 15.1 and Microsoft Excel. The public protocol can be found here: https://osf.io/pwa6d/.

Results: We identified 654 residency programs of which we randomly sampled 50. Among the 50 programs, 8 were included, totaling 101 graduates from family medicine residencies for analysis. Of the 101 analyzed residents, 76 (75.2%) produced zero publications. Of the analyzed residents, 30 (29.7%) pursued a fellowship, with most in sports medicine (5/101 [5.0%]). The mean number of publications for all analyzed residents was 0.8, with most publishing after completion of residency.

Conclusion: While a majority of family medicine graduate's publications were post-residency, the average number of publications was lowest during residency training. Increased research opportunity and activity during residency may increase the proportion of family medicine graduates pursuing fellowships and careers in academia, as well as increase resident comfort with both interpretation and utilization of evidence-based interventions in clinical practice.

Keywords: Family Medicine, Residency, Research

Chronic appendicular abscess presenting as a complex adnexal mass: A case report

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Background: The authors present an unusual presentation of a chronic appendicular abscess. A 57-year-old presented to the emergency department with acute on chronic abdominal pain, worsening abdominal distention and decreased appetite. Abdominal imaging revealed the presence of a multi-septated cystic right adnexal mass concerning for metastatic ovarian carcinoma. Intra-operatively the diagnosis of a likely chronic ruptured appendix at the base of the colon was confirmed. In postmenopausal women the majority of adnexal masses are benign neoplasms, however, the risk of malignancy is much greater than in premenopausal women. Postmenopausal women with clinical symptoms and findings on diagnostic imaging suggestive of malignancy warrant expedited management. While imaging and biomarkers help to give insight into origin of masses and can aid in determining treatment, diagnostic operations may be ultimately required to achieve final diagnosis and direct further management.

Methods: All data collected was de identified and kept within a secure location.

Results: Adnexal masses can present in a variety of ways and yield pathology from simple cysts to infectious process or even metastatic carcinoma. On the contrary, the diagnosis of acute appendicitis is typically straight forward, classically manifesting with acute periumbilical pain localizing to the right lower quadrant, abdominal guarding, and leukocytosis. The atypical presentation of chronic appendicitis can often lead to misdiagnosis, particularly in sexually active females, or as in our case, patients presenting with symptoms consistent with an ovarian malignancy

Conclusions: Chronic appendicitis (CA) is a rare clinical entity with an incidence of 1.5% in all cases of chronic abdominal pain of unknown etiology. CA poses as a diagnostic and therapeutic dilemma for clinicians since a majority of patients present with atypical symptoms. It is very rarely thought to be the primary diagnosis due to the low frequency of occurrence. A postmenopausal patient with chronic worsening abdominal pain, distention, and decreased appetite presenting with a complex adnexal mass and ascites is highly suspicious for ovarian malignancy. It is imperative to thoroughly review all images and consider subsequent imaging modalities to ensure infectious etiologies are excluded, but ultimately, diagnostic operations may be inevitable

Keywords: Abscess, Appendix, Chronic, Exploratory, Laparoscopy, Surgery

Refractory kawasaki disease with cardiovascular involvement

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Kawasaki disease is a multi-systemic acute vasculitis seen primarily in children with a propensity for coronary artery dilation, which can lead to potentially fatal aneurysms, thrombosis, myocardial infarction, and congestive heart failure. Refractory Kawasaki is defined as persistent or recurrent fever of any magnitude between 36 hours to two weeks after treatment with IVIG. In this case report, a 2-month old male presented initially with fever, diffuse maculopapular rash, increased fussiness, and decreased oral intake. It was eventually determined that he met atypical criteria for Kawasaki disease, and he was treated with high dose aspirin and IVIG. The patient had rebound fever within 36 hours post discharge and was readmitted to the hospital with rash, decreased oral intake, and periungual desquamation. After a second dose of IVIG, repeat echocardiogram demonstrated moderate dilation of all coronary arteries. CT angiogram demonstrated diffuse ectasia of the great vessels, subclavian arteries, axillary arteries, common carotid arteries, and at the origins of the renal and mesenteric arteries. Patient was then treated with low dose aspirin, Lovenox, Infliximab, and cyclosporine before eventual discharge. This case was atypical in that the patient was very young and had refractory Kawasaki disease that was resistant to 2 rounds of IVIG with the development of cardiovascular involvement less than 2 weeks after having a normal initial echocardiogram. It is important to have a high degree of suspicion for Kawasaki disease in pediatric patients who have prolonged fever if there is no better alternate diagnosis.

Keywords: Kawasaki Disease, Infectious Disease, Pediatrics

Bacteriophage genome analyses for phage therapy

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Introduction: Bacteriophages (phages) are viruses that can infect and lyse bacteria. Virulent phages could be used as alternative or supplemental approach to fight drug-resistant bacteria. However, some phages can undergo a temperate, non-lytic life cycle. During this lysogeny, phage DNA integrates in the host genome as so-called prophage, which does not lead to bacterial cell death. In order, to learn more about lytic and lysogenic phages in the mammalian gut, we have isolated phages from fecal material and have searched for prophages in genomes of gut bacteria.

Methods: Bacteriophages infecting Escherichia coli host bacteria were isolated from dog, goat, and horse feces and were purified using repeated single plaque isolation. Their genomic DNAs were isolated and further characterized by restriction fragment analysis. Additionally, the phage genomic DNAs were prepared for whole genome sequencing. Bioinformatics approaches were used to screen bacterial genomes for prophages.

Results: All of the isolated bacteriophages were virulent against E. coli strains. Restriction enzyme digest indicated double stranded DNA with an approximate genome size of 50kb. Using next-generation sequencing, we will be able to assemble the phage genomes and screen the sequences for indications of potential lysogeny or harmful genes. Several prophages were discovered in members of the gut microbiota.

Conclusion: This proof-of-concept study offers a glimpse on the ecology of phages in the gut microbiome and also provides potential candidates for phage therapy against pathogens.

Keywords: Phage therapy, genome analysis, bioinformatics, microbiome, Lactobacillus

A systematic review: Evaluation of the completeness of interventions reported in published randomized controlled trials in plastic surgery

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Background: With the increasing number of RCTs being conducted and published in plastic surgery, clear, accurate, and complete reporting of trial information is critical for readers to properly evaluate a trial's methodology and arrive at appropriate conclusions about its merits and applicability to patients. The Template for Intervention Description and Replication (TIDieR) checklist was introduced to address the limited guidance for reporting trial interventions. In the present study, we will apply the TIDieR checklist to evaluate the completeness of intervention reporting of RCTs in plastic surgery, compare the quality of intervention reporting before and after the guideline was published and evaluate characteristics associated with TIDieR compliance.

Methods: A PubMed search was conducted to identify two trial cohorts — the first cohort published prior to the release of TIDieR and the second cohort published after its release. A random sample of 150 trials from each cohort was screened based upon predefined inclusion criteria. From the final sample, the TIDieR checklist was applied to intervention descriptions and relevant study characteristics were extracted. All screening and data extraction were conducted in duplicate, blinded manner, and discrepancies were resolved by group discussion.

Results: Following screening, 130 trials were included for analysis. The mean TIDieR score was 6.4 of a possible 12. Five items were reported 90% of the time, while 4 items were reported fewer than 10% of the time. We found that TIDieR publication did not affect intervention reporting (p=.22). Several trial characteristics were associated with both poorer and greater TIDieR adherence.

Conclusion: Our study identified areas in which intervention reporting could be improved. Furthermore, the extent of TIDieR adoption by trialists appears to be limited, and greater efforts are needed to disseminate this reporting guideline if widespread uptake is to be expected. Alternately, it may be more beneficial to incorporate TIDieR into the more widely recognized CONSORT statement.

Keywords: plastic surgery, TIDieR, intervention reporting

The use of superlatives in news articles on cardiology drugs

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Background: Superlatives are exaggerated expressions that are often used by writers to inflate the benefit of drugs and medical devices. News articles containing superlatives have the potential to mislead consumers' and health care providers' perception of a drug's effectiveness or its potential harm. The primary objective of this study is to evaluate the presence of superlatives in news articles covering drugs in the field of cardiology.

Methods: We searched Google News for news articles published over a four-day period (September 1, 2019 to September 5th, 2019). The following superlative terms were searched: breakthrough, game changer, miracle, cure, home run, revolutionary, transformative, life- saving, groundbreaking, and marvel. Articles were reviewed and data was extracted for all news articles in a duplicate, blinded fashion.

Results: Twenty-three unique news articles were included in our study which contained 29 instances of superlative use. Ten drugs from 7 drug classes were associated with superlative use. The most common drug associated with superlative use was Inclisiran, a PCSK9 Inhibitor, with 15 instances in 10 articles. Over a quarter of the drugs in this study did not have FDA Approval (3/11).

Conclusion: We demonstrated that superlatives are commonly used in news articles covering a variety of cardiovascular medications. Superlatives have the potential to influence a reader's opinion of a specific drug and its relation to current medical care. We provide recommendations that readers exercise caution when reading news articles containing this sensational style of writing.

Keywords: Cardiology, Superlatives, News Articles

Estrogen-treated rats alter salt intake after repeated episodes of dietary sodium deficiency

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Background: Sex differences in sodium intake are apparent; however, estrogen's role in these differences is currently unclear. Previous studies examining repeated episodes of furosemide-induced sodium depletion showed that while stimulated salt intake was similar between males and females, there were clear sex differences in sodium intake after rats were sodium replete. We aimed to further elucidate the long-term effects of estrogen on sodium intake using repeated episodes of a low salt diet, a more physiological challenge.

Methods: Ovariectomized rats were placed on two-week periods of access to regular chow (NaR) or sodium deficient chow (NaD), which we alternated for a total of two exposures to each diet. Estrogen benzoate (EB) or oil injections were given twice weekly throughout the experiment. At the end of each diet period, rats were given a 2-hour two-bottle test (water and 0.5 M NaCl). At the end of the experiment, rats were sacrificed and trunk blood was collected and centrifuged to collect plasma. Plasma protein levels were measured. Uteri were collected and 1 cm segments of the uterine horns were weighed.

Results: We confirmed the efficacy of EB treatment via effects on body weight, uterine weight, and plasma proteins. Specifically, EB-treated rats maintained body weight throughout the experiment, with the expected transient decreases corresponding to the EB injection schedule, while oil-treated rats gained weight. In addition, both plasma proteins and uterine weights were greatly increased in EB-treated rats compared to oil-treated rats. During two-bottle tests, both EB- and oil-treated rats had similar baseline intakes of 0.5 M NaCl and water. When salt intake was stimulated by dietary sodium deficiency, both EB- and oil-treated rats drank similarly increased amounts of 0.5 M NaCl. Interestingly, EB-treated rats drank more 0.5 M NaCl and water than did oil-treated rats following return to regular chow. The second period of dietary sodium deficiency again elicited similar intakes of 0.5 M NaCl and water by EB- and oil-treated rats.

Conclusions: Our study demonstrated that estrogen did not alter salt intake induced by the physiological challenge, dietary sodium deficiency. However, the low salt diet led to persistent changes in behavior, as demonstrated by the continued consumption of salt and water by EB-treated rats even after sodium repletion.

Keywords: estrogen, sodium depletion, salt intake

Massive transfusion protocol optimization

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Hemorrhage is the leading cause of mortality in trauma, accounting for up to 80% of intraoperative trauma mortalities and nearly half of the deaths that occur within 24 hours of traumatic injury. The timely and appropriate administration of blood products in hemorrhage control is paramount to adequate resuscitation efforts. Given the need for rapid delivery of products, appropriate product infusion ratios, and adjunctive therapies for control of hemorrhage and anticoagulation reversal, it is essential that facilities have and maintain a Massive Transfusion Protocol. The goal of this project was to create a Massive Transfusion Protocol for our facility that incorporated current literature, involved buy-in from all involved departments, and optimized blood product ordering and delivery in the emergency setting. To this end, a literature search was performed, and a protocol was drafted which focused on single entry point ordering, and automated product delivery until massive transfusion was halted. Elective orders were also incorporated for easy requesting of coagulation reversal agents and pro-clotting factors. The final draft of the protocol was submitted to the hospital transfusion committee for approval and then incorporated into an EHR order set. Staff training was performed in all involved departments before deployment. Outcome measurement is ongoing but it is anticipated that this updated protocol will decrease time between disposition of major bleed and arrival of blood products at the bedside. It is also expected that this protocol will decrease the amount of crystalloid products given to major bleeding patients by increasing efficiency of blood product delivery.

Keywords: Massive Transfusion, Blood Products, Trauma, Hemorrhage, Exsanguination, Bleeding

Neuronal activation in Nucleus Tractus Solitarius and Area Postrema of young and aged female rats induced by hypotension

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It is well documented that blood pressure changes with age, and the effect is particularly pronounced in females. However, few studies have examined blood pressure in aged individuals, and most animal studies have been done with male rats. Our goal was to investigate responses to experimental hypotension in aged females, comparing activity in central nervous system areas implicated in blood pressure control in young and aged female rats. Isoproterenol (ISOP) is a β-adrenergic agonist that produces hypotension, thereby activating the renin-angiotensin system (RAS) and baroreceptors located in the aorta and great veins. Input from baroreceptors terminates in the hindbrain Nucleus of the Solitary Tract (NTS), whereas circulating hormones are detected by the adjacent Area Postrema (AP). Accordingly, we assessed neural activation in these areas using immunohistochemical labeling for the fos protein.

The results showed a marked difference in numbers of fos+ neurons between young and aged female rats across both areas in response to ISOP. Fos in aged females was blunted in both caudal and middle levels of the NTS and throughout the AP. We conclude that aged females have an impaired response to baroreceptor input after hypotension and are less sensitive to hormones, such as Ang II, that are associated with hypotension. Thus, neurons in the hindbrain areas involved in cardiovascular control may play a role in age-related changes in blood pressure in females.

Keywords: hindbrain, baroreceptors, Angiotensin II, isoproterenol

Publication trends among internal medicine residents, fellows, and graduates and its relationship to future academic achievement

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Background: Medical research is essential for establishing evidence-based care and furthering clinical practice knowledge for the success of physicians. For example, research is considered a scholarly activity by the American College of Graduate Medical Education and is a requirement during residency (1). Furthermore, research is used as a tool to measure academic success given that it allows for a qualitative measure for residency and fellowship applications. Publication trends among internal medicine have previously been studied (2,3); however, our follow-up study also adjusts for gender when comparing research success and outcomes. Our primary objective is to assess the influence that research in medical school has on residency success by analyzing fellowship placement, h-index scores, and continued research success measured by publications.

Methods: Using Doximity residency navigator, we reviewed internal medicine graduates from 50 randomly sampled residency programs. From each included program, publicly available graduate records were obtained and included for identification of each graduate. After extracting our list of graduates, each graduate was searched on SCOPUS for degree, gender, fellowship pursued, h-index, academics pursued, and publications. Microsoft Excel and Stata 15.1 were used for all statistical analysis functions.

Results: Our initial search of internal medicine residency programs yielded 530 programs of which we randomly sampled 50 programs. Among the 50 programs, 328 graduates were identified and included in our analysis. Over half of our sample were males with the most common fellowship pursued being cardiology (Table 1). Graduates with first authorship publication prior to residency were more likely to pursue a fellowship or go into academic medicine (Table 2).

Conclusion: Our study found that graduates with primary author publication before residency were more likely to go into academic medicine or pursue a fellowship after internal medicine residency. Given that Internal medicine provides several options following residency, research provides a qualitative measure of academic performance and future success. Our study highlighted no difference among gender and future career success. These results are comparable to other studies (2,3). In conclusion, total publications, first author publication, and h-index scores independently indicate a significant positive correlation in pursuing a fellowship or academic medicine after residency.

Keywords: Cross-sectional, Internal Medicine, Publication Trends, H-index

Publication trends among emergency medicine residents, fellows, and graduates and its relationship to future academic achievement

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Shelby Rauh B.S.,
Austin Johnson B.S.,
Matt Vassar Ph.D

Purpose: Scholastic activity through research involvement is a fundamental aspect of a physician's training, and may have a significant influence on residency and fellowship match success. Despite this fact, little is known regarding the pursuit of academia and/or fellowships in emergency medicine graduates. In this review, we will (1) describe factors involved in academic research including peer-reviewed publications among emergency medicine residency graduates and (2) determine if a relationship exists between publication rates before, during, and after emergency medicine residency.

Methods: Using a cross-sectional study design, we analyzed the research output of emergency medicine graduates and its relationship to future academic involvement from a random sample of 50 emergency medicine programs' graduates. Data were extracted for each graduate and analyzed using STATA 15.1 and Microsoft Excel. A public protocol is available here: https://osf.io/pwa6d/.

Results: Using Doximity, we identified 238 emergency medicine residency programs of which we sampled 50. Of the 50 included programs, 6 programs were included, amounting in 154 graduates available for analysis. Of the 154 analyzed graduates, 97 (63.0%) were male, 91 (59.1%) were osteopathic graduates, and 91 (59.1%) had zero publications. Additionally, we found that 26/154 (16.9%) pursued academia and 16/164 (10.4%) pursued a fellowship, with 4/16 (25%) in medical toxicology and 4/16 (25%) in emergency medical services. The mean number of publications for each graduate was 0.87. Of the graduates with research, more research was published on average after graduation from residency (0.42) compared to before residency (0.17) and during residency (0.34).

Conclusion: While a majority of psychiatry graduate's publications were post-residency, many publications occurred during residency, with the lowest number of publications occurring pre-residency.

Keywords: Publication Trends, Emergency Medicine, Residency

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Arjun Reddy, BA; Graduate Student;
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Sheridan Evans B.S.,
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Keywords: Publication Trends, Emergency Medicine, Residency

Publication trends among general surgery residents, fellows, and graduates and its relationship to future academic achievement

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Bryan Wright, BS,
Audrey Wise, BS,
Erin Jackson, BS,
Austin L. Johnson, BS,
Nicholas Kinder, BS,
Matt Vassar PhD.

Background: Medical research is considered a core component of Accreditation Council for Graduate Medical Education (ACGME) residency programs. Through conducting, evaluating, and applying medical research, physicians aim to improve the quality of care for patients and better health outcomes. Our study aims to determine associated factors that influence publication rates before, during, and after general surgery residency.

Methods: Our cross-sectional study included a random sample of 50 general surgery residency programs. Using each program's online website, publicly available records were obtained for residents that graduated in 2013-2015. Previous publication information, h-index, medical degree, and fellowship pursued were obtained for each graduate by searching Scopus and PubMed. Microsoft Excel functions were used to calculate descriptive statistics and 95% confidence intervals

Results: Of the 30 included programs, 68 residents were analyzed for sample characteristics and publication rates. Among the 68 graduated residents, the majority, 31 (45.6%) had between 1-5 publications. Of the 68 residents, most pursued a fellowship in Minimally Invasive Surgery (14/68; 20.6%). Most research outcomes reported were during residency with a total of 150 (of 321; 46.7%) publications. Of the 321 total publications recorded, the lowest reported median was before residency.

Conclusions: Our study indicated that research outcomes were more prevalent during residency when compared to research outcomes before and after residency. Given that research remains a core part of ACGME general surgery residency programs, it is important for residents to continue progressing their scientific knowledge through continued research. In conclusion, publication rates remain the highest during residency.

Keywords: Publication Trends, Cross-sectional, General Surgery

Relationship between susceptivity to triclosan sensitization by outer membrane permeabilization and cell surface hydrophobicity properties in opportunistically pathogenic serratia species

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BACKGROUND: The nosocomial opportunists Pseudomonas aeruginosa and Serratia marcescens are atypically resistant to the hydrophobic biocide triclosan due largely to outer membrane impermeability properties for hydrophobic substances. However, we have recently shown that the degree of cell envelope impermeability for triclosan differs dramatically among other opportunistically pathogenic Serratia species. Moreover, susceptivity to sensitization to triclosan by outer membrane premeabilization also differs among other intrinsically resistant species. The purpose of the present study was to determine if cell surface hydrophobicity (CSH) properties underlie susceptivity to triclosan sensitization by outer membrane premeabilization in selected species as we further characterize their cell surface properties in anticipation of investigating their propensities to form in vitro biofilms.

METHODS: Three Serratia species (marcescens, fonticola, and odorifera) exhibiting disparate degrees of susceptivity to triclosan sensitization by outer membrane premeabilization were examined to determine their susceptibility levels to mechanistically-disparate hydrophobic molecules and their CSH properties. Intrinsic resistance to hydrophobic antibacterial agents was assessed using a standardized disk agar diffusion bioassay. CSH was determined using conventional crystal violet binding, hydrocarbon adherence, and 1-N-phenylnapthylamine uptake assays routinely employed in this laboratory.

RESULTS: S. marcescens and S. fonticola were intrinsically resistant to all mechanistically-disparate hydrophobic antibacterial agents examined to include triclosan, while S. odorifera was susceptible. The CSH properties of all these differed only slightly, despite the disparate susceptivities of the two triclosan-resistant species to triclosan sensitization.

CONCLUSION: These data suggest that phenotypic differences seen in three opportunistic Serratia species with regard to intrinsic resistance to hydrophobic antibacterial agents in general, and triclosan specifically are at least due in part to disparate abilities of their outer membranes to exclude hydrophobic substances. Moreover, susceptivity to triclosan sensitization by outer membrane premeabilization in the triclosan-resistant species S. marcescens and S. fonticola appears not to be influenced by differences in cell surface hydrophobicity properties.

Keywords: Serratia species, triclosan, cell surface hydrophobicity

Subsidization of race entry fees lowers barriers to participation in 5K races in children under age 14

Alexis B. Jones, PhD;

Background: Numerous studies have highlighted the physical health benefits of children's participation in sports and more recently, a body of research is growing that details the mental health benefits. Despite these benefits, children are leading increasingly sedentary lifestyles and this puts them at greater risk of chronic disease, obesity, and poor school performance. The key barriers to participation in sport for children have been identified by researchers as 'cost' and 'time'. One way to reduce the cost barrier is to subsidize race entry fees for 5K races.

Methods: Data for national averages was retrieved from a public database (meteor.run), which calculates statistics for the aggregate of all 5K events in the system. Data from selected races where fee waivers are available was retrieved from public databases containing specific event information (oksportsandfitness.com and tatur.org). Male and female participation in the age group of 1-14 years was analyzed.

Results: Nationally, in races where fees are not subsidized, participation by children aged 1-14 is 7.0% in females and 10.5% in males. In selected races where fee-subsidization is offered, participation by children is much greater. Over the course of five years (2015-2019) in the Cherokee National Holiday 5K, average participation by females aged 1-14 years is 14.3% and males is 21.3%. In the 2019 Redbird 5K, female participation in the 1-14 age group was 16% and the male rate was 26.8%. The 2019 Beat the Heat 5K had 15.4% female participation in the 1-14 years age group and 21.5% male participation. The Isaiah Sapp 2019 5K was 17.8% females aged 1-14 and 28.2% males. The Huckleberry 5K 2019 was 12.5% females aged 1-14 and 21.3% males. The Mayes Co HOPE 2019 5K had 14.3% participation from females aged 1-14 and 20.1% participation from males aged 1-14.

Conclusions: The races where fee waivers were available took place at different times during the school year and summer (the Holiday 5K was calculated over a five-year period). These races took place during differing weather conditions and in different cities around northeastern Oklahoma. There is a commitment necessary by parents to enroll the children into the wellness program in order to receive the race fee waivers and there is a requirement to attend the races once registered. However, despite the membership, registration, and attendance requirements, children are still motivated to train for and participate in the races at a greater rate if their fees are paid. Policy makers, parents, and teachers should be aware that 'cost' and 'time' are key barriers to participation in sport for children. More opportunities are needed where costs are reduced and this provides one example of an effective cost-reducing method for increasing participation in running.

Keywords: exercise**,** children**,** barrier**,** 5K

The end(s) of vaping: A search query review of e-cigarettes

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Cole Wayant, BS1,
Matt Vassar, PhD1.

Background: As of December 2019, 52 electronic nicotine delivery system (ENDS) related deaths and over 2,400 related cases of lung damage have been confirmed in the US; the CDC refers to this pathology as EVALI—e-cigarette, or vaping, product use associated lung injury. The primary endpoint of this investigation is to provide insight into the public consciousness and to shape future studies and policies on this rapidly evolving topic by updating a 2015 study by John W. Ayers, Ph.D. et al.

Methods: Internet search query data were located using Google Trends (https://trends.google.com/trends). We compared the terms vape vaping e cig and e cigarette as well as searches for alternative tobacco options such as snus Chantix and nicotine-replacement therapies. Variations in state search rates were explored by comparing ENDS searches according to 10 state specific traits: the longitude of each state, tobacco excise tax rates, cigarette smoking rate, population density, lung cancer incidence rate, national tobacco control program funding and the percentage of available funding used by the state, smoke-free air grades from the American Lung Association, crude ENDS prevalence, and the anti-smoking norms as reported by Ayers et al. All analyses were conducted using Stata 15.1 (STATA Corp., College Station, TX).

Results: Total ENDS searches increased 88% over the past 5 years. We found that ENDS was searched with greater frequency than other popular smoking alternatives. Significant geographic findings for 2019 include a lower annual relative search rate for all ENDS on either coast of the United States with a higher relative search rate in the center of the country. Trends from 2015 - 2019 for different ENDS search phrases meant to represent different intentions (buying, health, and cessation) behind ENDS searches were compared and the phrase buy vape was searched the most out of this set. Over the last 5 years, both YouTube and Google Shopping saw total ENDS searches rise from 2015 to 2018 only for both to fall in 2019.

Conclusion: Total ENDS searches in the United States increased dramatically over the last 5 years compared to the decade prior, peaking the week of September 8, 2019. Earlier that week, a warning was sent by the CDC of the potential link between ENDS and severe lung illnesses after more than 25 states had reported possible cases of lung illnesses associated with use of ENDS products. ENDS searches by state have become more concentrated in the last 5 years, reversing the trend of the early 2010's observed by Ayers et al. This trend could be, in part, due to states passing laws to curb the use of ENDS. The public definitively prefers using vaping terms over e-cigarette terms in a phenomenon similar to that of high fructose corn syrup versus sugar. It would be wise to frame policy discussions and public education campaigns using vaping terms as well as e-cigarette terms, and encourage states to enact policies associated with lower ENDS usage.

Keywords: Vaping; e-cigarettes; ENDS; Google Trends; public health

Association between sports specialization and risk of musculoskeletal injury in high school athletes: A critically appraised topic

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Jennifer Volberding, PhD, LAT, ATC

Context: Sport specialization is defined as intensive, year-round training in a single sport to the exclusion of other sports. The increased training and competition loads secondary to this trend have been hypothesized to contribute to psychological burnout and overuse injuries. High school athletes, in particular, are of interest due to the increased intensity and level of competition compared to youth sports. By classifying levels of sport specialization and analyzing injury history of subjects, correlations have been made to the relationship between sport specialization and the prevalence of musculoskeletal injuries in high school athletes. Thus, the question being investigated in this critically appraised topic is Is sport specialization association with an increased risk of musculoskeletal injury in high school athletes?

Objective: To determine if sport specialization is associated with an increased risk of musculoskeletal injury in high school athletes.

Data Sources: An electronic database search included PubMed, SPORTDiscus, and Medline. Search terms included high school athletes AND sport specialization AND musculoskeletal injury OR injury.

Study Selection: Studies were included if they investigated both male and female high school athletes, were level 3 evidence or higher, in English, and published within the past 10 years (2009-2019). Studies were excluded if the participants were too young to participate in high school sports, investigate non-musculoskeletal injuries, or investigate a population from only a single sport (ex: only baseball players).

Data Extraction: Three cross-sectional and one cohort study were included and appraised using the Checklist for Measuring Quality.

Data Synthesis: All four studies utilized a 3-question sport participation survey in order to classify participants as either high, moderate, or low specialization and an injury history survey. Two studies included high school athletes from 29 different high schools, one included high school athletes from 2 different high schools, and one included high school athletes from only one high school. Three studies analyzed in this appraisal found positive correlations between moderate and high levels of sport specialization and musculoskeletal injuries while one did not. Additionally, two of the studies found a positive correlation between time-loss injuries and participation in club sports.

Conclusions: Evidence suggests that sport specialization is associated with a higher risk of musculoskeletal injuries in high school athletes. However, other factors, such as training volume, competition volume, and club sport involvement may all also play a role in this relationship.

Strength of Recommendation: B

Keywords: sport specialization, injury, musculoskeletal injury, high school athletes

Does the wearing of padded headgear in non-helmeted contact sports reduce the likelihood of sustaining a concussion?

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Context: Concussions are a hot topic in the world of athletics. When most people think of concussions in the world of sports, they generally think of sports such as American football or ice hockey. Current literature men's rugby has the highest amount of concussions of all the team contact sports for both adult and adolescent athletes. High on the list for adolescent athletes is soccer, having the 5th most concussions behind hockey, American football, and lacrosse. It is important to note that of the top 5 sports for concussion, soccer and rugby are the only ones that do not require the use of a helmet. This raises the question: could wearing padded headgear decrease the amount of concussions in the high concussion risk sports that do not require a helmet?

Objective: To determine whether or not the wearing of padded headgear in contact sports (i.e. rugby and soccer) reduce the likelihood of sustaining a concussion.

Data Sources: A search was conducted in November 2019. Electronic databases utilized included PubMed, SPORTDiscus, and Google Scholar. Hand searches were also performed through the article's reference lists. The terms used in the search included soccer, rugby, headgear, padded headgear, concussions, and prevention.

Study Selection: Studies were included if performed on humans, looked at the relationship between padded headgear and concussions, were conducted within the last 15 years, and included only rugby or soccer. Studies were excluded if they were performed on animals, looked strictly at how headgear dissipates force, looked at non-padded headgear (hard shelled helmets, mouth-guards, or face shields), researched how headgear effected accuracy, or sought out the athlete's opinions on headgear and concussions.

Data Extraction: Three studies, one cross-sectional study and two randomized controlled trials were selected based on the inclusion/exclusion criteria. Data Synthesis: The cross-sectional study asked adolescents (12-17yo) on a traveling soccer team a survey that asked them about their use of headgear and any concussion symptoms experienced and found that a little more than 50% of non-headgear users reported concussion symptoms compared to 27% of headgear users. One RCT studied 14-18-year-old soccer players while the other studied 13-20-year-old male rugby athletes. Both studies showed that the wearing of headgear did not decrease the likelihood of sustaining a concussion.

Conclusions: There is good, but conflicting evidence about the use of padded headgear in non-helmeted contact sports. It is due to this confliction that we cannot say whether or not these headgears may be useful in preventing concussions. More focused research is necessary in order to better understand the impact padded headgear has on concussions. Based on the SORT system, a grade B recommendation is given due to inconsistent findings in level 2 evidence.

Keywords: Headgear, Concussion, Prevention, Contact Sports

Analysis of awareness months using google trends

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Objective: Health awareness months are growing in popularity with over 200 awareness days, weeks and months recognized in the United States. Awareness months cover a wide array of topics including Breast Cancer Awareness Month, Save Your Vision Month and National Recovery Month, etc. Despite their growing popularity, the efficacy of awareness months has been called into question. Given the inconsistencies regarding the efficacy of awareness months, we used Google Trends to investigate public awareness for each awareness month during the respective awareness month.

Methods: We used Google trends to determine the relative search interest for an awareness month by using related keywords. The data was then analyzed to determine if there was a spike in relative search volume for each specific keyword. A spike was defined as a keyword with a 25% or greater increase in relative search volume compared to the previous 10 months. If at least half the months over the 10-year period were associated with spikes for that specific keyword, the awareness month was considered effective at increasing public awareness for that keyword. Each awareness month was associated with increased public awareness if at least 2 of the 5 related keywords were considered effective. We then reached out to the organizations that sponsor to determine their willingness to provide information about their campaign strategies.

Results: We evaluated 105 national awareness months and found that when classified by month September had the highest number of awareness months with 16 and December had the lowest with only 1. When classified by disease, Health Promotions/Wellness had the highest number of awareness months with 30 and Sexually Related Disorders had the lowest with 3. We found that 33% (35 of 105) of awareness months were associated with a spike. Gastrointestinal Related Disorders classification had the highest percentage of months associated with a spike at 60% (3 of 5) while Cardiac and Blood Related Disorders had the lowest percentage of months associated with a spike at 14.3% (1 of 7). A majority of sponsors did not reply, (61.5%) and that information was not able to be used as a tool for drawing relationships. Overall, there were a majority of awareness months that did not cause an increase in awareness via web trafficking (67.7%).

Conclusion: We conclude that while some awareness months were successful in increasing awareness for their cause, the majority of campaigns were not contributing to the overall goal of increasing awareness and educating about their campaign. We recommend further research into the efficacy of awareness months on disease prevention and the potential conflicts of interest they present.

Keywords: Health Awareness Months, Awareness Month, Google Trends

Assessing the limit of detection of fentanyl vapors using SPME and VASE

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With fentanyl use on the rise across the United States, law enforcement and first responders are becoming more likely to enter areas of contamination. These types of occupational exposures create hazardous work environments, the extent of which is unclear. In order to assess the type and amount of hazards associated with these exposures, the air within fentanyl-contaminated locations must be characterized to identify what compounds are present and at what concentrations. Before characterization of an actual fentanyl-contaminated location can occur, the methods used to collect and analyze samples must be assessed. This research is the first step in that assessment and will seek to determine the limit of detection for fentanyl, its analogs, and its impurities in the air. Two different sampling methods will be compared to determine which technique is better suited for a future field application. These sampling techniques include solid phase microextraction (SPME) and vacuum assisted sorbent extraction (VASE), both of which passively collect samples from the air on a sorbent that can then be introduced to gas chromatography mass spectrometry for analysis. Once the limits of detection are established, the resulting method will be implemented to assess the occupational exposures associated with fentanyl-contaminated locations, bettering our understanding in the amount and types of precautions that should be exhibited before entering such a location.

Keywords: GC-MS, Fentanyl, SPME, VASE

The histological ontogeny of ornamented adocusians and trionychids from the Kaiparowits Formation of Utah

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We here describe the histological variance of four genera from the Upper Cretaceous (Campanian) Kaiparowits Formation of southern Utah, USA. Twenty-seven slides were produced from multiple ontogenetic stages to understand how and why shell growth varies on a histological level. While an emphasis is placed on diagnostic surficial ornamentation, bulk histological anatomy is also described herein and contextualized within a broader ecological and phylogenetic framework.

Consistent with previous studies, relative zone thickness is ecologically derived. Terrestrial turtles like Basilemys exhibit relatively thick and avascular cortices, while aquatic and semiaquatic genera exhibit thin, vascularized cortices. Vascularization patterns in all genera support a standard reptilian growth model. Ornamentation is also an ontogenetically derived feature, with mature specimens exhibiting increasingly defined ornamental morphologies in all genera.

Two mechanisms of ornament deposition are proposed that fall along higher taxonomic classification. Trionychids rapidly deposit a basal layer, then continue laminar deposition at an asymptotic rate. Adocusians erode the external surface of the previous ornamentation and laminarily deposit derived ornamentation a top it. As a result, resorption lines are present in genera where lateral migration exceeds radial growth. While collected histological data provides no definitive ornamental function, the depth and orientation of Sharpey's Fibers and primary vascularization suggest mechanical and exogenic influences respectively.

The trionychid plywood-like structure expands externally, with additional layers being added along the distal margins of the shell. Although biomechanical testing is needed, we hypothesize that the structure distally thickens in response to mechanical stress inflicted upon the shell. The adocusian Lower External Cortex consists of a dense mat of secondary osteons, which we hypothesize to serve a similar function to that of the trionychid plywood-like structure.

The medullary cavity and internal cortex are taxonomically consistent relative to the external cortex. All genera exhibit externally expanding medullary cavities with canals that preferentially remodel ISF bundles between LAGs. The internal cortex is laminar and largely unaltered, save sparse radially decreasing primary vascularization in the trionychids that reflects early asymptotic growth.

Keywords: Paleohistology, trionychoid, Kaiparowits, ontogeny, ecology

Effect of voluntary exercise on weight gain and associated neuroimmune signaling in ovariectomized rats

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Obesity is a multifaceted disease that poses a health care challenge, affecting ~40% of adults in the United States. It is associated with a range of co-morbidities and exorbitant medical costs. Obesity as a disease disproportionately affects different ethnic groups, as well as individuals of different socioeconomic status. However, the disparity between sexes is particularly concerning. 45% of women are obese compared to only 38% in men. Given this disparity, there is still surprisingly little literature on female obesity, even in animal models. It is known that ovarian hormones influence body weight, and that ovariectomized (OVX) rats rapidly gain weight. Additionally, it was noted in our previous study that this post-OVX weight gain is associated with regionally specific changes in neuroimmune signals in the CNS, particularly in areas involved in body weight regulation and feeding control, such as the arcuate nucleus (ARC), paraventricular nucleus (PVN), and the dorsal vagal complex (DVC). Obesity management is an issue as well. Due to its multifaceted nature, obesity is difficult to control. The most common recommendations for obese individuals are still dieting and exercise. In this study, we investigated the impact of exercise on weight gain along with the associated changes in neuroimmune signals focusing on Interleukin-6 (IL6), Monocyte Chemoattractant Protein (MCP-1), Toll-like Receptor 4 (TLR4), and Glial Fibrillary Acidic Protein (GFAP) due to their involvement in innate immune activation, which is associated with obesity.

Sixteen female adult Sprague-Dawley rats were OVX, with 8 then housed in cages with running wheels attached, while the other 8 were housed in standard cages without access to running wheels. Body weight and running distance were recorded weekly. At the 3-week mark, the rats were switched, with rats that initially were sedentary housed in cages with running wheels, and rats that had immediate access to running wheels transferred to standard cages. Rats were sacrificed at the end of the 6th week, and plasma, brains and spleens were collected. Punches were taken from ARC, PVN, and DVC and the expression of IL6, MCP-1, GFAP, and TLR4 were quantified using immunoblotting (IL-6, MCP) or ELISA kits (GFAP, TLR4).

OVX rats gained significantly less weight during their first week of running, regardless of whether they ran immediately or 3 weeks after OVX. Both TLR4 and GFAP in the DVC were significantly greater in the immediate exercise group, whereas IL-6 and MCP showed no differences between the two groups. Thus, exercise had transient effects to slow post-OVX weight gain, but was more effective when it was delayed for 3 weeks. With regard to neuroimmune signals, the effects of exercise were limited to GFAP and TLR4 and were regionally specific. Together, these findings suggest that exercise and the concomitant slowing of the post-OVX weight gain may reduce innate immune activation in hindbrain areas that respond to stimuli associated with feeding.

Keywords: Arcuate nucleus, Paraventricular nucleus, Dorsal vagal complex, Obesity, neuroimmune signaling

Posterolateral hip muscle strengthening in decreasing symptoms of patellofemoral pain syndrome: A critically appraised topic

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Context: Patellofemoral pain (PFP) is an idiopathic condition characterized by aching pain in the peripatellar area, which is exacerbated by physical activities, such as climbing stairs, squatting, jumping, running, and prolonged sitting. PFP can often be managed by corrective exercise treatment that emphasizes strengthening of thigh and hip musculature, correction of malalignment of the lower extremity, and improvement of patellar incongruence. Evidence is inconclusive whether strengthening of the thigh or hip musculature is more beneficial in the treatment of PFP.

Clinical Question: Does posterolateral hip muscle strengthening compared to quadriceps strengthening help decrease symptoms in individuals presenting with patellofemoral pain?

Summary of Key Findings: A search of the following databases was conducted using search terms of hip strengthening, quadriceps strengthening, anterior knee pain, and patellofemoral pain (Pubmed, SPORTDiscus, EBSCO host, Trip Research, and Google Scholar). Only peer-reviewed studies that were randomized control trials, or systematic reviews were included in the analysis. Of the four articles that were included in this critically appraised topic, all recognized that hip strengthening had positive patient reported outcomes in decreasing symptoms of PFPS.

Clinical Bottom Line: There is moderate evidence that shows decrease in symptoms of pain in patients presenting with PFP that participated in posterolateral hip strengthening compared to thigh musculature training alone.

Strength of Recommendation: Level 2

Keywords: patellofemoral pain syndrome, posterolateral hip strengthening, hip strength and knee pain, quad strengthening

Cross-reactivity of venoms and antivenoms determined in vitro using size-exclusion chromatography

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Background: Size-exclusion chromatography (SEC) can be used to characterize venom-antivenom immune complex formation. Complex formation would be expected between antivenom and venom used in the antivenom production process. Binding of antivenom with venom not used in the production process might be predicted due to similarities of venom composition, but would typically be confirmed by standard assays, such as inhibition of venom lethality or neutralization of venom toxicity. Evaluation of complex formation is relevant since venom-antivenom binding is required for neutralization of venom lethality or toxicity, though binding does not guarantee protection. SEC may be a useful tool in comparing the binding of different antivenoms to a particular venom, as well as binding of different venoms to a particular antivenom. The data presented in this study demonstrates the use of SEC to evaluate the cross-reactivity of two distinctly different antivenoms with venoms used in antivenom production. Antivenoms: Ovine Fab (FabAV) - Crotalidae Polyvalent Immune Fab (Ovine); Equine F(ab′)2 [F(ab′)2AV] - Bothropic antivenom, Butantan Institute, Brazil. Venoms: Crotalus atrox (North America) - used in FabAV production; Bothrops jararaca (Brazil) - used in F(ab′)2AV production.

Methods: Venom, antivenom, and venom-antivenom mixtures were prepared at 4oC in 50 mM sodium phosphate, pH 7.0, containing 0.15 M NaCl (column elution buffer) and incubated for 30 minutes at 37oC. (Samples were stored at 4oC prior to SEC.) Samples (20 uL) were injected into the SEC column (TSKgel G3000SWxl 7.8 mm ID x 30 cm, 5 um, TOSOH Bioscience) at a constant flow rate of 1 mL/min. Elution profiles were monitored using a photodiode array detector (Waters). Three regions within the elution profiles were chosen for integration based on comparison of control and venom-antivenom mixture profiles. Venom-antivenom binding was estimated from differences between control and venom-antivenom mixture region areas (i.e. DArea). Concentration-dependent changes in DArea were fit to a hyperbolic dose-response function (Eq.1) to estimate DAreamax (maximum binding) and C50 [effective concentration of reactants (C) at one-half □Areamax)]. DArea = DAreamax [C/(C50+C)] Eq. 1 Venom and antivenom reactants and venom-antivenom mixtures were comprised of: (1) C. atrox venom, FabAV; (2) C. atrox venom, F(ab')2AV; (3) B. jararaca venom, F(ab')2AV; and (4) B. jararaca venom, FabAV.

Results: Complex formation was apparent in all four combinations of venoms and antivenoms. C. atrox venom binding to FabAV was greater than to F(ab')2AV. B. jararaca venom, however, bound to F(ab')2AV greater than to FabAV. Venoms used in antivenom production tended to bind preferentially to the respective antivenom product. Concentrations of venoms at one-half DAreamax (C50) were similar for all four combinations of venom and antivenom.

Conclusion: The data presented in this study demonstrate the use of SEC to evaluate the binding of different antivenoms to a particular venom, as well as binding of different venoms to a particular antivenom. SEC may have application in evaluating cross-reactivity of different types of antivenoms and venoms.

Keywords: venoms, antivenoms, venom-antivenom binding, size-exclusion chromatography

Inferring cranial and abdominal arteries of tyrannosaurus rex through extant phylogenetic bracketing

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Synopsis: Our research compared cranial and abdominal arteries of humans and archosaurs (birds and crocodilians) with the goal of inferring the vasculature of Tyrannosaurus rex.

Background: In vertebrates, cranial arteries supply structures of the head, and branches from the abdominal aorta supply the viscera. Although human vasculature is well known, details of vasculature are unknown for most vertebrates, especially extinct ones. We investigate arteries in the extinct dinosaur Tyrannosaurus rex using its extant archosaur relatives (birds and crocodilians), with the aim of understanding how vessels contributed to this dinosaur's extreme size and functional adaptations. This study is the first to infer abdominal vasculature in an extinct organism.

Methods: We inferred arteries in Tyrannosaurus with extant phylogenetic bracketing (EPB), which assesses unknown traits in an organism based on its position in a phylogenetic tree between relatives with known features. EPB is useful for inferring traits (i.e. soft tissue) that do not fossilize well. We examined the abdominal and cranial arteries of predatory and non-predatory birds (modern dinosaurs), crocodilians (their nearest relatives), and humans through literature sources and dissections. Humans represent the distantly-related outgroup to archosaurs; arteries present in all three groups strengthens their inference for Tyrannosaurus.

Results: Abdominal Arteries: In all four vertebrates the large abdominal aorta bifurcates distally into the right and left common iliac arteries, and archosaurs possess a large caudal artery supplying the tail. The coeliac trunk from the aorta has left gastric, splenic, and common hepatic; birds lack splenic and common hepatic arteries with the gastric artery anastomosing with the coeliac trunk, whereas crocodilians have a gastric artery that branches into the gastro-hepatico-intestinal artery and pancreo-intestinal artery. These arteries supply foregut structures. Branches of the superior mesenteric artery supplies the midgut and inferior mesenteric artery the hindgut. Crocodilians only possess one mesenteric artery, which supplies the entire intestinal tract. Humans have paired middle suprarenal arteries and renal arteries. Archosaurs lack middle suprarenal arteries, but have renal arteries that supply both the adrenal glands and kidneys. All vertebrates have paired gonadal arteries.

Cranial Arteries: In all vertebrates, vertebral arteries supply the brain, and the common carotid bifurcates into external and internal carotids. The external carotid supplies structures of the neck and head external to the cranium, branching into the superior thyroid, ascending pharyngeal, lingual, facial, occipital, posterior auricular, maxillary, and superficial temporal arteries. Archosaurs' external carotid branches into temporomandibular, pterygoid, maxillomandibular, palatomaxillary, maxillary, palatine, and oromandibular arteries. The internal carotid artery supplies the brain, eyes, and forehead. In humans, the internal carotid artery branches into the anterior cerebral, middle cerebral, posterior communicating, and ophthalmic arteries, whereas archosaurs' internal carotid artery branches into the cerebral carotid, common encephalic, stapedial, temporoorbital, and caudal auricular arteries.

Inferences for Tyrannosaurus: As an archosaur, we can confidently infer that Tyrannosaurus possessed temporoorbital, rostral auricular, cerebral carotid, mandibular, palatomaxillary, oromandibular, palatine, medial nasal, common nasal, and opthalmotemporal arteries. Birds and crocodilians differ is some cephalic and abdominal arteries, and their inference in Tyrannosaurus will require a search for shared osteological correlates for these vessels.

Keywords: Tyrannosaurus, Arterties, Phylogenetics, Archosaurs

Incidence of delirium in the intensive care unit before and after implementation of the confusion assessment method for the ICU

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Background: Delirium is a serious condition that affects patients in the intensive care unit (ICU) that can lead to worse outcomes and increased length of ICU stay. Delirium was not assessed at Oklahoma State University Medical Center (OSUMC) but the implementation of the Confusion Assessment Method for the ICU (CAM-ICU) has changed that. This study looks to determine the incidence of delirium before and after implementation of the CAM-ICU. The objective of this study is to improve recognition of delirium at this hospital to improve patient outcomes and reduce length of stay in the ICU.

Methods: This study has been approved by the institutional review board. It evaluates all patients in the ICU before and after implementation of the CAM-ICU. This four-question assessment will be performed by nurses on their regular shift assessment. The assessment will be modified to fit the institution's use of the Ramsay Score instead of the Richmond Agitation and Sedation Scale. A positive result will be recorded in the patient's electronic medical record (EMR) as well as verbally communicated to the doctor and pharmacist. Diagnosis codes for delirium from January 1st, 2019 through June 30, 2019 will be used to determine the incidence of delirium before the implementation of the CAM-ICU. This study will analyze patients from 10/29/2019 through 3/31/2019 who have undergone the CAM-ICU at least once. Once the study period is complete, a report from the EMR will be performed to identify each patient with a positive CAM-ICU. The patient's age, past medical history, assessment results, medication lists, length of stay in the ICU and hospital will be obtained from the electronic medical record. All data will be maintained and analyzed in a secure database to which only the researchers will have access.

Results: From January 1st, 2019 until June 30th, 2019, there were 4 patients in the ICU with a diagnosis code of delirium that was associated with their time in the ICU. From 10/29/19 through 12/31/2019, 153 patients underwent testing by the CAM-ICU. Since then, 19/153 patients (12.4%) have tested positive for delirium. 13/19 (68.4%) of patients were male and 11/19 (57.9%) were older than 65. 10/19 (52.6%) patients had a history of substance abuse. The average length of stay in the intensive care unit was 6 days (1-15). 10/19 (52.6%) patients were on a ventilator. The most common intervention performed in 13/19 (68.4%) was to open the blinds. 9/19 patients were never in a room with a window.

Conclusion: This study is currently ongoing. Preliminary results show the CAM-ICU does improve recognition of delirium in patients. Currently it shows that white males >65 who have respiratory failure requiring ventilation have a high incidence of delirium as well as patients with a history of substance abuse.

Keywords: critical-care, delirium, CAM-ICU, Intensive care unit

Publication Trends of Urology Medical Students, Residents, and Beyond

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In urology, research is critical to the advancement of evidence-based patient care, and to sustain such advancements, a critical need exists to develop urologists who are competent to perform research and subsequently move on to perform independent research. Currently, the Accreditation Council for Graduate Medical Education requires scholarly activity for both faculty and residents. Little, however, is known about the extent of engagement of urology residents to participate in research at various stages of their training. Our study addresses this knowledge gap. In this study, we used Doximity to derive a list of all urology residency programs, and from this list, we obtained a random sample of 50 programs. We first searched the websites of the urology programs to determine whether residents were listed by name on them, and if so, we extracted this information for all residents for the years 2013, 2014, and 2015. If such information was not available on program websites, we contacted program directors by email to request this information. We then used SCOPUS, PubMed, and Google Scholar to gather the publications from each resident, which was done by two authors in a duplicate blinded fashion. Here, we present an interim analysis of our findings while we continue with data collection.Of the 50 programs, 23 are included in our final sample, which included 156 residents. Collectively, residents produced 1888 publications. The mean number of publications for residents, stratified by stage of training, are as follows: 1.1 (SD =2.3) before residency, 4.5 (SD=4.5) during residency, and 6.6 (SD=9.2) after residency. Since research training and participation during residency may be critical to producing urologists who move the field forward by testing novel therapeutics, efforts are needed to derive additional strategies that can be used to encourage residents to continue research engagement beyond their training.

Keywords: Urology, Residency Programs, Publications

Gender Differences in Serial Homicide

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Background: Serial homicide is a topic of great interest both in popular culture and academics. There has been an abundance of research conducted on the matter from a plethora of perspectives all of which have provided valuable data for progress in the fields of Psychiatry and Forensics. However, there has been limited study on the differences between male and female serial killers. The purpose of this study is to identify variable trends between male and female serial homicide offenders. Data used for this study was extracted from the Radford/Florida Gulf Coast University Serial Killer Database. The database has a total of 2,870 serial killer entries with victim entries totaling 9,064.

Methods: Data extraction was conducted using Microsoft Excel and included information related to serial killer individuals and teams, name, date of birth, sex, sexual preference, number of victims, and race. For every serial killer, the corresponding victim profiles were entered, in chronological order, by date of attack. The following information was extracted from victim profiles: Name, Date of Attack, Age, Sex, Race, Target, Weapon, Method of Kill, and Treatment. With the data properly filtered and sorted based on timeline, we created separate data sets for male (1,044) and female (71) subjects who committed their murders individually. For each set, we calculated the percentage of subjects within each race (White, Black, Hispanic) and sexual preference (Heterosexual, Homosexual, Bisexual). For the victims of each subject, we calculated the percentages of all first victims, second victims, and so on, based on the following demographics: Age, Sex, Race, Target, Weapon, Method of Kill, and Treatment. Once these percentages were calculated for each victim, the average was taken calculated across all victims.

Results: Both male and female serial killers show steady escalation with victims 1-4 and then de-escalate between 4 and 5 with escalation returning between victims 5-7 and de-escalating again between 7 and 8. Differences were identified in male and female serial killers in victim selection, weapon of choice, method of kill and treatment of victims.

Conclusion: Our study was successful in identifying areas of notable similarity and difference in male and female offenders. However, even with access to the RFGCU Database, there is still a great deal of data to be gathered and analyzed on the subject of serial homicide, specifically in gender comparison. The identified trends provide a basis for potential areas of in-depth Psychiatric and Forensic research on gender differences in serial homicide offenders.

Key Words: Serial homicide, Gender, RFGCU database

Evaluation of Firefighter's functional movement

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According to previous research, firefighters have a higher rate of being overweight, or obese, than the general population. these higher risk predict mortality, morbidity, short and long medical costs. Various programs in conjunction with acute care will allow for athletic trainers to utilize a variety of skills and improve the quality of health care provided for firefighters while reducing the fiscal bottom line.

Firefighters who exercise regularly on-duty were found to have nearly half the odds of suffering a non-exercise-related injury compared with those who do not regularly on duty. One-third of the injuries reported among firefighters was the result of physical training or exercise, which are the most common sprains and strains.

Keywords: firefighters, sprains and strains, exercises, healthcare

Evaluation of Osteopathic Manipulation in Newborns with Latching Difficulties

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Background: Breastfeeding is the recommended source of feeding for infants during the first year of life by the American Academy of Pediatrics. There are multiple benefits to breastfeeding, yet less than 50% of mothers continue to breastfeed past 2 months of life in the United States. Many report unsuccessful breastfeeding due to difficulties with latch. The LATCH scoring system is a widely accepted standard assessment of latching and breastfeeding, and is predictive of exclusive breastfeeding at hospital discharge, with scores 9 or greater.

Hypothesis: We hypothesize heathy term newborn infants with LATCH scores 7 or less receiving 1 Osteopathic Manipulative Medicine (OMM) treatment within the first 24 hours of life, in comparison to those receiving standard newborn care or sham treatment, will have a LATCH score 9 or greater after treatment.

Methods: Double-blinded randomized control study of 7 heathy term newborn infants with LATCH scores of 7 or less, who were randomized into 3 groups: OMM treatment, a sham treatment, or no treatment. Lactation-trained nurses, blinded to treatment group, performed LATCH scores prior to intervention and upon the next feeding following intervention. Those with OMM were treated only once for 15 – 20 minutes with standardized OMM protocol. Soft touch was provided to the sham group by rocking/holding the infant for 15 – 20 minutes. The no treatment group was not touched.

Results: All infants in the treatment group had a latch score of 9 or greater after treatment, whereas all other infants had a score of 8 or less.

Conclusion: This study provides initial data showing infants receiving OMM have better LATCH scores. Future studies with larger sample sizes should be performed for more conclusive and statistically significant data.

Keywords: Newborn, breastfeeding, LATCH

Single Nucleotide Polymorphisms in Touch DNA

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It is widely known that DNA can be recovered from body fluids such as blood, semen, and saliva. All of which are commonly encountered at crime scenes. In fact, it is often this type of evidence that leads to the perpetrator of a crime being caught. However, it is a lesser-known fact that DNA can also be recovered from skin cells left behind on an object that a person has handled or touched. This type of DNA is known as touch DNA, and can be useful in cases involving items such as bullets or shell casings that a perpetrator may have handled before firing from a gun and leaving behind at the scene.

The issue with touch DNA is that very small amounts of it can typically be recovered. The STR typing method that is commonly used to produce a suspect profile is not sensitive enough to detect these minute amounts of DNA so that a useful profile can be produced. We aim to explore the idea of SNP genotyping in touch DNA. While SNP genotyping is not as discriminatory a method as STR typing in terms of being able to exclude or include an individual as being the source of a given DNA sample, it is a more sensitive method. SNP typing holds promise in the forensic field for being able to obtain valuable information in a case through the analysis of touch DNA left on objects at a crime scene.

Keywords: SNPs, Touch DNA, Genotyping, Crime Scene

Publication and Research Trends Among Neurological Residents

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Research is a critical aspect of residency training, but many programs lack a robust research component in their curriculum. Research publications are one way that physicians can advance their career in academic medicine, and the number of publications is often used as a criterion for determining suitable fellowship applicants. In this study, we evaluate the relationship between publications during and after residency in the field of neurology as well as analyze the relationship between number of publications and characteristics such as gender and career path. We randomly selected 50 ACGME Neurology residency programs from across the United States and recorded the number of publications, h-index, gender, fellowship choice, and career path for each graduate between 2013-2015. Each publication was sorted into time frames before residency, during residency, and after residency. The study included a total of 379 neurology residents from 25 different residency programs. Residents who pursued academic medicine had a significantly higher mean total publications (M = 10.1, SD 16.4) than those who pursued private practice (M = 4.2, SD 9.0) (t377 =-4.5, p <0.000). The mean total publications for male residents (M = 8.6, SD 16.5) was significantly higher than female residents (M = 4.1, SD 5.6) (t377 =-3.6, p <0.0002). Pearson correlation also revealed a correlation between publications during residency and publications after residency, with a Pearson product moment correlation of 0.61. The positive correlation between number of publications during residency and publications after residency, demonstrates the importance of implementing strong research principles and practice in a residency's curriculum. We also report a higher number of mean total publications by those who pursued academic medicine than those who pursued private practice. In addition, the results show an underrepresentation of females in neurology research, indicating a need to encourage more females to engage in neurology research and possibly STEM fields in general at an earlier stage in their educational career.

Keywords: Neurology, residency, research, publications

An Analysis of Publication Trends in Orthopedic Residents in Relation to Academic Achievement Post-Graduation

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Background: Continuing Medical Education (CME) is an essential component of physician's careers. For many years the Accreditation Council for Graduate Medical Education (ACGME) has required residency programs to promote scholarly activity to obtain and retain accreditation. Many programs interpret this to mean promoting research amongst their members. Encouraging students to publish during residency is believed to promote research throughout their careers, but little information has been collected and analyzed to verify this assumption. This study was undertaken to determine if publishing in peer reviewed journals during orthopedic residencies was an indicator of continued academic achievement post-graduation.

Methods: We examined whether research outcomes during orthopedic residencies indicated academic advancement and continual research. We identified 201 orthopedic residency programs and randomly selected 50 credible programs to include. Of the 298 graduates, we recorded the number of peer-reviewed publications, H-index score, fellowship program and if the graduate is currently working in private practice or an academic setting.

Results: We included 201 orthopedic residency programs in our sample, of those 50 programs were included. A total of 25 (50%) programs provided graduate rosters for 298 residents. Thirty-seven residents (12.5%) had zero publications, 213 residents (80.0%) had 1-5 publications, 36 residents (12.2%) had 6-10 publications, 5 residents (1.7%) had 11-15 publications, 2 residents (0.66%) had 21-25 publications and 3 residents (1.0%) had 26-30 publications. Sixty-eight graduates (of 298, 22.8%) pursed academia and 276 (of 298, 92.6%) pursed a fellowship.

Summary: The results indicate the vast majority of orthopedic residents published in peer reviewed journals complete fellowships. Though over 90% of residents actively pursued research during their medical instruction, less than a quarter chose to pursue academic medicine after completing their residencies. While not many students continued on to teach, nearly three quarters published after completing their programs. Encouraging publications during medical education does appear to promote further academic achievement after graduation, though more commonly as continued research not necessarily institutional academia.

Keywords: academia, publications, residents

The Effects of Low-Intensity Blood Flow Restriction Training vs. No Blood Flow Restriction Training on Measures of Aerobic Capacity in Physically Active Individuals

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Background: Blood flow restriction (BFR) training has become an extremely popular training method over the years. Improvements in measures of aerobic capacity (such as VO2max) are crucial for individuals whom seek to be physically active for longer periods of time. Recent studies have focused on the combination of BFR and aerobic exercise at lower training intensities as an adapted training method for either maintaining or improving measures of aerobic capacity in physically active individuals.

Clinical Question: In physically active individuals, is low-intensity blood flow restriction training more effective than no blood flow restriction training at improving measures of aerobic capacity?

Methods: A computer-assisted literature search of PubMed, MEDLINE, SPORTDiscus, and EBSCOHost databases (from inception to November 2019) was utilized to identify studies of level 3 evidence or higher that assessed the effect of low-intensity BFR training versus no BFR training on measures of aerobic capacity in physically active individuals. The main outcomes of interest were either pre-post testing assessments of aerobic fitness (such as VO2max or VO2peak) and/or pre-post testing assessments of aerobic performance (such as time to exhaustion).

Summary of Key Findings: The search strategy revealed 4 studies that met the inclusion criteria. One study reported that there were no significant improvements in measures of aerobic capacity when using low-intensity BFR training versus not using BFR training (1.96%, p < 0.05), while two studies reported that there in fact were significant improvements in measures of aerobic capacity (VO2max: 6.5%, p < 0.05 and TTE: 15.4%, p < 0.01; VO2max: +9.1± 6.2%, P < 0.001). One study reported that there were significant improvements in aerobic capacity when using low-intensity BFR training versus low-intensity training without BFR (BFR group: 5.6 ± 4.2%, P = 0.006, ES = 0.33; LOW group: 0.4 ± 4.7%, P = 0.75); however, high-intensity training without BFR showed greater improvements in aerobic capacity when compared to low-intensity training with BFR (HIT group: 9.2 ± 6.5%, P = 0.002, ES = 0.9).

Clinical Bottom Line: There is moderate evidence to support the use of low-intensity BFR training to improve aerobic capacity in physically active individuals.

Strength of Recommendation: Grade B evidence exists that low-intensity BFR training is more effective than no BFR training at improving measures of aerobic capacity in physically active individuals.

Keywords: low-intensity, blood flow restriction, BFR, training, aerobic capacity

A quality improvement approach to improve assessment and responsiveness to food insecurity

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Background: Access to nutritious food is essential to foster optimal health and development in children. Thus, the American Academy of Pediatrics recommends pediatricians routinely screen for food insecurity (FI). Previous initiatives within the OSU Pediatric Clinic sought to improve FI screening and intervention with varying degrees of success. Notably, rates of FI varied widely as studies used different validated screening tools and methods of assessment. The purpose of this project was to refine workflow, using a multistep quality improvement process, to more accurately assess for and appropriately respond to FI.

Methods: Dr. Nguyen lead a working group through a series of Plan, Do, Study, Act cycles to assess and then refine existing FI screening and intervention protocol. Cycle 1: Conducted semi-structured interviews of key champions within the OSU Pediatric Clinic to elicit feedback regarding existing FI protocol. Cycle 2: Administered anonymous survey, developed based on feedback obtained in cycle 1, to all clinical staff and providers within the OSU Pediatric Clinic to elicit additional feedback regarding existing FI protocol. Cycle 3: Trained providers and staff on newly implemented FI protocol, designed based on feedback obtained in cycles 1 and 2.

Results: Cycle 1: Semi-structured interviews of key stakeholders yielded a common theme regarding food insecurity- the stigma behind admitting struggling with providing food. Cycle 2: Anonymous survey with pediatric faculty confirms food insecurity stigma. Additional findings noted a desire for further training about FI, FI assessment and FI interventions. Cycle 3: Development of new workflow and training based on results of cycles 1 and 2.

Conclusion: Results of previous FI studies and QI projects within the OSU Pediatric Clinic noted discrepancies in FI rates depending on the method of screening and tools used. This necessitated further study. It was felt that using a combination of qualitative and quantitative data within a QI framework would better inform needed changes to workflow and training related to FI screening and intervention.

To de-stigmatize the concept of being food insecure, posters with facts regarding the current rate and adverse effects of FI were posted in clinic in hopes of normalizing FI screening for both patients and staff. Further, staff and providers were given fast facts and common scripts to communicate with patients about FI as well as in-service training.

To sustain staff and provider knowledge and comfort with regard to FI assessment and intervention, each member of the healthcare team should have yearly training in FI and all new members should have training upon hire. FI rates should be reassessed in one year to assess consistency with reported norms for this population.

Keywords: Food insecurity, quality improvement, pediatrics

Role of Outer Membrane Impermeability in Psuedomonas aeruginosa Resistance to Liptin D7

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BACKGROUND: Pseudomonas aeruginosa is an opportunistic pathogen that is intrinsically resistant to hydrophobic molecules, yet is susceptive to chemical sensitization by low concentrations of the biocide triclosan using the outer membrane permeabilizer compound 48/80. In order to obtain a better understanding of these properties in P. aeruginosa, it was decided to examine disparate hydrophobic substances thought to also possess antibacterial potential. Researchers working with Dr. Dennis Burns at Wichita State University have recently synthesized and characterized a novel class of picket porphyrins (liptins) and showed them to have antibacterial properties in previous studies.

METHODS: Minimal inhibitory concentrations (MICs) were determined for a model liptin molecule (d7) using a conventional macro-broth dilution bioassay. Pasteurella multocida was included as a reference organism because of its permeable outer membrane. The next steps would have been to repeat the analysis in the presence of outer membrane permeabilizer compound 48/80, as well as to perform disc agar diffusion assays to eliminate possible bactericidal interference by the solvent.

RESULTS: The liptin d7 did not readily dissolve in absolute ethanol, thereby resulting in a turbid suspension at concentrations necessary for this study. P. aeruginosa and P. multocida were both found to be resistant to liptin d7 with MICs of 32 and 64 μg/mL, respectively.

CONCLUSION: Because the MICs were so high, especially with respect to P. multocida which was expected to be susceptible, both organisms were deemed liptin d7 resistant. We were subsequently informed by our collaborators that the liptin derivative sent to us may have been incorrectly labeled and was in fact a less soluble and less inhibitory derivative than the intended liptin d7. This halted further study of the compound due to an inability to obtain the more soluble active form to perform the analyses.

Key words: Liptin, Macro-broth dilution bioassay, Susceptibility

Antibiotic prescriptions upon hospital discharge: a blind spot of antimicrobial stewardship

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Background: Transitions of care are a known source of patient vulnerability. The incidence of medication errors during transitions of care is well-documented.1 Discharge from the hospital has proven to be one area where antimicrobial stewardship is absent or lacking and can result in: poor clinical outcomes, adverse drug events, and emergence of multidrug resistant organisms. In one study, 53% of cases reviewed found antibiotics prescribed at discharge were inappropriate.1 Large discrepancies exist between guideline recommendations and antimicrobials prescribed upon hospital discharge.2 At this time, no prior study at OSU Medical Center has analyzed the impact of antimicrobial stewardship at hospital discharge.

Methods: This study will be a retrospective chart review based on a report of patients age 18 years and older discharged from OSUMC from 7/1/2018 to 6/30/2019 with CAP or uncomplicated UTI. This data will be used to determine whether optimal antibiotic therapy was prescribed upon hospital discharge. Optimal therapy is defined as: prescription in accordance with nationally-approved guidelines for the management of CAP and UTI; effective and narrowest spectrum of activity; correct dose for indication, organ dysfunction, and medication allergies; and correct duration of therapy. This study will also the assess antibiotic classes most frequently involved in errors, as well as the most commonly occurring types of errors (incorrect drug, dose, or duration). Patients with multiple types of infection will be excluded from the study. Data collected will be organized and evaluated using REDCap™. The following data will be obtained: date of discharge, days of optimal inpatient antibiotic therapy, discharge antibiotics regimen, infection type (CAP vs. uncomplicated UTI), pertinent laboratory and microbiology data, and bacteria cultured with source and date results finalized.

Results: Data collection is still ongoing. At this time, 1402 patient charts have been reviewed, and 168 patient charts met inclusion criteria. Of those included, patients were primarily female (63%) with an average age of 62 (range 21-95), and 43% were discharged on a suboptimal antibiotic regimen. The most common reason for a suboptimal regimen was an inappropriate duration of therapy (92%) followed by an incorrect medication dose (26%).

Conclusions: At the time of this writing, duration of therapy far outweighs any other cause for a suboptimal discharge antibiotic regimen. By completing this study, we hope to gain more insight into how we can better serve our institution by educating physicians, reducing errors, and optimizing transitions of care.

Keywords: transitions of care, antimicrobial stewardship, discharge antibiotics

Qualitative proteomic analysis of Chlamydomonas wild-type and long flagella mutant reveals differential expression

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Background: Cilia and flagella are highly conserved organelles essential for normal health and development. The molecular mechanisms that regulate their assembly state, however, remain largely unknown. In Chlamydomonas, mutations in any of five long flagella (lf) genes result in cells that assemble flagella that are more than twice the length of wild-type cells. To learn more about the role of one of these genes, LF4, which encodes a MAP kinase, we used a phenotypic analysis along with a global proteomic approach to identify differentially expressed proteins in the flagella and cell bodies of lf4 and wild-type cells.

Methods: To examine cell body volumes, cells were fixed with an equal volume of 1% glutaraldehyde and examined by phase contrast microscopy. Cell volume was determined with the following equation (4/3□[length/2][width/2]2). Quantitative LC-MS/MS was performed on equal amounts of protein from purified cell bodies and flagella. Resulting data was analyzed using MaxQuant (Version 1.5.2.8) and Perseus (version 1.5.5.3)

Results: Microscopic analysis of lf4 and wild-type cells revealed a significant increase in size of lf4 cell bodies compared to wild-type cells. Analysis of the quantitative LC-MS/MS spectra identified 1,313 proteins from cell bodies and 692 proteins from flagella. We found that 66% of the total proteins identified were common between lf4 and wild-type cells. We found that 11% of flagellar proteins and 12% of cell body proteins were differentially expressed in lf4 and wild-type cells. Enrichment analysis revealed that proteins involved in protein synthesis, translation and ribosomal biogenesis were decreased in lf4 cell bodies. An increased expression was seen for proteins involved in energy production in lf4 cell bodies compared to wild-type. Analysis of the flagellar proteome revealed increased expression for proteins involved in signal transduction and proteinases in lf4 while wild-type flagella had higher levels of expression for proteins associated with the negative regulation of transcription and metabolism.

Conclusions: The observation that lf4 cell bodies are larger than wild-type cells suggest that regulation of both flagellar length and cell body size are impaired. This could indicate that LF4 not only regulates flagellar length (or assembly state) but is also part of a signaling pathway controlling cell size and growth. The decreased expression for proteins involved in protein synthesis and ribosomal biogenesis in lf4 are surprising given the increased length of flagella and increase in cell body size. The increase in protein levels for proteins involved in energy production could reflect an increased energy requirement necessary for flagellar motility with the lf4 flagella.

Keywords: proteomic, Chlamydomonas, flagella, size control

Retained Placental Products with Concern for Placenta Accreta: A Case Report

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We present an unusual case of retained placental products with concern for placenta accreta six weeks following a spontaneous vaginal delivery in a primiparous woman. A 19-year-old female presented to us as a transfer of care secondary to vaginal bleeding six weeks following her delivery. Imaging at outlying facility revealed retained placental products with concern for possible accreta as well as a possible mullein anomaly. She also reported a suction dilation and curettage immediately following her delivery as well as a subsequent suction dilation and curettage two weeks after the initial. Abdominal imaging revealed retained placental products with concern for placenta accreta due to her clinical situation. The patient was given a single dose of methotrexate. This treatment regimen was successful in helping the patient pass the remaining products of conception without invasive surgery or surgical loss of fertility. Retained placenta with imaging concerning for placenta accreta in the setting of a primiparous women is a clinical oddity and is often associated with definitive surgical treatment via a hysterectomy. This case report reveals less invasive and fertility sparing option which may be appropriate for certain patients.

Keywords: Placenta, Accreta, Retained, products, Methotrexate

Manus morphology of an extraordinarily large proboscidean from the Gray Fossil Site of eastern Tennessee, with comparison to Sauropod modifications based on gigantism

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Beginning in the fall of 2015, excavations at the Mio-Pliocene aged Gray Fossil Site (eastern, TN, USA) yielded a nearly complete skeleton of an unknown mastodon-like proboscidean. Morphology and initial mass estimates suggested that the specimen could not be easily classified within pre-existing taxa; hence, a detailed description was warranted for alpha taxonomy. Among the elements recovered thus far is a complete left manus, described here and compared to other large proboscidean taxa (both extinct and extant), and other non-mammalian giants (i.e. sauropods). With additional recovered elements and different allometric equations, body mass was calculated to approximately 19 tons, making it one of the largest land mammals ever. Descriptions and measurements of the manus were compared to the proboscideans: Mammut americana, Mammuthus columbi, Amebelodon britti, and Loxodonta africana. Observations show variability of the carpals and metacarpals of the Gray specimen compared to those of Mammut americana and Loxodonta africana. Articular facets show a mosaic of areas that have less mobility whereas others have more mobility than in other proboscideans. Compared to the two recently aforementioned proboscideans, the trapezoid is more angular; the trapezium has two medial facets instead of four; and the first metacarpal has the phalange and sesamoid facets oriented obliquely to the dorsal facet. Such differences may correspond to size, aiding in stability and support of large body masses. No terrestrial vertebrate taxa, especially within Mammalia, are close in size, but the superficial size similarity of sauropods with large proboscideans, along with their similar fat pad and foot structure make them ideal for comparisons. If large proboscideans exhibit manus modifications, it is suspected that giant sauropods like Brachiosaurus and Argentinosaurus would have similar structural modifications resulting in convergence in these unrelated taxa. Though proboscideans do not reach the body masses of the largest sauropods, it is possible that there are modifications unique to the lineages, such as proboscideans exhibiting locking sesamoids and sauropods displaying splayed metacarpals.

Keywords: Mastodon, Sauropod, Manus, Gigantism

Scholarly Research Productivity Among Otolaryngology Residents, Fellows, and Graduates and Its Relationship to Future Academic Achievement

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Background: The Accreditation Council for Graduate Medical Education (ACGME) requires that all residencies participate in research. This growing emphasis on research during residency has made it increasingly important for medical students to gain familiarity with the basic principles of research before beginning residency training. Thus, our goal is to determine if an association exists between publication rates before, during, or after otolaryngology residency training and whether publication efforts may predict future academic achievement. If such an association exists, perhaps otolaryngology residency program directors and education policymakers could use it as a predictive tool to screen future applicants.

Methods: In this cross-sectional analysis, we selected a random sample of 50 otolaryngology residency programs listed on Doximity. From these programs, we assembled a list of graduating residents from 2013, 2014, and 2015. Using SCOPUS, PubMed, and Google Scholar, a list of publications for each graduate was compiled and data were extracted in an independent, double-blinded fashion by two investigators.

Results: Of the 50 randomly selected otolaryngology residency programs included in this analysis, 27 (54%) programs representing 207 residents were included. Before residency, graduates published a mean of 0.7 (SD=2.3) articles and a mean of 0.2 (SD=0.8) first author publications. During residency, graduates published a mean of 4.1 (SD=5.0) articles and a mean of 2.2 (SD=3.2) first author publications. After residency, graduates published a mean of 5.4 (SD= 9.6) articles and a mean of 1.8 (SD=2.8) first author publications. Residents who pursued a fellowship had more publications (t205=-5.5, p <.001) and more first author publications (t205=-5.3, p <.001) than residents who did not pursue fellowship training. Residents who chose careers in academic medicine had a higher number of mean total publications (t205=-7.2, p <.001) and first author publications ((t205=-7.0, p <.001) than those in private practice.

Conclusion: Otolaryngology residency graduates are actively involved in research opportunities throughout their medical training. Research productivity significantly correlated with future fellowship training, the pursuit of an academic career, and overall h-index. Residents who published more research were more likely to enter fellowship training and academic careers. Our results indicate that promoting greater physician involvement in the research process may strengthen confidence in the interpretation and application of research findings and ultimately lead to future academic success.

Keywords: residents, publications, H-index, otolaryngology, education

Public Awareness of the National Suicide Prevention Lifeline Following the Release of a Hip Hop Song

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Suicide is a leading cause of death within the United states and rising rates of suicide observed in recent years puts itself at the forefront of public health issues. This study's purpose was to measure the effects on the public engagement and awareness following the release of hip-hop artist Logic's song titled after a suicide prevention hotline. Surrounding the release of the song, data was obtained from Google Trends using search terms related to suicide hotline and Twitter data was obtained using Sprout Social concerning tweets mentioning suicide hotline as well as tweets directed towards the National Suicide Prevention lifeline (NSPL) twitter account. Greater than percentages were calculated using an autoregressive integrated moving algorithm (ARIMA). Results showed that Google searches for Suicide Hotline and 1-800-273-855 increased greater than expected for the day and month following the release of the song. Twitter activity directed towards the NSPL twitter account and tweets mentioning 1-800-273-855 increased greater than expected for the day and month following the release of the song. The highest reported number of calls to the NSPL both came on the day of the release of Logic's song, as well as after a live performance of the song at the 2017 Video Music Awards. This data fits into a well-established trend of the influential capability of the media and celebrities concerning views of suicide in the public. Suicide is a complex issue and as seen with research surrounding Netflix's 13 Reasons Why there can be negative consequences in which suicide and suicidal ideation can increase following depictions in the media. Logic's song proves be an example of a positive influence on public health and provides support for further development and standards for proper awareness of suicide in the public view.

Keywords: Logic; hotline; suicide; Google Trends; public health

Augmenting Medical Neuroanatomy Cadaveric Dissection with DiceCT Imaging

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Brain and central nervous system dissections are highly beneficial for medical education; however, the process is destructive and leaves little reference material for the future studying of neuroanatomy. In this project, we utilized diffusible iodine-based contrast-enhanced micro-computed tomography (diceCT) to generate a high-resolution, 3D digital library of central nervous system scans which can be referenced for future classes and studies. DiceCT, compared to non-contrast enhanced CT, provides a tissue differentiation closer to magnetic resonance imaging (MRI) by making soft tissues radiodense. Imaging studies like these provide students with extra resources of neuroanatomical scans to study unique pathologies and anatomical structure variation. To establish the best method for incorporating diceCT imaging into the curriculum, formalin-preserved whole brains were stained using various concentrations of iodine (3, 4, and 5% aqueous I2KI) for 3 weeks. The iodine solutions were replenished at the end of one and two weeks. After iodine staining, specimens were micro-CT scanned at 63-micron resolution. The image stack was then imported into Avizo version 2019.2.

The stained brains were then bisected, with one hemisphere being de-stained for 4 weeks, a process accomplished through alternating 1% sodium thiosulfate and deionized water baths at week-long increments. This method was successful in removing all concentrations of iodine. Comparative dissections between the never-stained, stained, and then de-stained and stained brains were then performed. This was followed by digital dissections of each iodine concentration. The physical dissection yielded few advantages with regard to the stained brain: although the stained brain did enhance some fiber tracts, the structures were smaller due to water extraction by the saline staining solution, troublesome to manipulate, and more challenging in terms of identifying the subcortical structures because of their smaller size. The never-stained and de-stained brains were similar during manual dissection, as the de-stained brain recovered a substantial amount of its initial volume. With digital dissection, the 5% I2KI brain provided the best resolution and clearest distinction between structures, and pathologies such as age-related atrophy were evident. The process of digital dissection not only leaves behind a permanent imaging library for the study of the nervous system, but it also allows for the 3D printing of these digital brain regions. Therefore, we recommend—alongside manual dissection—the incorporation of tissue staining, tomography, and de-staining, which can be rapid and inexpensive, to enhance participation and clinical foundations in Anatomy.

Keywords: diceCT, MRI, neuroanatomy, and medical education

An Analysis of Publication Trends and Its Relationship with Academic Success Among Dermatology Residents and Fellows

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Background: Exposure to academic research is regarded as a meaningful component of medical training. Despite the importance placed on research activities, little is known regarding the extent to which dermatology residents and fellows participate in research. Thus, we sought to determine if research productivity during residency and fellowship training predicted future research and academic success.

Methods: We assessed whether research productivity during residency predicted future research and academic success. We searched for names of graduates from a random sample of 50 reputable dermatology programs. For each of the 202 graduates included, we determined the number of peer-reviewed publications (published before, during, and after residency), the total number of first authored peer-reviewed publications, H-index score, fellowship program, and if the graduate is currently working in a private or academic setting.

Results: One hundred dermatology residency programs were identified, for which 50 were included in our sample. Graduate rosters were available for 16 programs (32%) with a total 202 residents. The majority of graduates had 1-5 publications (94/202, 46.5%), with 28/202 (13.8%) having 0 publications and 8/202 (3.96%) having >30 publications. The average number of publications prior to residency was 0.98, 3.33 during residency, and 3.39 after residency. Overall, the average number of total publications per resident was 7.71. Greater than one-half of first-authored publications were completed during residency (347/635, 54.6%). Lastly, one-third of graduates (68/202, 33.6%) elected to pursue a fellowship, and 66 graduates (of 202, 32.6%) chose to pursue a career in academia after completion of residency training.

Conclusion: Our results demonstrate that graduates of dermatology residency and fellowship programs are actively involved in research opportunities throughout their medical training. The value placed on research during dermatology training appears to carry with graduates into their postgraduate career, accounting for the continued research productivity after residency. We emphasize the importance of active involvement in research during and after residency in an effort to equip training physicians with valuable skills in order to accurately interpret and apply research outcomes to better patient care.

Keywords: Publication, Trends, Dermatology, Success

Metabolic Hormones Associated with Weight Gain in OVX Rats: Effect of Voluntary Exercise

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Obesity is prevalent in the United States and is associated with a range of co-morbidities and increased health care costs. Much of the obesity research focuses on males; however, more women are obese compared to men (38.0% vs. 41.5%), with a further increase in obesity in postmenopausal women. Obesity is a multi-faceted disease that is difficult to manage. The most common recommendations involve diet and exercise. Our previous study showed female rats reliably gain weight after ovariectomy and weight gain asymptotes after ~3 weeks.

We expanded this study by initiating voluntary exercise at different times after ovariectomy and assessing the impact of exercise at various phases of weight gain, along with changes in circulating levels of the metabolic hormones, insulin and leptin. We predicted that weight gain in ovariectomized (OVX) rats and the associated peripheral hormones would be altered by the timing of exercise.

OVX rats had access to running wheels for three weeks beginning immediately (R-S) or three weeks after (S-R) ovariectomy. Body weight was assessed at weekly intervals for six weeks and circulating levels of insulin and leptin were assessed at the end of the six-week period using commercially available ELISA kits (Millipore; Rat/Mouse Insulin; EZRMI-13K and Rat Leptin; EZRL-83K) according to the manufacturer's instructions.

We found that the final body weight of the group that ran initially and then were switched to sedentary conditions (R-S) was greater than the S-R group that ran for three weeks after a 3-week sedentary period after ovariectomy. Weight change during the first week of running was significantly less than all other weeks for both groups. Specifically, the R-S group gained significantly less weight during their first week of running and the S-R group lost weight during the first week they had access to running wheels. The body weight of the R-S group increased steadily each week, while the S-R group gained weight that was significantly greater than the previous week for the first three weeks, but there were no increases after switching to running wheels. Finally, we found that circulating levels of leptin and insulin were significantly less in the S-R group.

Thus, it would appear that exercise has transient effects to slow post-ovariectomy weight gain, regardless of whether exercise was initiated immediately or after a three-week delay. These data suggest that some adaptation occurred that minimized weight loss as time went on, even as running increased. In addition, the transient effects on weight gain were associated with decreased circulating levels of leptin and insulin. In short, although a sedentary lifestyle contributes to obesity, changes in metabolic hormones may complicate its use as an exclusive weight loss strategy.

Keywords: obesity, leptin, insulin

Subsymptom Threshold Graded Aerobic Exercise for Adolescents with Acute Concussions: A Critically Appraised Topic

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Context: Concussions have been a prevalent in sports for many decades and more so in recent years due to the scrutiny and shock of the injury being misdiagnosed and improperly cared for in the recent decade. Since this increase in notoriety, concussion management has become a widely studied and debated topic. To date, the widely accepted and standard of care for this closed head injury is relative physical and mental rest until symptom free followed by a progressive exercise regimen designed to slow integrate the patient back into activity. Among these still developing management strategies is the use of subsymptom threshold graded aerobic exercise. What remains unclear is whether this type of exercise for the management of acute sport related concussions is effective in decreasing recovery time. Determining the effectiveness of this treatment will aid clinicians in providing the most effective and safe treatment for these tricky injuries. **Objective:** Does subsymptomatic threshold graded aerobic exercise decrease signs and symptoms when compared to rest in adolescent athletes with acute concussions? Data Sources: An electronic database search was conducted using Medline, PubMed, SportDiscus, Clinical Key, and Google Scholar. Hand searching was completed through existing reference lists. Search terms included adolescent athletes with acute concussions, aerobic exercise, rest, and decreasing severity of signs and symptoms. Study Selection: Studies were included if they included aerobic exercise as an intervention for an acute concussion, included adolescent patients (ages 10-19), included patients with and acute sports related concussion (0-10 days post-injury), were published after 2009, and measured symptom severity. Studies were excluded if they required purchase, were not in English, or were narrative articles. Data **Extraction:** Two quasi-experimental studies and two randomized controlled trials were identified and appraised according the 2011 Level of Evidence Scale and Strength of Recommendation from the CEBM. Data Synthesis: Three studies utilized subsymptomatic threshold graded aerobic exercise on either a treadmill or a cycle ergometer. One study compared strict rest with no activity for the initial 5 days post-injury versus normal activity. All studies utilized an adolescent population (ages 10-19). Two studies looked solely at males due to a lack of eligible female participants while the other two studies looked at both sexes. Results of all four studies found that the graded subsymtomatic aerobic exercise was effective in speeding the recovery of the participants when compared to rest. Consequently, subsymptom graded aerobic exercise may be beneficial for treating adolescents with acute sports related concussions. **Conclusions:** Evidence suggests that subsymptom graded aerobic exercise was effective in reducing the number and severity of concussion symptoms in adolescent athletes with acute concussions when compared to rest. The reduction of symptoms leads to a quicker recovery time in these patients; therefore, this treatment may be effective for treating adolescent patients with acute sports related concussions.
Strength of Recommendation: B

Keywords: Concussion, Aerobic Exercise, Recovery, Treatment, and Symptoms

Investigation of Stable Fluorescent Protein Expression in Lactobacilli

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Background: The mammalian gastrointestinal tract (GIT) is home to a highly complex community of microorganisms. Lactobacilli are considered an important component of the gut microbiota because of their potentially beneficial (probiotic) effects on the host organism. In order to be able to track the in vivo location of these bacteria in the GIT, we have begun to label Lactobacillus strains with fluorescent proteins expressed from plasmids. Some of these transformed strains remained fluorescent without plasmid selection, indicating that fluorescent protein genes might have stably integrated in the bacterial genome. Such strains could be used for in vivo detection in the GIT in the absence of antibiotic selection.

Methods: Growth over several generations without selection was used to confirm stable mCherry fluorescent protein expression. Genomic DNA of the bacteria was isolated to identify plasmid integration sites by restriction fragment self-ligation followed by inverse PCR or cloning. Quantitative PCR was employed to determine mCherry gene copy numbers in the genomes of stable transformants and also in fecal DNA from prairie voles that had received the fluorescently-tagged lactobacilli in drinking water.

Results: Several attempts of integration site localization using different restriction enzymes followed by cloning and inverse PCR were unsuccessful. Therefore, sequencing libraries for whole genome sequencing of a stable mCherry transformants and the isogenic control were prepared. Absolute quantitation of mCherry gene copy numbers by qPCR revealed that multiple mCherry gene copies were present in the genomes of transformants. Quantitative PCR also allowed for detection of the bacteria in fecal material of voles.

Conclusion: While we were not successful in identifying gene integration sites, quantitative detection of mCherry genes was possible and can now be used for tracking the location of lactobacilli in the GIT. Generation of additional tagged strains with different markers will aid in the characterization of bacterial communities and their functions in the GIT.

Keywords: Lactobacillus, mCherry, quantitative PCR, microbiome

Assessing Residents' Competency in Performing Lumbar Punctures

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Background: Lumbar puncture (LP) is an important procedural skill for residents to acquire. LPs done by the inexperienced physician, may result in a failed or traumatic tap, resulting in equivocal interpretation. Traditionally, residents learned procedures through observing a senior resident/attending and then attempting themselves, referred to as the see one, do one, teach one method. However, there has been little research to support this method of learning. Numerous studies show that simulation-based training has a positive impact on clinical learning (1). In this retrospective chart review, we will determine the number of failed and traumatic LPs that were performed over a year at our residency training facility, prior to implementing simulation training.

Method: Analysis of LPs performed from 07/01/2017 to 06/30/18 was done. A total of 29 residents (PGY-1: 9, PGY-2: 12, PGY-3: 8) and 52 total LPs performed during this time. Six LPs were excluded because they were not performed by a pediatric resident, thus 46 LPs were analyzed. The following data was obtained: age of patient, indication for LP, PGY level, space of needle insertion, use of conscious sedation or lidocaine, number of attempts made, and CSF RBC count. Fisher's Exact Test was used for data analysis.

Results: Of the 46 LPs that were reviewed (average of 1.6 procedure/resident), 31 (68%) procedures were performed by PGY-1 residents, 11 (25%) by PGY-2 and 3 (7%) by PGY-3. Ten (22%) LPs were uninterpretable. Out of those, 4 failed (no CSF) and 6 were traumatic (>400 RBCs). Of the 4 failed LPs, half were performed by PGY-1, with 6% incidence and half were performed by PGY-2 with 18% incidence (p-value 0.5). Of the 6 traumatic LPs, 4 were performed by PGY-1 with a 16% incidence and 2 were performed by PGY-2 with 28% incidence (p-value 0.6). PGY-3 residents had zero failed and traumatic LPs. Twenty-four LPs were performed at the L3-L4 space and 22 at the L4-L5 space. All failed LPs occurred at the L4-L5 space (p-value 0.04). Traumatic LPs occurred exclusively in age group 0-2 years (p-value 0.3), the age group in which the most LPs were performed (n=36). The most common indication for LP was fever in a neonate (n=10). 15/46 (33%) LPs were done with conscious sedation and/or lidocaine and did not correlate with reduction in failed or traumatic LPs.

Conclusion: This study shows very low average number of LPs performed per resident, with almost a quarter of procedures performed by PGY 1 and 2 residents which are uninterpretable due to failed or a traumatic LP. Failed LPs occurred exclusively at the L4-L5 space (p-value 0.04). All traumatic LPs occurred in age group 0-2 years, which could be due to a variety of reasons including high number of LPs occurring in the newborn period, smaller anatomical spaces, and increased activity during the procedure due to age. These results prompted the residency program to implement simulation lab training to learn LPs. Additional study is necessary to assess if number of traumatic and failed LPs decrease after implementation of simulation.

Keywords: lumbar puncture, pediatrics, simulation training

TORSADES DE POINTES AND THE CLASSIC SHORT-LONG-SHORT ACTIVATION SEQUENCE IN THE SETTING OF ATRIAL FIBRILLATION

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Torsades de pointes (TdP) is an ominous form of rapid polymorphic ventricular tachycardia occurring in the setting of QT prolongation that must be addressed immediately as it often leads to ventricular fibrillation. TdP is associated with many factors that prolong the QT interval, including hypokalemia, hypomagnesemia, hypocalcemia, drugs (antiemetics, antipsychotics, SSRI's, TCA's, macrolide and fluoroquinolone antibiotics) and congenital long QT syndrome. We present a case of TdP in the setting of electrolyte abnormalities and atrial fibrillation with a classic short-long-short (SLS) activation sequence on EKG prior to deteriorating into TdP.

An 88-year-old female with a history of atrial fibrillation and dementia presented to the emergency room with progressive weakness. Patient requires total care from her son at baseline. Her vitals were stable on arrival. Chemistry revealed hypokalemia, hypocalcemia, and hypomagnesemia which were contributed to poor appetite. Her troponin was elevated. Urinalysis revealed pyuria suggestive of urinary tract infection. Patient's EKG revealed atrial fibrillation and old left bundle brand block on arrival. She was given magnesium oxide and potassium chloride for electrolyte replacement.

Shortly thereafter, the patient was noted to have several episodes of non-sustained ventricular tachycardia. Multiple EKGs were performed and exhibited prolonged QTc greater than 500 ms. While in the emergency room, patient was noted to have seizure-like activity and found to be pulseless. The EKG during this period showed a run of atrial fibrillation that progressed to TdP after a SLS activation sequence. The patient required chest compressions, one round of epinephrine and defibrillation before achieving ROSC with spontaneous movement and breathing. She was admitted to ICU and received aggressive electrolyte replacement and non-QT prolonging antibiotic treatment for her urinary tract infection. Her home medication list was reviewed and trazadone was discontinued due to potential QTc prolongation. Her troponin was concluded to be type 2 myocardial infract in the setting of active infection and defibrillation. She did not have any additional arrhythmia throughout her hospital stay.

TdP is an uncommon but well recognized polymorphic ventricular tachycardia pattern that involves a twisting of the QRS complexes around the isoelectric line. In the setting of QTc prolongation, a SLS activation sequence has been observed to precede TdP. The sequence was theorized to promote heterogeneity of myocardial repolarization that creates potential reentry that results in TdP. Our case demonstrated another layer of arrhythmia as patient has underlying atrial fibrillation. The R-R variation in atrial fibrillation makes the widely used Bazett formula difficult to access QTc. Additionally, atrial fibrillation has been described in literature to be associated with TdP when treated with Class III antiarrhythmic for rhythm control. TdP occurring in atrial fibrillation in the absence of antiarrhythmic drugs is poorly understood. Prompt recognition of this life-threatening arrhythmia and prompt defibrillation to restore perfusion rhythm continues to be the cornerstone of treatment for an unstable patient with TdP. A careful history and medication reconciliation often guide prompt action to prevent future occurrence.

Keywords: Torsades, activation sequence, atrial fibrillation

Cytosolic aspartate aminotransferase: A potential therapeutic target for treating neurogenic inflammation

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Background: Most dorsal root ganglion (DRG) neurons are glutamatergic utilizing phosphate-activated glutaminase (GLS) and cytosolic aspartate aminotransferase (cAST) for the synthesis of the major excitatory neurotransmitter glutamate. Glutamate as neurotransmitter derives mainly from the glutamine-glutamate cycle via GLS. Our previous finding showed elevated levels of GLS in DRG neurons during peripheral inflammation. Although cAST can provide a net synthesis of glutamate, little is known about its precise functional role in sensory neurons during inflammation. In addition, the incomplete understanding of the interplay between GLS and cAST led us to investigate the expression of these enzymes in rats with genetically induced hypoglutamatergic tone (Heterozygous: GLS+/-). **Methods:** Heterozygosity of the GLS1+/− rats was verified by genotyping using a polymerase chain reaction. Antigen induced arthritis (AIA) was induced by injecting complete Freund's adjuvant (CFA) into the right hind paw of anesthetized, 8-10-week-old male WT and GLS+/- Sprague Dawley rats (200-300gm). L4 and L5 DRG were collected from control and AIA animals at 24 and 48 hours of inflammation. Messenger RNA and protein expression of cAST and GLS in DRG were determined by quantitative PCR and immunoblot techniques, respectively. **Result and Conclusion**: Our findings show an increase in the expression of cAST and GLS in the DRG of WT rats indicating a change in glutamate synthesis during peripheral inflammation. However, the change in expression of these enzymes in GLS+/- rats was less significant representing the probable interplay between GLS and cAST during peripheral inflammation.

Keywords: Cytosolic aspartate aminotransferase, Glutaminase, Glutamate, Inflammation.

Metabolic Inhibition of Glutamine Synthetase Alters Nociception

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Background: Glutamine Synthetase (GS) is an enzyme important for the degradation of neurotransmitter glutamate to glutamine. Satellite glial cells (SGCs) surround dorsal root ganglion (DRG) neurons and have been observed to contain abundant levels of GS. DRG neurons are known to alter concentrations of glutaminase (synthetic enzyme for neurotransmitter glutamate) during peripheral inflammation and subsequent sensitization, but potential complimentary alterations in GS levels are unknown. If GS or SGC function is disrupted, it may lead to aberrant pain processing and dysregulation of glutamate. The current study was undertaken to determine if GS mRNA and/or protein levels are altered in rat DRG during acute peripheral inflammation, as well as to determine any changes in pain processing that occur as a result of GS inhibition.

Methods: Peripheral inflammation was induced via injection of Complete Freund's Adjuvant (CFA) in right hindpaw of anesthetized, albino Sprague Dawley rats. Western blot, qPCR, and immunohistochemistry were performed to see expression profile of GS in DRG neurons at 24h and 48h. In addition, glutamate metabolic inhibitors were added to the peripheral injection under the same conditions and compared to CFA-only animals.

Results: mRNA and Protein results in experimental animals show GS levels increase at day one, and continue to increase further at day two. The increase in GS during acute inflammation is substantially attenuated in inhibition studies. DRG Immunofluorescence data are consistent with these results.

Conclusion: These data further our understanding of the glutamate/glutamine cycle and of the communication between SGC's and DRG neurons in relation to nociception and inflammation.

Keywords: Nociception; Pain; Inflammation; Glia; Glutamate

Short and Sweet: Effects of short-term sucrose intake on dopamine levels in 'reward' areas of the adolescent rat brain

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Background: In adults, dopamine may be released in the Prefrontal Cortex (PFC) and Nucleus Accumbens (NAC) when exposed to a natural reward like sucrose, similar to changes that occur with drugs of addiction. Adolescent brains undergo many critical developmental changes. During these changes, reward pathways could be more susceptible to environmental influences. Importantly, sucrose intake by adolescents is greater than by any other age group. Currently, it is unknown if chronic sucrose exposure during adolescence will alter reward pathways which may, in turn, predispose to drug addiction.

Objective: To assess the effect of adolescent exposure to a natural reward by measuring dopamine in the central nervous system reward pathway following sucrose access.

Methods: Adolescent Sprague-Dawley male rats received intermittent 2-hr sucrose access during 10 days starting at postnatal day 33; control adolescent rats received water. On postnatal day 44, all rats were terminated and brains were collected for ELISA immunoassay to measure dopamine (DA) and its metabolite, homovanillic acid (HVA), in the PFC and NAC.

Results: Rats consumed all of the sucrose that was available during the 2hr-period. Surprisingly, sucrose-exposed rats did not gain more weight compared to controls. DA levels in the PFC of sucrose-exposed rats were greater than those in control rats, while HVA levels did not change or decreased slightly. Similar to the results for the PFC, DA levels in sucrose-exposed rats tended to increase in the Nucleus Accumbens, while HVA levels did not change or decreased slightly.

Conclusion: These findings suggest increased release and/or transport of DA to the PFC and the NAC in adolescent rats with chronic intermittent access to sucrose. Thus, long-term sugar intake may alter activity in central reward pathways.

Keywords: sucrose intake, dopamine, adolescent brain

Impact of adolescent sucrose access on Neuronal Primary Cilia Expression in the Prefrontal Cortex and Nucleus Accumbens

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Introduction: Sugar is a natural stimulus that activates similar neural circuits involved in mediating reward. Sugar intake may lead to a sensitization of the reward system, changing the response to subsequent rewarding experiences. Neuronal primary cilia (NPC) are components of the neuron immediately related to changes in the neuronal environment. This function seems to be closely related to Dopamine effects, especially in the nucleus accumbens (Nacc) and prefrontal cortex (PFC). However, the effect of natural rewards on NPC has not been described. This study, therefore, will address the lack of information on the role of sugar intake, as a natural reward, in the morphology and number of the NPC in the PFC and Nacc

Hypothesis: Chronic sugar intake will predict changes in NPC in reward brain areas of adolescent rats.

Methods: We will determine the effect of sugar intake on NPC morphology and number. On postnatal day (PND) 28, pre-adolescent male rats will be assigned to sucrose (5%) or tap water group. From PND 31 (adolescent period) to PND 41 rats will have 2hr access to sucrose each day; the tap water group will have water during these 2-hr tests. Rats will be sacrificed immediately after the last sucrose intake session. Brains will be extracted and processed for immunofluorescent labeling of Adenyl Cyclase 3 (AC3), a validated marker for NPC.

Results: Independent of sucrose intake, there were significantly less AC3+ cells in the Nacc Shell than in the Nacc Core, suggesting that the number of NPC may correlate with the functional role in the Nacc. Further, sucrose intake significantly increased the length of NPC in both the NAcc core and shell. Our study is the first to demonstrate differences in the baseline number of NPC between the Nacc shell and core regions. Furthermore, we demonstrated that chronic sucrose access increased the length but not the number of NPC in the Nacc of adolescent male rats. Conversely, NPC length in the PFC was reduced after chronic sucrose intake, suggesting that different lengths suggest different sensitivity or regulation of NPC in different regions of the brain.

Keywords: sucrose intake, neuronal primary cilia and adolescent brain

The potential effects of financial conflicts of interest of speakers at the Pulmonary/Allergy Drug Advisory Committee meetings

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Rationale: The Pulmonary-Allergy Drugs Advisory Committee (PADAC) evaluates the safety and efficacy of new drugs used in the treatment of pulmonary, allergic, and immunologic diseases. Previous studies have shown, however, that positive recommendations from advisory committees are associated with drug approval by the FDA in up to 79% of cases.

Objective: To investigate the relationship between FCOI among public speakers and their recommendations for the drug under review at PADAC meetings and to determine whether the number of speakers and the number of speakers with FOCI were related to PADAC voting patterns.

Methods: We included the testimonies of all public speakers at the PADAC meetings from November 2009 to May 2019 using verbatim transcripts deposited on the FDA website. We used a pilot tested Google form to perform blinded, independent data extraction for each speaker. An ordered logistic regression was performed with each speaker's overall statement about the drug — negative, positive or neutral — serving as the dependent variable. Independent variables included whether the speaker was taking the drug in question, whether the speaker had the disorder treated by the drug, and whether the speaker disclosed a FCOI. Stata 15.1 was used for all analyses.

Results: From 16 PADAC meetings, we extracted data for 128 speakers. From all meetings included in our sample, 38% (49/128) disclosed a FCOI. Our ordered logistic regression model found that speakers who disclosed a FCOI were significantly more likely to give a positive testimony than those who did not (OR = 5.13, 95% CI = 1.83—14.37, P < 0.001) and that speakers who had the disorder for which the drug was taken were significantly more likely to provide positive testimony than speakers who did not have the disorder (OR=5.49, 95% CI = 1.84 — 14.37, P < .01).

Conclusion: Our findings suggest that public speakers who have FCOI are more likely to recommend drugs for approval, at least within the context of PADAC. However, these findings combined with others show a consistent effect. Greater efforts are needed to understand the effects of public speakers on voting behaviors. Changes to the current guidance on FDA FCOI disclosure are needed, and the future role of public speakers should be questioned.

Keywords: Financial, Conflicts, Drugs, Advisory, Committee

Effects of Ovariectomy on Body Weight and Metabolic Hormones in Rats

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Introduction: Oklahoma ranks 6th in the US in the incidence of obesity, and particularly concerning is the greater incidence of obesity in women, especially after menopause. We have modeled post-menopausal weight gain in ovariectomized (OVX) rats and recently reported that post-OVX weight gain is accompanied by changes in neuroimmune signaling in central nervous system (CNS) regions that respond to metabolic hormones including leptin and insulin.

Research Question: Our working hypothesis is that alterations in neuroimmune factors involved in post-OVX weight gain are associated with changes in metabolic hormones and/or in their CNS receptors.

Study Design/Methods: Groups of rats were OVX (n = 24) or sham OVX (n = 24) and fed standard laboratory chow. Body weight was measured post-surgically daily for 5 days, and weekly thereafter for 33 or 54 days. At termination, body weight was determined and brains and plasma were collected. Brain punches were obtained from the arcuate nucleus (ARC), then homogenized. ELISA kits were used to measure leptin and insulin receptor expression in the ARC, and circulating insulin and leptin levels.

Results: Body weight increased rapidly and progressively in OVX rats but not in sham OVX rats.

Plasma insulin and leptin levels showed temporal patterns with insulin increasing quickly and leptin increasing over time in OVX rats. However, leptin and insulin receptor levels in the ARC did not differ between OVX and sham OVX rats.

Conclusions: Circulating levels of insulin and leptin increased with post-OVX weight gain; in contrast, there was no change in expression of receptors for either insulin or leptin in the ARC. These data suggest that, while neuroimmune factors that are involved in post-OVX weight gain may be associated with increased circulating levels of metabolic hormones, they are not related to changes in the expression of the receptors for those hormones in the ARC.

Acknowledgements: funding provided by OSU-CHS intramural award (KSC); OCAST HR18-089 (KSC)

Keywords: Obesity, post-menopausal, leptin, insulin, ARC

ANAVIP^TM INTERACTION WITH WESTERN PYGMY RATTLESNAKE VENOM: INVITRO ASSESMENT OF REACTIVITY USING SE-HPLC

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Background: Every year there are a large number of venomous snake bites that occur around the world and especially in tropical areas. This is a problem that is faced worldwide with the World Health Organization classifying venomous snake bites as one of their highest priority neglected tropical diseases. One of the reasons for this classification is the short supply of antivenom compared to the number of snake envenomations that occurs each year. The standard of care for snake envenomation is administration of antivenom. Many antivenoms are polyvalent in that they are produced using venoms from multiple species of snakes. These polyvalent antivenoms can treat envenomation from the snake venoms that are used in the production, but also show cross-reactivity against snake venoms that share similar components. Determining the cross reactivities of antivenoms could help improve the quality of treatment, and provide a better understanding of venom-antivenom binding. Until recently there has only been one antivenom available for treatment of North American Crotaline envenomation. With the introduction of an F(ab') 2 antivenom (Anavip□) into the United States, we look at the cross-reactivity of the western pygmy rattlesnake, Sistrurus miliarius streckeri, against Anavip.

Methods: SE-HPLC was used to assess cross-reactivity. SE-HPLC is a viable method to analyze antivenom-venom reactivity based on separation of higher molecular weight complexes that form vs unreacted components. Estimates of venom-antivenom reactivity was measured in reaction mixtures based on the increase in the elution profile area where higher molecular weight complexes are observed (region 1) and on the decrease in the elution profile area where reactants are observed (region 2). Reaction mixtures contained Anavip (1.0 mg/ml) and S. miliarius venom (0.125, 0.25, 0.5, or 1.0 mg/ml). Controls were Anavip and S. miliarius (1.0mg/ml). Mixtures were incubated at 37□ C for 30 minutes, then stored at 4□ C prior to SE-HPLC.

Results: Cross-reactivity was seen between Anavip and S. miliarius venom based on changes in elution profile areas. A decrease in region 2 (reactants) and increase in region 1 (immune complexes) was observed at all venom-antivenom concentrations. The maximum venom-antivenom binding was calculated, based on changes in profile region areas, to be approximately 67% relative to the total area.

Discussion/Conclusion: Apparent saturation of reactive antivenom was observed at all venom concentrations. Estimates of Anavip reactivity with S. miliarius venom are seen in the changes of the elution profile region areas, showing the formation of larger molecular weight complexes and decrease in reactants. This shows that Anavip could provide protective effects against S. miliarius envenomation. Further studies are needed to determine binding within a broader range of venom concentrations, as well as the composition of reactive and unreacted components. Results suggest that binding of Anavip to S.miliarius venom does occur, which is consistent with protective effects that are observed clinically

Keywords: Anavip, Crotaline, antivenin, SE-HPLC

Publication Trends among Ophthalmology Residency Graduates

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Purpose: The Accreditation Council for Graduate Medical Education (ACGME) requires that ophthalmology residents participate in scholarly activity during residency. However, to our knowledge it is unknown whether research publications during undergraduate, medical school, residency or fellowship training predict future academic publication performance among ophthalmologists. The aim of this study was to (1) measure scholarly research productivity (as measured by the h-index) among ophthalmology residency graduates, as measured by peer-reviewed publication output, and its relation to future publication output, and (2) evaluate whether scholarly impact of academic ophthalmologists is correlated with any specific characteristics.

Methods: This study is cross-sectional in nature and included a random sample of 50 ophthalmology residency programs. From each program, a list of graduating residents from years 2013, 2014, and 2015 was compiled and each graduate was search on Scopus, PubMed, and Google Scholar. The publications of each graduate were then identified and data was extracted and collected in a double blind, duplicate fashion by 2 investigators. Research publication output was then stratified and analyzed.

Results: Graduates that had a higher mean total publication (M = 9.11, SD=12.91) were significantly more likely to pursue a fellowship than those that did not (M=2.68, SD=3.16) (t234= -3.9, p = .0001). Graduates with more first person publications and higher H-index values were also significantly more likely to pursue fellowships (t234= -3.78, p = 0.0002) (t234= -3.93, p = 0.0001).Graduates that had a higher mean total publication (M = 14.2, SD= 18.19) were more likely to pursue a academic careers than those that did not (M=4.57, SD = 4.88) (t234= -6.3, p = 0 .0001). Graduates with more first person publications and higher H-index values were also significantly more likely to pursue academic careers (t234= -5.12, p < 0.001) (t234= -4.84, p < 0.0001).Gender proved to not be a significant determination of research pursuit in terms of publication or first person publication numbers (t234= -1.01, p = .3107) (t234= -0.53, p = .5949). However, H-index values for men (M = 3.06, SD= 3.47) and women (M = 2.52, SD=2.64) were significantly different (t234= -3.9, p = 0.0406).

Conclusion: The positive correlation between the between graduates' research productivity and career and future research outcomes could present an interesting aspect for viewing candidates for fellowship or careers. The correlation demonstrates that students who performed research before and during residency were more productive with research after residency. This could present a positive reason to select an individual for a fellowship or academic program. The lack of research conversely indicates a likelihood of low research productivity. This could potentially negatively impact candidates. The evaluation of an individual's H-value, first-person publications, or total number of publications can then possibly be supplementary for decision making or gauge potential.

Keywords: ophthalmology, publication trends, observational

Inappropriate Prophylactic Use of Antibiotics in Gynecologic Surgeries in an Inner City Hospital

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As antibiotic resistance is an increasing healthcare issue, promotion of antibiotic stewardship within hospitals has led to research into their proper use. The American College of Obstetricians and Gynecologists (ACOG) has specific recommendations for antimicrobial prophylaxis prior to gynecologic procedures. We hypothesized that patients in an inner-city hospital in Oklahoma City, Oklahoma undergoing gynecologic procedures were receiving prophylactic antibiotics that were not necessarily indicated for their surgery. A retrospective chart review was performed from July, 2017 to June, 2018. 314 surgeries were performed in this time and 169 cases met inclusion criteria as gynecologic procedures with no indication for antimicrobial prophylaxis. Of the 169 included cases, 98 (57.99%) revealed antibiotics were inappropriately given, which was statistically significant (p< 0.5). The most common procedure in which misuse was noted were laparoscopic procedures without entry into the bowel or vagina, composing 61.2% of cases. Cefazolin was the most frequently used and was given in 84.7% of the cases. These results reflect the overuse of antibiotics for surgical prophylaxis, which contributes to increasing antibiotic resistance in women undergoing elective gynecologic procedures. Overall, this is hindering the progressive movement towards promotion of antibiotic stewardship. We hope that these study results will limit the misuse of antibiotics in a hospital setting, and specifically in surgical specialties.

Keywords: Gynecologic procedures, gynecologic surgery, antibiotic prophylaxis, antibiotic resistance, antibiotic stewardship

XRD Analysis on Sauropod Bone

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Sauropod bones recovered from SNOMNH V1694, a dinosaur-bearing site in the Late Jurassic Morrison Formation of Oklahoma, are variably permineralized by calcite. We suspect that the bones were first buried and then infilled by the calcite. The time at which permineralization occurred is unclear, because recent soil carbonates can be found at the site and ancient soil carbonates can be found in nearby outcrops of the Morrison Formation, indicating that groundwater has carried calcium carbonate through the sediments at different times. Twelve bone samples collected in June 2019, and mineral samples from the surrounding sediments, were crushed and processed using X-ray diffraction to determine how much of the bone was infilled by calcite and the mineral composition of each sample to determine the source. To test these samples, we used a mortar to crush them into a fine powder, we then took the powder and spread it across a lead plate and put it into the X-ray Diffractometer. While in the machine X-rays are then passed through the sample, we receive what it is called a peak. These peaks reveal what minerals comprise a sample. Testing these samples showed that the mineral composition of the bone infill was calcite due to the peaks shown in the graphs. In sample one of the bones, there was a peak at 1600 which determined that what has infilled the bone is calcite. In sample two, there was a peak at 600 which shows calcite and another peak at 550 which is determined as quartz. Samples of the mud showed that there was no correlation with the bone. This means that the mud is not viable source for the precipitated calcite. These results suggest the source of the calcite could be from a different type of sediment or groundwater could be coming from a source that is rich with carbonate minerals and transporting the dissolved minerals into the bone pores. In the future, analysis of stable oxygen isotopes may help determine whether the calcite infill is related to recent groundwater movement or whether it is more ancient.

Keywords: X-ray diffraction (XRD), Sauropod, Groundwater, Calcite

Rural men who have sex with men's experiences and preferences for health programming

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Background: Studies researching the healthcare experiences of men who have sex with men have predominately featured urban populations, leaving rural MSM underrepresented in the research. The fear of isolation and stigmatization can prevent disclosure of sexual behaviors to a medical provider, impacting the person's sexual health care (Hollander, 2013). The landscape of healthcare is different in urban versus rural areas, particularly in LGBT health. This study examines the healthcare experiences of MSM residing in rural Oklahoma.

Methods: Participants recruited via flyers and various LGBT social networking websites. No identifiable information was collected from the 40 adult men participants who identified as MSM living in Oklahoma. Questions were asked from an interview guide which consisted of content-specific probes about health, sexual behavior, MSM related themes. Participant demographics collected were age, race/ethnicity, educational level, relationship status, employment status, educational level, annual personal income, and sexual orientation. NVivo software (Version 11) was used to thematically categorize transcripts. Descriptive analyses were conducted using SPSS (Version 21).

Results

1. Cultural differences were cited by a majority of the participants (N = 22, 55%) as a central motif of their healthcare experiences, largely centered around the conservative and largely religious culture of Oklahoma, particularly in rural areas.

2. A sizable portion of the participants (N = 18, 45%) commented that doctor-patient relationship quality was a contributing factor to either a detrimental or beneficial healthcare experience.

3. A number of participants recalled their doctors not knowing about current LGBT healthcare issues like PrEP (Pre-exposure prophylaxis), a drug that is used to prevent HIV transmission.

Conclusions: There is a need for greater understanding of LGBT issues and treatments by physicians and mental health professionals, particularly in a rural context. Also, research needs to emphasize rural MSM populations who are potentially most vulnerable to certain health risk factors.

Keywords: Health equity, rural medicine, LGB health, under-served populations

Severe Manifestations of Undiagnosed Systemic Lupus Erythematosus: A Challenging Presentation in a 21-year-old Female

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Introduction: A clinical presentation of pleural effusion, fever, and non-specific hematologic findings points toward the common diagnosis of community acquired pneumonia. This is a case report of a young female whose severe SLE flair was initially confused with pneumonia with pleural effusion. When clinical improvement did not occur in response to standard treatment for community acquired pneumonia, an extended workup revealed a new diagnosis of SLE.

Case Summary: A 21-year-old African American female presented to the emergency department with shortness of breath, chest pain and generalized fatigue. Her medical history was significant for juvenile rheumatoid arthritis (JRA), and recent treatment for community acquired pneumonia diagnosed in another facility. At presentation to our facility, there was concern for sepsis with fever, leukopenia, and an infection source of pneumonia with a large pleural effusion. Standard of care was initiated, including broad spectrum antibiotics. Thoracentesis and bronchoalveolar lavage did not reveal a definitive cause for the pleural effusion or pneumonia. The patient was discharged with prednisone 80 mg, hydroxycholorquine 200 mg, and amoxicillin/clavulanic acid 875 mg/125 mg. Follow up plans included follow up care with nephrology and rheumatology, renal biopsy, and immunological therapy.

Discussion: There are two key learning points in this case. First, when the routine workup for pleural effusion was indeterminate, further workup was needed. Our initial approach to the treatment of the pleural effusion and pneumonia was broad spectrum antibiotics, followed by diagnostic thoracentesis. In a majority of cases this would reveal an infectious or malignant cause, neither of which were found in this patient. Immunologic work up revealed that the patient had SLE. Definitive treatment for SLE became the focus. Second, it was interesting that the immunologic work up pointed more towards SLE rather than the previously diagnosed juvenile rheumatoid arthritis. The very high immunologic markers and the patient's presentation were classic for untreated SLE. It is interesting to consider that the patient's prior rheumatologic treatment for JRA may have masked the true diagnosis of SLE.

Keywords: Rheumatology; Systemic Lupus Erythematous; Pleural Effusion

The Osteopathic Academic Heritage of Oklahoma State University College of Osteopathic Medicine

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BACKGROUND: In 1892, Dr. Andrew Taylor Still founded the field of Osteopathic Medicine by publishing The Philosophy and Mechanical Principles of Osteopathy when his philosophy of holistic medicine and tenets of osteopathic medicine became practice. Today in 2020 osteopathic physicians find their profession threatened by single accreditation and a decrease in the number of physicians incorporating Osteopathic Principles and Practices (OPP) in their patient care, despite rising numbers of osteopathic graduates. The purpose of this study was to evaluate the osteopathic ancestry of instructors and graduates at Oklahoma State University College of Osteopathic Medicine (OSU-COM) in order to unite past, current, and future graduates with their academic heritage in an effort to preserve a portion of the practice of osteopathic medicine. **METHODS:** Direct survey of current OSU-COM Osteopathic Manipulative Medicine (OMM) faculty and their mentors was used to obtain the majority of data. Data was gathered in person, over the phone, and by email. Additional gratitude is provided to Dr. Amelia McConaghy for supplying information on the earlier generations of osteopaths. Once the information was collected, it was consolidated and simplified into a diagram styled after genealogical trees to visually demonstrate the generational connections. **RESULTS:** It was demonstrated that current OSU-COM students and graduates since 1993 are directly linked to the personal instruction of A.T. Still by as few as 5 generations of mentors. The OSU-COM lineage also includes other notable osteopaths such as Dr. Fred Mitchell Sr., who developed the muscle energy technique, and Dr. William Sutherland, who first conceptualized the primary respiratory mechanism. **CONCLUSIONS:** It is noteworthy that OSU-COM graduates can trace their techniques back to the physicians who developed those methods as manual skills that were passed from person to person. It is our hope that the information gathered and consolidated in this study will inspire current and future graduates to both incorporate OPP in their practices and pass along the knowledge acquired at OSU-COM to the next generation of osteopathic physicians. Though this study provides a significant analysis of academic mentorship and heritage, further studies and investigation should be conducted so as not to lose the value and roots of academic ancestry at Oklahoma State University.

Keywords: Osteopathic Medicine, Osteopathy, Academic Heritage, A.T. Still, Oklahoma State University

Poster presentation

Comparison of Alcohol Consumption by Three Methods in Women of Childbearing Potential

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Introduction: Alcohol use behaviors can be monitored in several ways: self-report, continuous measurement via the use of wearable electronic devices, or through specialized biological sampling. Ethyl glucuronide (EtG) concentration in hair samples have become a common tool for alcohol use detection in alcohol and drug treatment monitoring. The purpose of this study is to evaluate the validity of hair EtG concentrations compared to transdermal alcohol concentration (TAC) and self-reported alcohol use.

Methods: This trial included 25 adolescent and young adult females, ages 15-24, who reported at least one heavy drinking episode (≥4 drinks) n the past two weeks before baseline. All participants were asked to wear a Giner WrisTAS-7 (n=21) or Giner WrisTAS-9 (n=4) alcohol biosensor over a one-month prospective study. Participants visited the lab weekly to complete a detailed self-report of behaviors, including day of drinking events, amounts and types of alcohol use, and length of drinking events. Estimates of blood alcohol concentration (eBAC) were computed from self-report data using National Highway and Transportation Safety Administration (NHTSA) equation. TAC and eBAC data were categorized into at risk and high-risk drinking events (BAC of >0.05 and >0.08 grams alcohol/milliliter blood, respectively). Hair EtG concentration, total number of drinking events, moderate and high level of TAC and eBAC drinking events were analyzed with Spearman rank correlation test for validity comparisons.

Results: No significant correlations were found between Hair EtG values and total number, moderate or high levels of detected drinking events by eBAC or TAC. Total number of drinking events detected and number of drinking events >0.08 using eBAC and TAC methods were significantly correlated with each other (respectively, r =.33, p<0.05; r =.42, p<0.05).

Discussion: Results of this analysis show that hair EtG values are not a good indicator of drinking episodes or abstinence. Our findings indicate that, due to the number of false negatives, hair EtG concentrations should be used with caution for monitoring abstinence from alcohol use.

Keywords: Alcohol EtG transdermal self-report

Effects of social defeat on iκ-bα inflammatory signaling in male c57BL/6J

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An estimated 30 million people in the United States have been diagnosed with mood and anxiety disorders. Unfortunately, many of these patients do not adequately respond to current pharmacotherapies, so developing new drugs and strategies to treat such disorders is critically important. There are only a few drugs on the market that target neuroinflammation. Thus, it's critical that we identify anti-inflammatory agents that effectively reduce neuroinflammatory responses, hereby expanding or augmenting available options for treating neurological disorders. Previous work has shown that the derivative of naltrexone, β-funaltrexamine (β-FNA), inhibits inflammatory signaling in human astrocytes in reduced expression of proinflammatory chemokines. IκBα is one of the specific signaling proteins in the inflammation pathway.

Keywords: anti-inflammatory, pharmacotherapies, neuroinflammatory, β-funaltrexamine, IκBα

Recovery of Cognitive Function in a Substance Abuse Population

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Background: Substance abuse is known to cause injury to the brain that may not be fully repaired by sobriety. The most commonly identified impairments are in attention, working memory, and executive functioning. Although research has found that most people do experience some level of cognitive improvement after stopping substance use, it is unclear how quickly this happens and if there is a particular pattern in improvement. This pilot study tested the natural rate of cognitive recovery in early substance abuse treatment.

Methods: Participants were 28 adults newly admitted to a residential substance abuse treatment facility. All were post-detox. The majority were in treatment for polysubstance abuse, with 15 having primary opioid abuse. NIH Toolbox cognition battery was administered at intake and 4 weeks later.

Results: Regarding cognition, primary weaknesses at baseline were in processing speed (Pattern Comparison mean t-score=41.96), attention and executive function (Flanker mean t-score=43.0) and working memory (List Sorting mean t-score=44.04). Cognitive recovery during the normal course of early inpatient treatment was significant in the areas of processing speed, attention and executive functioning and yielded significant improvement in the Cognitive Function Composite Score (p<.01).

Conclusions: Consistent with previous research, this pilot study found that patients commonly enter inpatient treatment with inefficiencies in fluid cognition skills. Over the course of 1-month of inpatient treatment, this sample of patients experienced significant improvement across multiple domains, with significant improvements in composite Fluid and Total Cognition scores. Further study on the pattern of cognitive changes during substance abuse treatment may be used to help better match intervention strategy to cognitive level and possibly develop cognitive rehabilitation protocols to increase treatment engagement and extend abstinence via improvement in cognitive capacity.

Keywords: Addiction, Substance Abuse Treatment, Cognition/Cognitive Functioning

Does the Quadriceps Tendon Graft for ACL Repair Produce Similar Quadriceps Strength Measures Compared to Hamstring Tendon Graft? A Critically Appraised Topic

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Introduction: Anterior cruciate ligament (ACL) ruptures are one of the most common and most challenging injuries to manage in competitive sports. It is estimated that 100,000 to 250,000 ACL injuries happen per year. Of the challenges faced faced by athletes, quadriceps strength recovery is one of the most prevalent. It is possible that graft choice for ACL repair may play a role in quadriceps strength recovery following ACL repair.

Objective: The purpose of this critically appraised topic is to determine if the Quadriceps Tendon (QT) graft is an effective choice for ACL repair with regards to recovery of quadriceps strength when compared to Hamstring Tendon (HT) graft.

Study Design: Critically Appraised Topic

Methods: An online search was performed using the following terms: Quadriceps tendon, Hamstring Tendon, Graft, Anterior Cruciate Ligament, Reconstruction, and Quadriceps Strength.

Results: Four of five studies found similar outcomes of quadriceps strength after ACL repair when comparing QT to HT grafts. The fifth study showed quad strength to be significantly lower in the QT group compared to the HT group. All studies showed a significant improvement from baseline strength measurements. Sample sizes were generally small, there was variability in strength assessment, and inconsistent post-operative rehabilitation protocols.

Conclusion: There is level B evidence according to the GRADE Guidelines that the QT graft produces similar outcomes compared to HT grafts for primary ACL reconstruction with regards to quadriceps strength recovery. More high quality studies are needed to make a stronger recommendation.

Keywords: Quadriceps, Tendon, ACL Graft Strength

Identification of Glyptops (Paracryptodira:Testudines) from the Jurassic Morrison Fm. of Oklahoma

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Anne Weil, Ph.D.

A fossil turtle (SNOMNH V79260) excavated from approximately 152 million-year-old mudstones of the Morrison Formation in Cimarron County (SNOMNH V1694) preserves a significant amount of cranial anatomy. MicroCT scanning of the specimen revealed the presence of delicate rostral bones that are rarely preserved. Multiple fractures in the bone complicated segmentation of the scan. Some characters, such as dorsal extent of the prefrontal, remain ambiguous. Unambiguous location of posterior foramen of the internal carotid canal far anterior on the basisphenoid-pterygoid suture identifies the turtle as belonging to Paracryptodira. Additionally, the small supraoccipital crest does not extend posteriorly beyond the foramen magnum. We compared the segmented scan with illustrations of described paracryptodire crania. V79260 resembles Glyptops, Mesochelys, and Dorsetochelys in having large posterior palatal foramina and an elongated basisphenoid. Unlike that of V79260, the basisphenoid of Dorsetochelys does not span the length of the pterygoid. The pterygoids of Dorsetochelys have a broad midline contact, and its vomer is proportionally shorter antero-posteriorly than those of either V79260 or Mesochelys. V79260 can be distinguished from Mesochelys by the shape of the pterygoid bones. The external process of the pterygoid of Mesochelys is hooked at the end and the pterygoids do not extend laterally to exclude the jugal from the border of the posterior palatal foramen. The anterior of the vomer is rectangular, in contrast to the rounded shape of V79260. Glyptops and Mesochelys are very similar; one cranial study suggests they are united in the family Glyptopsidae. V79260 corresponds best with specimens of Glyptops plicatulus, but it is not identical. They share an elongated vomer, and in Glyptops and V79260 the external processes of the pterygoids are wing-like and extend laterally to exclude the jugal from the posterior palatal foramen. However, the basisphenoid of Glyptops plicatulus is described as elongated, contacting the vomer and completely separating the pterygoids from one another. In V79260, the basisphenoid does not come as far anterior and there is a short midline contact of the pterygoid bones. This may be because the sole described specimen of Glyptops plicatulus from which the vomer is known is laterally crushed, or it may be that V79260 represents a new species.Identification of the skull on the basis of morphology is consistent with occurrence data available in the Paleobiology Database indicating that Glyptops is the Jurassic turtle most likely to be found in Cimarron County, Oklahoma.

Keywords: fossil, turtle, cranium

The effects of Opioid Prescribing Laws on drug usage in trauma patients

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Background: On November 1st, 2018 Oklahoma Bill 1446 went into effect: limiting the total days of initial opioid prescriptions, follow up opioid prescriptions, chronic opioid prescriptions, mandating prescription monitoring program checking, prescribing opioids to minors, and the need to establish drug contracts and urine drug screening of your patients taking opioids. We believe that with the new rigid opioid prescribing laws in Oklahoma and difficult access to prescription pain medications, abandoned pain patients will turn to illicit drugs because of cheap cost and ease of access. We are assessing the illicit drug usage outcomes after a prescribing law going into effect in patients aged 18-65 reported in level II trauma registries.

Methods: Data base search of all patients admitted to the trauma service at a level II trauma center from November 1st 2017 to November 1st 2019. We will assess de-identified patient data regarding Injury severity score, mechanism of injury, urine drugs screen results, time spent in hospital and emergency department, prehospital prescriptions, emergency department medications, BMI, age, gender, mechanism of injury, surgical services, type and number of procedures performed, and disposition.

Results: Currently we are building the search based on the above criteria of the trauma registry. We expect the results to demonstrate that illicit drug usage will rise in trauma patients after Bill 1446 went into effect due to decreased access of prescription opioids. Based on our current study design urine drug screen for opioids alone will not be enough information because many patients transferred into the trauma center may have received prescription opioids prior to arrival at the hospital via EMS or transferring facility. We expect arise in urine drug screen's positive for illicit drugs. We also expect patients that did test positive for illicit drugs to have longer hospital admissions, higher injury severity scores, more surgeries/procedures required, and worse mechanism of injuries.

Conclusions: We believe that with the new rigid opioid prescribing laws in Oklahoma and difficult access to prescription pain medications, many patients will turn to illicit drugs after Bill 1446 went into effect. Our study is aimed to determine how the Opioid Prescribing Laws in Oklahoma affected illicit drug use in trauma patients. The primary goal for implementing the Opioid Prescribing Laws was to combat the Opioid Epidemic across the United States, however we believe law makers may have been too stringent on the implementation of the Opioid Prescribing Laws. We believe our study will help guide politician and law makers in the future when assessing the possible secondary effects of these drugs laws.

Keywords: Trauma, Opioids, Drug Law

Complications and re-operation rates following fixation of femoral neck fractures using the Femoral Neck System. A preliminary study

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Background: Femoral neck fractures represent the most common type of hip fracture presentation. Because of this, ensuring fixation of these fractures is robust is paramount to maximizing positive outcomes and sustaining quality of life among this already vulnerable population. Typically femoral neck fractures are treated with 3 cannulated screws. Because of the relatively high rate of poor outcomes among those receiving cannulated screws for femoral neck fractures, the door has been open for a new method or implant to utilize for femoral neck fracture fixation. In July 2019 the Femoral Neck System (FNS) was released as a dedicated product for the fixation of femoral neck fractures.

Methods: Because of this, we seek to evaluate the utility of this system in treating femoral neck fractures. Our primary objective is to evaluate re-operation rates and complications of fractures treated with the FNS. By doing so we hope to shed light on the applicability of this promising new system's potential of improving morbidity, mortality, and costs related to the management and treatment of hip fractures. All data was obtained retrospectively from the patient chart, and extracted into excel. We used comprehensive meta-analysis for descriptive statistics and analyses. Our primary objective was the rate of hardware failure and re-operation.

Results: In total, we have amassed 26 patients treated with the FNS. Of these, there has been 1 (3.8%) re-operation due to hardware failure. Our short term success with the FNS is 96.2%.

Conclusion: Short term results indicate the FNS may be superior to 3 cannulated screws for the treatment of femoral neck fractures.

Keywords: Hip fracture; femoral neck fracture; femur fracture; fracture

An analysis of practices to promote reproducibility and transparency in anesthesiology research: are important aspects hidden behind the drapes?

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Introduction: Reliable, high quality research is essential to the field of anesthesiology. Investigating reproducibility and transparency has been accomplished broadly in the biomedical domain and in the social sciences; however, practices that promote reproducibility and transparency have never been evaluated in the anesthesiology research community. In this study, we applied 14 indicators of reproducibility to evaluate the current climate of the anesthesiology research community.

Methods: We used the National Library of Medicine (NLM) catalog to search for all journals using the subject terms tag Anesthesiology[ST]. The inclusion criteria required that journals provided full-text publications in English and were MEDLINE indexed. The list of journals in the NLM catalog fitting the inclusion criteria were then extracted using the electronic International Standard Serial Number (ISSN). This series of ISSN were used in a PubMed search to identify all publications within these journals. We then limited the sample to publications from January 1, 2014 to December 31, 2018. Subsequently, we randomly sampled 300 publications that fit the inclusion criteria for our analysis. Data extraction was then conducted in a blinded, duplicate fashion using a pilot-tested Google form.

Results: The PubMed search of these journals identified 171,441 publications, with 28,310 being within the time-frame. From the 300 publications sampled, 296 (296/300, 98% [97% to 99%]) full text publications were obtained, while 4 (4/300, 1% [0% to 3%]) only showed the abstract or could not be accessed. Most (104/107, 97% [95% to 99%]) of the studies did not include material availability statements or protocol availability statements. For the analysis scripts, the majority of publications (121/122, 99% [98% to 100%]) did not provide a data analysis script statement. The majority (94/122, 77% [72% to 81%]) of the publications did not contain a pre-registration statement. Other study characteristics were found to be insufficient..

Conclusion: Anesthesiology research needs to drastically improve with regards to reproducibility and transparency. By making research easily accessible online and by improving the accessibility of detailed components (raw data, materials and protocols, analysis scripts) primary research can be reproduced in subsequent studies and help contribute to the development of new practice guidelines, helping change patient care through evidence-based conclusions.

Keywords: Reproducibility, Transparency, Anesthesia