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COLLEGE of HEALTH SCIENCES

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COLLEGE of PSYCHOLOGY

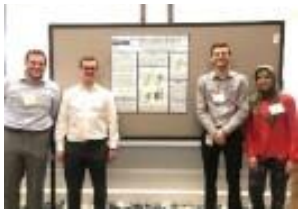
CALIFORNIA NORTHSTATE UNIVERSITY
COLLEGE of DENTAL MEDICINE

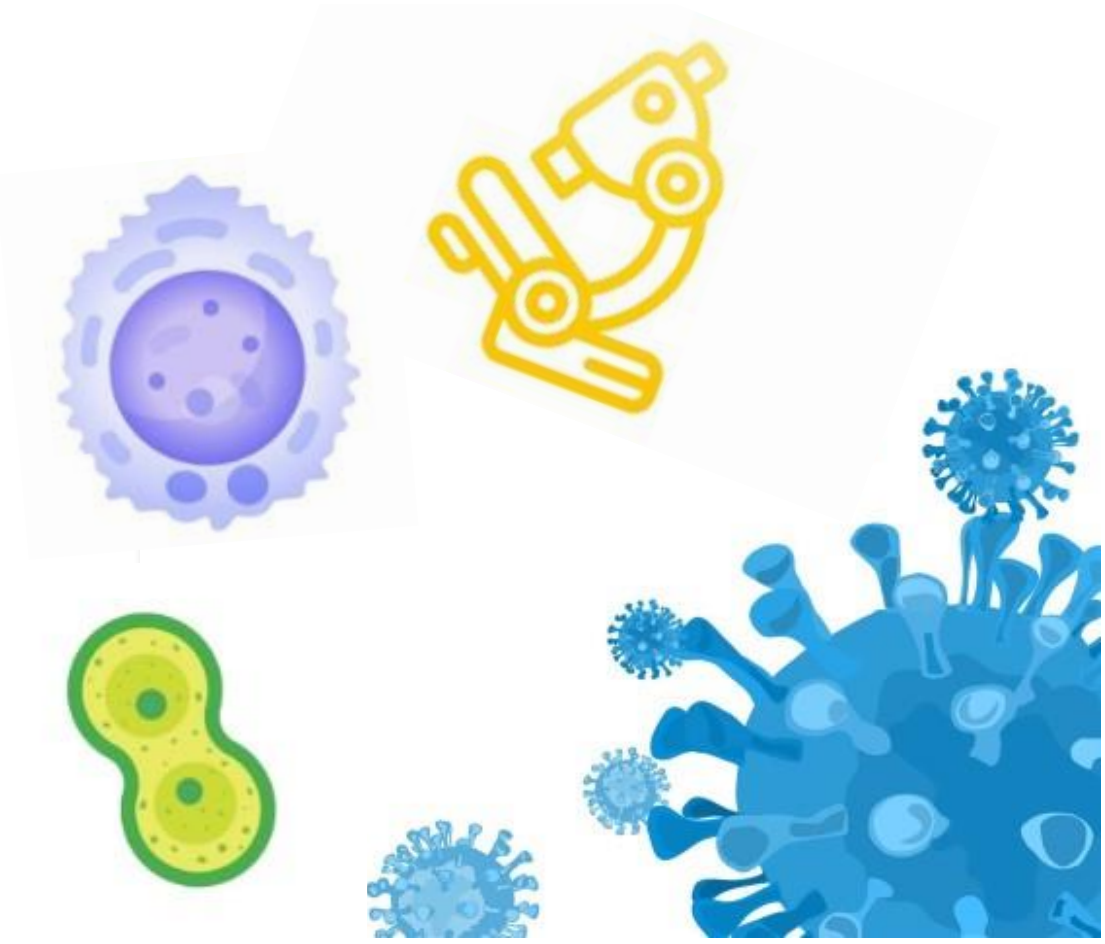
CALIFORNIA NORTHSTATE UNIVERSITY

2022

CNU Research DAY

March 18th 9:00 am – 5:00 pm





Research Day Schedule

Poster Viewing 8:30

Breakfast: (MPS classrom, 2nd floor) 9:00-10:00

Poster session A: Even numbered posters (P3 classroom, 2nd floor) 10:00-11:00

- **College of Medicine**
- **College of Pharmacy**
- **College of Health Sciences**
- **College of Graduate Studies, Masters in Pharmaceutical Sciences**
- **College of Psychology**

Poster session B: Odd numbered posters (P3 classroom, 2nd floor) 11:00-12:00

- **College of Medicine**
- **College of Pharmacy**
- **College of Health Sciences**
- **College of Graduate Studies, Masters in Pharmaceutical Sciences**
- **College of Psychology**

Lunch (COM classrooms, 1st floor) 12:00-12:30

Opening Remarks by Dr. Catherine Yang (COM classroom 1A, 1st floor) 12:30-12:45
Vice President of Academic Affairs

President Cheung introduction (COM classroom 1A, 1st floor) 12:45-1:00

Keynote Speaker, Dr. Satya Dandekar (COM classroom 1A, 1st floor) 1:00-2:00
Professor and Chair of the Depart. of Medical Microbiology and Immunology at UC Davis

Podium presentations (COM, classrooms, 1st floor) 2:05-3:35

- **Room 1A (**A1-A5 Podium presentations**)**
- **Room 1B (**A11-A16 Podium presentations**)**

Podium presentations (COM, classrooms, 1st floor) 3:40-4:55

- **Room 1A (**A6-A10 Podium presentations**)**
- **Room 1B (**A17-A20 Podium presentations**)**

Awards & Closing Remarks by Dr. Catherine Yang (COM, classroom 1A, 1st floor) 4:55-5:30
Vice President of Academic Affairs

Event Locations

Event Information	**Main Lobby 1st floor**
Breakfast/Reception	**MPS classroom 2nd floor**
Poster Presentations	**P3 classroom 2nd floor**
Lunch	**COM 1A & 1B classrooms, 1st floor**
Keynote Speaker	**COM 1A classroom, 1st floor**
Podium Presentations	**COM 1A & 1B classrooms, 1st floor**
Awards and Closing Remarks	**COM 1A classroom, 1st floor**

Keynote Speaker: Satya Dandekar, PhD

Professor of Microbiology and Immunology and Chair of the Department of Medical Microbiology and Immunology, University of California, Davis, School of Medicine

Lessons of Resilience from the Gut and Infectious Diseases

Satya Dandekar, PhD. is Professor of Microbiology and Immunology at UC Davis' School of Medicine and serves as the chair of the Department of Medical Microbiology and Immunology. She has applied her training in microbiology to investigate viral infections and mucosal immune responses counteracting these pathogens. Under Dandekar's leadership as chair, the UC Davis Department of Medical Microbiology and Immunology has become a leader in the field of mucosal infections and mucosal immunity and is highly ranked nationally for NIH research funding among all the medical microbiology and immunology departments in the country. Dandekar's pioneering research on HIV and AIDS revealed the direct and devastating impact of the virus on the gut early in infection. Within a few days to weeks, the virus damages the gut epithelial lining and impairs the gastrointestinal mucosal lymphoid tissue. Both are critical for generating the body's immune response for defending against infections. The findings supported changes in the treatment protocols for HIV, including starting anti-HIV therapy early in the infection to achieve better clinical outcomes. With her current research, Dandekar is investigating strategies to empower and leverage host immune systems for viral eradication. She explored the mechanism through which mesenchymal stem/stromal cells (MSCs) enhance the body's immune response to the virus, potentially providing a roadmap for developing multi-pronged HIV eradication strategies. Dandekar has previously received a prestigious MERIT award from the NIH National Institute of Allergy and Infectious Diseases (NIAID). Dandekar has served as a member of the NIAID Advisory Council and on the subcommittees of the council. She has continued to serve as a reviewer for the NIH review panels and scientific journals and on the scientific advisory boards. She was awarded the School of Medicine Dean's Award for Excellence in Mentoring. She is a Fellow of the American Association for the Advancement of Science (AAAS) and a Fellow of American Academy of Microbiologists.

Podium Presentation Abstracts

Podium Presentations: College of Medicine

Abstract # A1

Type of presentation: Podium

Authors: Anh Nguyen[1], James Zhou[1], Wenjia Wang[1], Hannah E. Neiger[1], Xinyu Pei[1], William Bautista[1], Devan Abhari[1], Shymaa Bilasy PhD[1], Gary Johanning[1], Yihui Shi MD PhD[1]
[1] College of Medicine, California Northstate University.

Title: HERV-K Blockade to Prevent RAS Activation in Breast Cancer

Introduction: Human endogenous retrovirus type K (HERV-K) is an ancient retrovirus that has become embedded in the human genome, but it has been silenced as a result of accumulation of mutations throughout evolution. Previous studies have established that HERV-K is overexpressed in breast cancer (BC) and other cancers, but is not expressed in normal tissues, making it a particularly unique therapeutic target. Recent studies also provide evidence that HERV-K influences signaling via the Ras/ERK pathway in BC and other cancers. However, the mechanism by which endogenous retroviruses impact expression and/or activation of Ras is unknown. This project is designed to yield insights into the biological significance of this interaction. The central hypothesis tested in this study is that HERV-K interacts with components of Ras signaling pathways to alter expression of Ras in breast cancer cells. **Methods:** Real time RT-PCR and Western Blot were used to examine the gene and protein expression of HERV-K and proteins in the Ras signaling pathway. HERV-K specific chimeric antigen receptor (K-CAR) was engineered into T cells by lentiviral infection. K-CAR-T cells were activated and expanded in a Gas Permeable Cell Culture System. The metabolic biomarkers of CAR-T cell expansion were examined by lactate and glucose monitors. Cell proliferation assay was performed by using CellTiter Glo reagents. **Results:** Our studies revealed that knockdown of HERV-K with an shRNA consistently downregulates expression of Ras. RT-PCR analysis of H-Ras, N-Ras and K-Ras isoforms after overexpression of HERV-K in MCF-10A breast cells compared to controls showed that N-Ras isoforms were upregulated with forced HERV-K overexpression. Lactate and glucose were identified as metabolic biomarkers for the production of CAR-T cells. K-CAR-T cells demonstrated therapeutic efficacy against MDA-MB-231 which has a high HERV-K expression level. **Conclusion**: Ras may be activated by persistent HERV-K−associated upstream signaling to promote oncogenic transformation. K-CAR-T cells could be developed as an effective therapy for BC with overexpression of HERV-K.

Abstract # A2

Type of presentation: Podium

Authors: Christopher DeFrancesco[2], Carrie Freeman[1,2], Jiabin Liu MD[1], Stephen Haskins MD[1], David Kim MD[1], Daniel Maalouf MD[1], Meghan Kirksey MD PhD[1], Kethy Jules-Elysee MD[1], Ellen Soffin MD PhD[1], Jonathan Beathe MD[1], Sean Garvin MD[1], Kathrine DelPizzo MD[1], Alexandra Sideris PhD[1], Haoyan Zhong[1], Stavros Memtsoudis MD PhD[1]
[1] Department of Anesthesiology, Critical Care & Pain Management, Hospital for Special Surgery, New York, NY.
[2] College of Medicine, California Northstate University.

Title: **Comparative Effectiveness of Oral versus Intravenous Tranexamic Acid in Primary Total Hip and Knee Arthroplasty**

Background: The perioperative use of tranexamic acid (TXA) in total hip arthroplasty (THA) and total knee arthroplasty (TKA) has resulted in dramatic decreases in operative blood loss and transfusion rates. While oral rather than intravenous (IV) dosing of TXA may simplify perioperative protocols and reduce costs, it is not clear whether oral TXA is as effective as IV TXA in reducing blood loss and transfusion rates. **Methods:** This randomized control trial compared the use of one preoperative dose of oral TXA (1,950 mg) to one preoperative dose of IV TXA (1,000 mg) in patients undergoing primary THA via posterior approach or TKA and receiving regional anesthesia. Exclusion criteria were a BMI >40, history of bleeding disorders, active atrial fibrillation, thrombocytopenia (<100/nL), history of myocardial infarction or stroke in the past year, and use of preoperative anticoagulants or anti-platelet agents. The two primary outcomes were calculated blood loss (CBL) and transfusion rates between the two groups in both surgical cohorts. Blood loss was calculated in the post-anesthesia care unit (PACU) and on post-operative day 1 (POD1). Transfusion rates were calculated intraoperatively and until discharge. The study was designed as a non-inferiority analysis within an intent-to-treat model. **Results:** Two-hundred patients (100 THA and 100 TKA) patients were randomized. Oral TXA was non-inferior to IV TXA in both THA and TKA patients ($p<0.001$). In THA patients, estimated blood loss (oral vs IV TXA) in the PACU was 534 $\pm$ 285 mL versus 676 $\pm$ 550 mL, and 769 $\pm$ 257 ml versus 798 $\pm$ 302 ml by POD 1. In TKA patients, estimated blood loss (oral vs IV TXA) in the PACU was 289 $\pm$ 219 mL versus 486 $\pm$ 670 mL, and 716 $\pm$ 288 mL versus 846 $\pm$ 659 mL on POD1. No intraoperative transfusions were given in any group. One patient in the TKA + IV TXA group received a postoperative transfusion. **Conclusion:** Oral TXA can be feasibly administered in the preoperative holding area prior to THA or TKA, and it is non-inferior to IV TXA with respect to CBL and transfusion rates in this setting.

Abstract # A3

Type of presentation: Podium

Authors: Tara Gallant[1], Andrew Gilbert[1], Sina Zargham[1], Michael Frank DiLorenzo[1], Valerie Gerriets PhD[1]
[1] College of Medicine, California Northstate University.

Title: **California statute increasing naloxone availability did not improve opioid overdose rates**

Purpose: This study evaluates the impact of the 2016 California law (CA AB1535) permitting pharmacies to dispense naloxone without a prescription on the rate of opioid overdoses. Based on the survey responses from pharmacies throughout California, differences discovered between regions could be used to determine where resources should be directed in the future in order to make the greatest impact in the fight against the opioid crisis, ensuring people at risk of overdosing on opioids have easy access to this life-saving medication. **Methods:** California counties were categorized based on population density per the California Census, and rates of opioid-related deaths and opioid prescriptions by population density per the California Department of Public Health. Approximately 10 pharmacies from each category were interviewed, for a total of 146 responses. In a brief 1-minute interview, pharmacy representatives were asked if their pharmacy was aware of the 2016 law allowing them to dispense naloxone without a physician's prescription, if naloxone was available at their pharmacy without a physician's prescription, if naloxone is regularly in stock at their pharmacy, and how much it costs to purchase naloxone at their pharmacy. Data was recorded in numerical form, and chi squared tests were used to compare responses from different regions. **Results:** Few differences were discovered between pharmacies from different categories, although there were three statistically significant findings with a p-value set at 0.05. Pharmacies in counties with high overdose rates were more likely to have naloxone in stock than pharmacies in counties with medium overdose rates (p=0.01), and pharmacies in suburban counties were less likely to be aware of the law than pharmacies in both rural counties (p=0.02) and urban counties (p=0.02). **Conclusion:** Although most pharmacies in California are now aware of CA AB1535, it seems to have minimal impact on the overdose rate, as opioid-related deaths have only continued to rise in California since 2016. Pharmacies in counties with high overdose rates were somewhat more likely to be aware of the law and have naloxone in stock than all pharmacies surveyed, although the differences were not statistically significant. Pharmacies in counties with medium overdose rates were actually the most likely to have naloxone available without a physician's prescription, although differences between categories were not statistically significant. Our results suggest that making naloxone available at pharmacies without a physician's prescription is not enough to combat the growing opioid epidemic in California.

Abstract # A4

Type of presentation: Podium

Authors: Darcy C. Engelhart[1], Edward Durant MD[2], Annie A. Ma, MD[4], Margaret Warton[3], Vignesh Arasu MD[2], Raymond Bernal MD[2], Adina S. Rauchwerger[3], Mary E. Reed DrPH[3], David R. Vinson MD[2]
[1] College of Medicine, California Northstate University.
[2] The Permanente Medical Group.
[3] Kaiser Permanente Division of Research.
[4] University of California, Davis Medical Center.

Title: **CT Use Reduction in Ostensive Ureteral Stone (CURIOUS)**

Introduction: Computed tomography (CT) is performed in over 90% of patients diagnosed with ureteral stones, but only 10% of patients presenting to the emergency department (ED) with acute flank pain are hospitalized for a clinically important stone or non-stone diagnosis. We sought to create a highly sensitive clinical decision rule for the prediction of complicated ureteral stone. We hypothesized that the application of this rule to guide imaging decisions could identify patients at sufficiently low risk of this outcome to avoid CT. **Methods:** We conducted a retrospective cohort study of 4000 adults who presented to one of 21 community-based EDs in Northern California and underwent a non-contrast CT for suspected ureteral stone from 1/1/2016 to 12/31/2020. The primary outcome was complicated stone, defined as stone resulting in hospitalization or urologic procedure within 60 days. We used recursive partition analysis to generate a clinical decision rule predicting the outcome. We estimated the c-statistic (area under the curve) and plotted the receiver operating characteristic (ROC) curve for the model and calculated sensitivity, specificity, and predictive values of the model based on a risk threshold of 2%. **Results:** Among 4000 patients, 354 (8.9%) had a complicated stone. Our partition model resulted in four terminal nodes with risks ranging from 0.4% to 21.8%. The area under the ROC curve was 0.81 (95% CI 0.80, 0.83). Using a 2% risk cut point, a clinical decision tree including hydronephrosis, hematuria, and a history of prior stones predicted complicated stones with sensitivity 95.5% (95% CI 92.8 – 97.4), specificity 59.9% (95% CI 58.3 – 61.5), positive predictive value 18.8% (95% CI 18.1 – 19.5), and negative predictive value 99.3% (95% CI 98.8 – 99.6). **Conclusions:** Application of this complicated stone rule to imaging decisions would have led to 63% fewer CT scans with a miss rate of 0.4%. A limitation was the application of our decision rule only to patients who underwent CT for suspected ureteral stone. Thus, this rule would not apply to patients who were thought to have ureteral colic but did not receive a CT because ultrasound or history were sufficient for diagnosis.

Abstract # A5

Type of presentation: Podium

Authors: Yennie Shyu[1], Alyssa Abram[1], Jessa Alcaide[1], John Cusick PhD[1]
[1] College of Medicine, California Northstate University.

Title: **Elucidating the Relationship of RELT Family Members and Human Cancer**

Introduction: RELT is a member of the Tumor Necrosis Family Receptor (TNFR) superfamily. Collectively, RELT and its two paralogs, RELL1 and RELL2, are RELT family members (RELTfms). Recent studies have implicated RELTfms in various cancers and autoantibodies against RELT are upregulated in breast cancer (BC) patients. We sought to examine the effect of RELTfm expression on cancer cell lines and to determine if RELT is upregulated in BC patients. Finally, we sought to study a recently identified physical interaction between RELT and the actin-binding protein Filamin A (FLNA), a protein strongly implicated in many cancers. **Methods:** Luciferase assays measuring ATP were used to assess viability of breast cancer (231), lung cancer (H358) and HEK-293 embryonic kidney (293) cells transiently transfected with plasmids for RELTfms, a C-terminal fragment of FLNA (C-FLNA), or empty vector control (Vector). X-gal morphology and Caspase 3/7 luciferase assays were also used to quantitate death induced by transfection of plasmids for RELTfms. Immunohistochemistry (IHC) was utilized to compare the expression of RELT in biopsies of BC versus healthy mammary controls. Q-Tests and Student's T-test were performed to eliminate outliers and determine significance, respectively. **Results:** Luciferase assays measuring ATP revealed that RELT induced significantly more cell death than RELL1, RELL2, or Vector in H358 and 293 cells. When RELT was co-expressed with C-FLNA in 293 cells, a significantly higher amount of ATP was produced in comparison to RELT or C-FLNA alone. Caspase 3/7 luciferase assays reveal that RELT activates cleavage of Caspases 3 and 7 in 293 cells. X-gal morphology staining confirmed that RELT induces significantly more death than vector in 231 and H358 cancer cells. Lastly, preliminary IHC results showed increased RELT expression in BC biopsies compared to normal mammary tissue. **Conclusion:** Overexpression of RELT leads to increased cell death in several cancer cell lines and activation of Caspase 3/7 in 293 cells. Interestingly, C-FLNA co-expression reduced the ability of RELT to induce death, suggesting a potential physiological outcome of this protein-protein interaction, which is of great interest considering the well-established importance of FLNA, and the increasing implications of RELT, for human cancers.

Abstract # A6

Type of presentation: Podium

Authors: Riyan Bittar[1], Rafael Bravo[1], David Arenson MD[1]
[1] College of Medicine, California Northstate University.

Title: **Effects of Medicaid Expansion on Stage of Diagnosis of Colorectal Cancer in California**

Introduction: In 2014 the Federal Government allowed states to expand coverage of Medicaid to all adults up to the age of 64 with an income up to 138% of the federal poverty level. Medicaid expansion had a goal of providing healthcare to adults who had previously been left without adequate access to healthcare. California was one of the first states to participate in Medicaid expansion starting January 1, 2014. We hypothesized that improved access to care would allow patients with gastrointestinal symptoms to present earlier and should result in colorectal cancer (CRC) being diagnosed at an earlier, less lethal stage. **Methods:** Data was collected using the Surveillance, Epidemiology, and End Results (SEER) program. SEER 18 research plus was the main dataset. The search was confined to the California registries in the pre and post Medicaid expansion 2009-2013 and 2014-2018. Cases were limited to Colon and Rectum cancer (Cecum, Appendix, Ascending Colon, Hepatic Flexure, Transverse Colon, Splenic Flexure, Descending Colon, Sigmoid Colon, Large Intestine NOS, Rectosigmoid Junction, and Rectum) and stage of diagnosis limited to Local, Regional, Distant, and Unknown. Diagnosis was further broken down by age; group ages 0-34, 35-49, and 50-64. Comparisons were analyzed with chi-square calculations for Stage and year data within respective age groups. 1 tailed heteroscedastic t tests were performed to compare specific means of grades before and after expansion within specific groups. **Results:** Datapoints of 64,058 individuals with colon and rectum cancer from 2009-2018 were categorized by age (0-34; N=2714, 35-49; N= 14359, and 50-64; N=46985). Chi square test for independence of frequency data for aggregated years (before expansion, and after expansion) for each grade stage within each group showed a statistically significant association between stage and CRC expansion status (0-34; $p < .0001$, 35-49; $p < .0001$, and 50-64; $p < .0001$). After the expansion, an increase in early stage cancer diagnosis (local tumors) was seen in from the age group 0-34 from a mean of 71/year, 95% CI: 68 - 73 before the expansion (2009-2013) to 153/year, 95% CI: 140 - 165 after the expansion (2014-2018). In this age group there was no significant change in the number of more advanced tumors (t test: $p=.16$). Both later age groups saw a non-significant change in local tumors (t tests: 35-49 $p = .44$; 50-64 $p=.39$) and increase in higher grade tumors after expansion. **Conclusion:** There is a significant difference in the stage of CRC in the age group 0-34 and no difference in the 35-49 or 50-64 age groups.

Abstract # A7

Type of presentation: Podium

Authors: Reshmika Ramesh[1*], Ga Young (Amy) Byeon[1*], Andrew Sanfillipo[1*], Natalie Marlene [2], Andrea Hankins[2], Michele Guillen[2], Jennifer Alford PhD[2], Ulhas Nadgir MD[2], Prakasam Gnanagurudasan MD[2], Carol Parise PhD[2], Arpita Kalla Vyas MD[1,2]
[1] College of Medicine, California Northstate University.
[2] Sutter Institute of Medical Research, Sacramento.

Title: **The Association of Happiness and Resilience with Glycemic Control in Pediatric Type 1 Diabetes Mellitus**

Background: Depression and anxiety are examples of states of emotion that are associated with poor adherence to treatment in pediatric type 1 diabetes mellitus (T1DM). The relationship between perceived happiness and glycemic control is unknown. Resilience also influences perceived happiness and is positively correlated with improved compliance in T1DM. The purpose of this study is to determine if perceived happiness and resilience are positively correlated with better diabetes control.
Methods: Participants were patients between 12-18 years of age with T1DM for 2 or more years without a mental health condition, learning disability, history of substance abuse, or recent significant adverse life events. The Oxford Happiness Score and the Diabetes Strengths and Resilience (DSTAR) Questionnaires were completed by patients. Demographics, hemoglobin A1c (HbA1c), mode of treatment, and duration of TIDM were documented. Pearson Correlations were used to assess the relationship of Happiness with HBA1c, DSTAR, and duration of diabetes. Analysis of Variance was used to determine if mean happiness and DSTAR varied by mode of treatment.
Results: Data were obtained from 34 patients with a mean age of 14.7±2.16 years, had a mean HbA1c of 8.5±2.03, and had T1DM for 6.8±3.79 yrs. Happiness did not correlate with HbA1c (r =-0.229, p=0.201). Higher resilience was correlated with lower HbA1c (r=-0.562, p=0.002) and a higher resilience correlated with increased happiness (r= 0.597, p=0.001). Patients using pump therapy had both higher DSTAR ($F_{1,25}$ =15.39, p = 0.001) and happiness scores ($F_{1,31}$=12.44, p=0.001) when compared with patients on insulin injections.
Conclusion: Our preliminary data suggests that increased happiness is associated with higher resilience in patients with T1DM. Furthermore, patients with higher resilience have lower HBA1c. Our ongoing study aims to recruit more patients and identify targeted interventions to improve states of emotion in T1DM.

Abstract # A8

Type of presentation: Podium

Authors: Jiayi Ge[1], Luke Hsei[1], Shawn Park[1], Rochelle Frank MD[1], Craig Wetterer PhD JD[2], Bridget Mildon[3]
[1] College of Medicine, California Northstate University.
[2] College of Psychology, California Northstate University.
[3] FND Hope.

Title: **Longitudinal Study of International Online Registry for Functional Neurological Disorder Patients**

Introduction: Functional neurological disorder (FND) is a common yet poorly understood medical condition for which large-scale studies are currently lacking. Although there are existing large-scale online international studies and surveys of patient experiences with FND, there have been no patient registries by a patient group collected longitudinally. The use of an organized online registry may prove useful in assessing patient demographics, severity of symptoms, treatments, treatment outcomes, and disorder effect on quality of life. **Methods:** An international online self-reported registry was used to survey English speaking patients with a current diagnosis of FND or one of the listed inclusion terms. Participants were recruited through the FND Hope online website, social media platforms and other digital correspondence throughout 2016-2020. **Results:** 503 participants with a mean age of 43.9 (77.7% female) from 14 countries responded to the survey. Median age of FND diagnosis was within the 40-49 age-group, while median age for first symptom appearance and first doctor visit were both within 30-39. The most common symptoms reported were: excessive fatigue (64.8%), muscle aches (60.7%), joint aches (58.2%), and difficulty walking (53.4%). The most common symptom triggers were stress, exhaustion, and physical exertion. Common self-reported comorbidities were migraines (44.5%), vitamin deficiencies (37.3%), and irritable bowel syndrome (IBS) (35.5%). Some participants reported to believe that psychological (18%) and/or childhood (17%) trauma were the cause of their FND. 43% of patients perceived their illness to worsen over time, as opposed to 11% perceiving improvement; others reported no change or consistent waxing and waning. Treatment options of medication (38.8%), supplementations (33.9%), and occupational therapy (39.7%) were most commonly cited by patients to be helpful. **Conclusion:** This patient registry contributes further evidence to the demographics of FND patients. It illustrates a more complete picture of the various symptoms & comorbidities and their impact on patients' quality of life. Patient quality of life may be improved by quicker diagnosing by recognizing symptoms and initiating commonly helpful treatments. Potential exclusion and survivorship bias due to collecting data from participants associated with the online-based community are limitations.

Abstract # A9

Type of presentation: Podium

Authors: Ashley Yuen[1], Ruth Vinall PhD[2]
[1] College of Medicine, California Northstate University.
[2] College of Pharmacy, California Northstate University.

Title: **Anticancer Activity of Azadirachta Indica on Prostate Cancer**

Introduction: Neem **(**Azadirachta indica) is a medicinal plant used commonly throughout South Asia. Neem has demonstrated a wide range of biological activities, including anti-cancer activities. The goals of this project are to determine whether neem can inhibit prostate cancer cell growth as a single agent and to determine whether it can increase the efficacy of enzalutamide, abiraterone, and/or docetaxel, all of which are current standard of care treatments for advanced prostate cancer. **Methods:** Two prostate cancer cell lines, C4-2B and PC-3, were used to test the anti-cancer effects of neem. Both of these cell lines can grow in the absence of androgen and have metastatic potential and as such model advanced prostate cancer in patients. C4-2B and PC-3 cells were treated with neem, enzalutamide, abiraterone, or docetaxel as single agents or with neem in combination with enzalutamide, abiraterone or docetaxel. For each of the treatments, a clonogenic assay was performed to determine ability of single cells to grow into a colony (assessment of clonogenic potential). Three independent experiments were conducted and each treatment was performed in triplicate for each experiment. Mechanistic studies, including assessing the impact of treatments on expression of intracrine androgen synthesis enzymes through qRT-PCR and western blot analysis, are on-going. **Results:** Neem, abiraterone, enzalutamide, and docetaxel all caused a reduction in the clonogenic potential of PC3 and C4-2B cells. Abiraterone and docetaxel had a bigger impact compared to neem or enzalutamide. Combining neem with abiraterone, enzalutamide, or docetaxel resulted in a further decrease in clonogenic potential. RNA and protein samples have been collected and quantified. **Conclusion:** Our data indicate that neem can inhibit prostate cancer cell growth and increases efficacy of standard of care prostate cancer drugs. Our mechanistic studies will help elucidate how this occurs and could help support the usage of neem in a clinical setting.

Abstract # A10

Type of presentation: Podium

Authors: Eileen Ayoung Byeon[1], Katherine Whitcome PhD[2]
[1] College of Medicine, California Northstate University.
[2] College of Health Sciences, California Northstate University.

Title: **Effect of Knee Joint Stiffness on Gait and Posture**

Introduction: Kyphoscoliosis is a common condition found in Parkinson's disease (PD) patients and is correlated with additional complications of spinal degeneration. Some studies suggest that the spinal abnormality of PD is associated with Parkinsonian gait, characterized by knee joint stiffness. As a continuation of my previous research on parkinsonian gait, this study further examines the impact of knee joint rigidity on the torso and hip. If the torso angle is related to knee flexion, then it is hypothesized that there will be an increase in the torso angle toward the weight bearing leg in the frontal plane when the flexion of the right knee is limited. Additionally, if the hip angle is related to knee flexion, then it is hypothesized that there will be an increase in the ipsilateral hip flexion (right hip angle) during right leg swing phase when the flexion of the right knee is limited. **Method:** Kinematic data were collected with a Vicon MX T10 3-D motion capture system from 7 healthy college students walking at self-selected speeds on a motorized treadmill under two conditions: natural gait (control) and rigid knee gait (experimental), the latter achieved wearing an external knee brace limiting right knee flexion to 30°. Raw data were filtered through a 4th order low pass Butterworth filter, and variables were calculated in MATLAB r2017b software (Mathworks, Inc., USA). Pooled statistical t-tests were conducted using JMP Version14 software (SAS Institute Inc., USA). **Results:** The knee flexion angle of the braced limb was significantly lower than that of the unencumbered limb (t statistic = 9.589977, p-value < 0.0001), confirming braced-induced rigidity. The range of torso motion from side-to-side was greater in braced walking than in natural walking (t statistic = 2.834838, p-value = 0.0030), with less excursion symmetry associated with a larger lateral lean toward the stance limb (t statistic = 2.308217, p-value = 0.0121). No significant difference was found in the hip flexion angle. **Conclusion:** Modifications in gait kinematics as a consequence of experimental knee joint stiffness suggest that persistent Parkinsonian limb rigidity may lead to upper body positional asymmetries, increasing the risk of spinal malalignment, particularly, kyphoscoliosis.

Podium Presentations: College of Pharmacy

Abstract # A11

Type of presentation: Podium

Authors: Anmolpreet Kaur[1], Austin Qiu[1], Justin Lenhard PharmD[1]
[1] College of Pharmacy, California Northstate University.

Title: Pharmacodynamics of Polymyxin B and Ceftazidime-Avibactam against Mixed Cultures of Klebsiella pneumoniae and Pseudomonas aeruginosa

Introduction: Pseudomonas aeruginosa (PA) and Enterobacterales are commonly cultured together in polymicrobial infections. Here, we quantified the pharmacodynamics of polymyxin B (polyB), ceftazidime, and ceftazidime-avibactam (CZA) against co-cultures of PA and carbapenem-resistant Enterobacterales. **Methods**: Four isolates were investigated: PA isolated from a polymicrobial wound infection (clinical-PA), PA supplied by the CDC (CDC-PA), Klebsiella-pneumoniae carbapenamase producing K. pneumoniae (KPC-KP), and New-Delhi-metallo-beta-lactamase-1-producing K. pneumoniae (NDM-KP). Time-kill experiments were conducted over 24 hours using a starting inoculum of 106CFU/mL of each isolate. Concentration arrays of each antibacterial were evaluated against each organism in monoculture and co-cultures of PA cultured with K. pneumoniae. The area under the CFU curve (ceftazidime and CZA experiments) or the maximum log reduction (polyB experiments) was calculated for each drug concentration, and a Hill-type mathematical model was used to determine maximal antibacterial killing (Emax). **Results**: PolyB achieved an Emax of 3.75 (95%CI:2.63-4.88) against the clinical-PA in monoculture, whereas the Emax was 4.03 (95%CI:3.97-4.08) and 3.10 (95%CI:1.84-4.35) during co-culture with KPC-KP and NDM-KP, respectively. When CDC-PA alone was exposed to polyB, the Emax value was 3.67 (95%CI:2.71-4.63), whereas the Emax was 4.24 (95%CI:2.30-6.17) and 4.01 (95%CI:3.42-4.60) when cultured with KPC-KP and NDM-KP, respectively. Ceftazidime alone achieved an Emax of 2.98 against the clinical-PA in monoculture (95%CI: 2.89–3.08), whereas the Emax was only 0.33 (95%CI:0.20–0.46) when clinical-PA was cultured with KPC-KP. In contrast, the Emax for CZA was 2.66 (95%CI:2.57–2.74) against CDC-PA cultured with KPC-KP. The Emax of CZA against clinical-PA in monoculture was 2.97 (95%CI:2.90-3.04) and 3.20 (95%CI:3.10-3.32) when cultured with KPC-KP. The Emax of ceftazidime against clinical-PA was 2.81 (95%CI:2.74–2.88) during monocultures versus 0.73 (95%CI:0.64–0.82) when KPC-KP was also present. **Conclusion/Implications**: Pending future in vivo studies, these results indicate that polyB and CZA may be effective options for polymicrobial infections that involve drug-resistant pathogens.

Abstract # A12

Type of presentation: Podium

Authors: Xinge Zheng[1], Vy Tran Luu[1] Helen Alnabwani[1], Mina Al-Sabbagh[1], Islam Mohamed PhD[1]
[1] College of Pharmacy, California Northstate University.

Title: miR-146a; a potential therapeutic modality against shear stress-induced activation of the pro-inflammatory and pro-proliferative Osteopontin pathway

Introduction: Osteopontin(OPN) is a shear-sensitive matricellular protein that promotes vascular inflammation and proliferation as pre-requisites for Atherosclerosis. MicroRNA-146a(miR-146a) is a key anti-atherogenic shear-sensitive microRNA that can modulate vascular inflammation. Nevertheless, little is known regarding the interplay between miR-146a and the expression of OPN and downstream signaling pathways in response to acute oscillatory shear-stress (OSS) conditions. **Objective**: The goal of our work is to evaluate whether the over-expression of miR-146a can modulate OSS-induced expression levels of OPN and downstream signaling pathways. **Methods**: Human Aortic Endothelial Cells (HAECs) were subjected to simultaneous OSS and unidirectional shear stress (USS) control conditions using the standard orbital shaking model in vitro. HAECs subjected to acute OSS conditions isolated from the edge of the cell culture dish were compared to those isolated from the center of the cell culture dish that were subjected to USS conditions. miR-146a and scramble control were over-expressed using standard transfection protocols. Levels of OPN, its receptor alphaV-Beta3 and downstream signaling messenger, TRAF6, were compared between groups using western blot analyses. **Results**: Our preliminary results showed that HAECs subjected to OSS conditions increased levels of OPN, its receptor alphaV-Beta3 and downstream TRAF6, compared to HAECs subjected to USS conditions. Whereas HAECs cultured under static control conditions showed no difference in expression between HAECs isolated from the edge versus the center of the culture dish. Over-expression of miR-146a blunted the OSS-induced expression of OPN, its receptor alphaV-Beta3 and TRAF6 compared to scramble control. **Conclusion/Implications**: Our findings suggest a potential role of miR-146a in suppressing shear-stress-induced activation of the pro-inflammatory and pro-proliferative OPN pathway. Further studies can confirm the anti-atherogenic effects of miR-146a and its direct interaction with the OPN pathway as a foundation for developing innovative miR-based therapeutic modalities for atherosclerosis.

Abstract # A13

Type of presentation: Podium

Authors: Ngoc Nguyen[1], Julie Lam[1], Daniel Gentry[1], Angeline Le[1], Johnny Tran[1], Fatima Feroze[1], Aqib Khan[1], Alyssa Renison[1], Hongbin Wang PhD[1], Tibebe Woldemariam PhD[1], Uyen Le PhD[1]
[1] College of Pharmacy, California Northstate University.

Title: Formulation of Azadirachtin Using Liposome Technology for the Treatment of Melanoma

Azadirachtin, an active ingredient extracted from Azadirachtin indica, a native to the Indian sub-continent, has shown pesticide and pharmacological activities. Our objective was to develop liposomal formulations of azadirachtin for the treatment of skin melanoma. A thin-film hydration method was utilized to develop the liposomal formulations of azadirachtin, followed by quantification of the compound concentration using the HPLC technique and investigation of the formulations' physicochemical properties. Besides, in vitro cytotoxicity of azadirachtin was evaluated on different human melanoma cells. As a result, azadirachtin showed a significant inhibition on the cell growth of human melanoma cells. In addition, we formulated liposomal azadirachtin and studied the formulation's particle size, drug release, and stability. Although the formulation needs further optimization to achieve a high encapsulation efficiency of drug, liposomal azadirachtin has great potential for the development of a new approach for the treatment of melanoma.

Podium Presentations: College of Health Sciences

Abstract # A14

Type of presentation: Podium

Authors: Anuj Budhiraja[1], Vaniya Qureshi[1], Shymaa Bilasy PhD[2], John Cusick PhD[2]
[1] College of Health Sciences, California Northstate University.
[2] College of Medicine, California Northstate University.

Title: Determining Protein Expression Levels and Signal Transduction Pathways Influenced by the RELT family of Tumor Necrosis Factor Receptors

Receptor Expressed in Lymphoid Tissues (RELT) is a TNFR superfamily member that suppresses activation of T lymphocytes, is required for enamel development, and is implicated in several cancers. RELT has two homologous binding partners, RELL1 and RELL2, these three proteins are collectively referred to as RELT family members (RELTFMs). Several studies have implicated RELTFMs with human cancer, yet the physiological function of these proteins is still poorly understood. A genetic screen identified the actin-binding protein Filamin A (FLNA) as a potential binding partner to RELTFMs, and previous studies indicate that RELT binds MDFIC and is upregulated by TGFβ, two proteins implicated in regulating β-catenin activity. **Objective**: This study sought to examine the expression of RELTFMs in human tissues and cancerous cell lines and to further elucidate signal transduction pathways involving RELTFMs. **Methods**: Lipofectamine was used to transiently transfect cell lines with expression plasmids, and western blotting was used to detect protein expression. Co-immunoprecipitation and western blotting were used to confirm physical interactions between proteins. **Results**: RELT and RELL1 are abundantly expressed in human lung, heart, kidney, stomach, liver, and prostate tissues. RELL2 is expressed at highest levels in HEK-293 cells, and cancerous cell lines representing lung and colorectal cancer. RELT and RELL1 physically bind with a C-terminal fragment of FLNA. Preliminary results indicate that RELL2 downregulates phosphorylation of β-catenin. **Conclusions**: These results confirm a novel interaction between RELTFMs and FLNA, a protein that is strongly implicated in several human cancers. Preliminary results indicate that RELL2 may stabilize β-catenin, an important pathway in determining cell survival. Ongoing efforts are testing whether mutants of FLNA influence the ability of RELT to activate caspases and other pathways. Our results provide novel information regarding RELTFM protein expression in many non-lymphoid tissues, indicating that the evolutionarily conserved RELTFMs possess additional functions that merit further investigation.

Abstract # A15

Type of presentation: Podium

Authors: Mohini Vadalia*[1], Anhtho Tong*[1], Bhagvat Maheta[2], Gloria Poveda MA[1]
*Co-first authors. These authors contributed equally to this work.
[1] College of Health Sciences, California Northstate University.
[2] College of Medicine, California Northstate University.

Title: A Qualitative Analysis of a Health Science University's Service-Learning Through a High School Community's Perspective

Service-learning (SL) experiences are gaining attention and increasing in popularity within primary schools as well as post-secondary educational institutions. Youth tutoring and mentorship can be considered beneficial experiences for both SL students providing the service and the community partner (CP) receiving the service. Although a significant aspect of SL is geared towards the CP, there is a lack of research considering the perspectives of the CP regarding SL. This narrative study aims to address this gap in knowledge by determining the extent to which SL can improve the CP students' self-efficacy, academic achievement, and cognitive engagement and how SL can be improved in light of the COVID-19 pandemic. Intake surveys, structured interviews, and a semi-structured follow-up focus group will be conducted with high school CP students in a Medical Careers Pathway in the Sacramento, CA region. Responses will aim to shed light on how engagement with SL affects these students and gauge how the SL curriculum can be better adapted to meet their needs. We will also explore the extent to which the COVID-19 pandemic affected CP students' academic experience and how they believe SL modalities can be adapted based on the global pandemic. The themes generated by this study will benefit educators who adapt SL into their curriculum and help CP students receive service that is catered to their needs and fosters their growth. Within the research community, this study will also serve as a model to inform future SL research study designs to put a greater emphasis on the CP's perspective.

Abstract # A16

Type of presentation: Podium

Authors: Sherrice Law*[1], Hannah Park*[1], Sumer Sandhu*[1], Eyar Shany*[1], Damon Meyer PhD[1]
*Co-first authors. These authors contributed equally to this work.
[1] College of Health Sciences, California Northstate University.

Title: Effect of BRCA2 expression on homologous recombination in *Saccharomyces cerevisiae*

BRCA2 is a tumor-suppressor gene that is normally expressed in breast and ovarian tissue. The BRCA2 protein mediates the repair of DNA double-strand breaks (DSBs) using homologous recombination, which is a conserved pathway in eukaryotes. Women who express missense mutations in the BRCA2 gene are predisposed to an elevated lifetime risk for both breast cancer and ovarian cancer. In the present study, the efficiency of human BRCA2 (hBRCA2) in DSB repair was investigated in the budding yeast, *Saccharomyces cerevisiae*. While budding yeast does not possess a true BRCA2 homolog, they have a potential functional homolog known as Rad52, which is an essential repair protein involved in mediating homologous recombination using the same mechanism as BRCA2 in humans. Therefore, to examine the functional overlap between Rad52 in yeast and hBRCA2, we expressed the wild-type BRCA2 gene in budding yeast with or without Rad52 and monitored ionizing radiation resistance and DSB repair efficiency. We found that the expression of BRCA2 in rad52 mutants increases both ionizing radiation resistance and DSB repair frequency compared to cells not expressing BRCA2. Specifically, BRCA2 improved the protection against ionizing radiation by 1.93-fold and the repair frequency by 4.41-fold. In addition, our results show that homology length influences repair efficiency in rad52 mutant cells, which impacts BRCA2 mediated repair of DSBs in these cells. This study provides evidence that *S. cerevisiae* could be used to monitor BRCA2 function, which can help in understanding the genetic consequences of BRCA2 variants and how they may contribute to cancer progression.

Podium Presentations: College of Graduate Studies

Master of Pharmaceutical Sciences program

Abstract # A17

Type of presentation: Podium

Authors: Kanika Gulia[1], Justin Lenhard PharmD[2], Abdelbasset Farahat PhD[1]
[1] Master of Pharmaceutical Sciences, California Northstate University.
[2] College of Pharmacy, California Northstate University.

Title: Antimicrobial Evaluation of Novel Diamidine-containing Compounds

According to the CDC, at least 2.8 million people get an antibiotic-resistant infection each year (Antibiotic Resistance Threatens Everyone, 2021). With antibiotic resistance being one of the largest threats to public health, there is a high degree of interest in the design and synthesis of novel antimicrobial agents. Specifically, diamidine-containing compounds have displayed diverse biological activities and have the potential to serve as antimicrobial agents. This project focuses on performing antimicrobial susceptibility studies on novel diamidine-containing compounds synthesized by Dr. Farahat. The aim is to find the minimum inhibitory concentrations (MIC) of novel compounds when testing them against various microorganisms. The MIC is the lowest concentration of an antimicrobial agent that prevents visible growth of an organism after overnight incubation; MICs are often used to determine how susceptible a pathogenic organism is to a specific compound. This study uses the broth microdilution method, in which MIC assays are set up to observe the growth of microorganisms under varying concentrations of antimicrobial agents by using serial dilutions. These assays serve as indicators of the in vitro antimicrobial activity of the novel compounds. The organisms tested include methicillin-susceptible *Staphylococcus aureus*, methicillin-resistant *Staphylococcus aureus* (MRSA), *Enterococcus faecalis*, and vancomycin-resistant *Enterococcus faecium* (VRE), *Escherichia coli*, and *Pseudomonas aeruginosa*. The compounds tested are AF 75, AF 818, AF 1878, AF 1887, AF 1915, AF 1955, AF 1976, AF 2370, and AF 2375. According to the results, the novel diamidine-containing compounds have promise as antimicrobial agents, even against drug-resistant bacterial strains. Specifically, compounds AF 818, AF 1887, AF 1915, and AF 2375 show notable activity as anti-MRSA agents (MIC: 0.25 -2 µg/ml), comparable to the reference drug vancomycin (MIC: 1.5 µg/ml). Compounds AF 1976 and AF 2375 show notable activity as anti-VRE agents (MIC: <0.0625 - 0.25 µg/ml).

Abstract # A18

Type of presentation: Podium

Authors: Priya Manhas[1], Caroline Goswami[2], Ryan Lin[2], Martin Orden[2], Lawrence Santos[1], Ahmed El-Shamy DVM PhD[1]
[1] Master of Pharmaceutical Sciences, California Northstate University.
[2] College of Medicine, California Northstate University.

Title: Optimization of the Cell-Culture Based Model for Hepatitis B Virus Infection

Infection with hepatitis B virus (HBV) remains a potent cause of chronic hepatitis and mortality globally by causing severe complications such as cirrhosis, hepatocellular carcinoma, and hepatic decompensation. With a higher prevalence in many parts of Asia and Africa, targeted screenings and vaccination are the only tools to manage the spread of HBV. Even though curative therapies for hepatitis C virus (HCV) were introduced in 2013, there is no effective cure for HBV infections. One of the first steps in creating a cure is to model the infection in vitro to identify and possibly inhibit key mechanisms crucial to HBV pathogenesis. Although there is an estimated 296 million people chronically infected with HBV infection, it is notoriously difficult to replicate the virus in the laboratory due to the inherent instability of its partially double stranded DNA genome outside of the human body. Here, we show a substantial increase in the HBV infection rate of our NCTP-overexpressed hepatic cell line (HepG2-AE) that has been established in our laboratory. We began by optimizing several steps of the infection protocol. The collection and concentration of viruses resulted in a final titer of $8.2 * 10^6$ GE/mL. Our optimal seeding density of target cells was calculated to be 20,000 per well (about 80% confluency) and the viral genomic equivalence was 1000. We also introduced a heated incubation period to the viral inoculum prior to the infection of the target cells that may have contributed to viral stability through interactions with polyethylene glycol (PEG) and dimethyl sulfoxide (DMSO). After optimization we can visualize via fluorescent microscopy an improved viral infectivity of over 90%. An optimized model of HBV infection with a high infection rate paves the way for further research on the pathogenic mechanisms of infection and can support screening of compounds for antiviral activity.

Abstract # A19

Type of presentation: Podium

Authors: Christiane How-Volkman[1], Carter Bernal[1], Priya Manhas[1], Olivia Wu[2], Shymaa Bilasy PhD[3], Ahmed El-Shamy DVM PhD[1]
[1] Master of Pharmaceutical Sciences, California Northstate University.
[2] College of Medicine, California Northstate University.
[3] College of Dental Medicine, California Northstate University.

Title: Gender Disparity and COVID-19 Disease Outcome: In vitro Pilot Study

While SARS-CoV-2 infection rates have shown to be similar across the two biologically defined sexes, health outcomes have diverged. Men have been shown to have a higher odd of death as well as an approximately 3 times higher odds of requiring intensive treatment unit care compared to females. Therefore, we aim in this study to determine what factor may be facilitating this growing inequity. Firstly, understanding that SARS-CoV-2 exploits the ACE2 receptor to gain cellular entry, the research team was intrigued regarding the possibility of differing cellular infection rates across organs that would be representative of both sexes. To rule out the possibility that the relative expression levels of ACE2 may be enabling this sexual disparity, the research team extracted RNA from both female and male colon, kidney, and lung cell lines. Generally, it has been found that men have higher ACE2 expression which the team proposed could result in worse health outcomes. After screening our selection of dichotomous cellular populations, females demonstrated higher ACE2 expression in both the lungs and kidney, while males exhibited more ACE2 expression in the colon. Subsequent infection experiments have demonstrated marginal differences with male kidney cells illustrating slightly higher infection rates. Additional infections involving the colon and lungs are underway. Thus, our current results conclude that ACE2 expression levels vary among different organs of different genders. However, it seems that there is a modest correlation between ACE2 expression levels and infection efficiency of different organs of different genders. This raises the possibility of the involvement of other factors underlaying the difference in COVID-19 disease progression between male and female. Accordingly, the team aims to understand whether sex hormones such as estradiol may curtail infection, and two time points will be pursued–application of sex hormones before and during infection.

Podium Presentations: College of Psychology

Abstract # A20

Type of presentation: Podium

Authors: Christina Shavers[1], Jason Lillis PhD[1]
[1] College of Psychology, California Northstate University.

Title: The Association Between Depression and BMI Categories and Perception

A key perception individuals with Anorexia have about themselves is that they view their body size as bigger than what it is. 50-75% of individuals with Anorexia Nervosa have a comorbid diagnosis of depression. This secondary data analysis of the National Study of Adolescent Health (Add Health) sought to answer these two questions: •Is BMI associated with having depression? •Are individuals who inaccurately perceive their weight likely to be more depressed than individuals who accurately perceive their weight? This author analyzed the data collected from 5040 individuals ages 24 through 34. Individuals' BMI's were calculated, which were divided into four BMI categories. Underweight BMI <18.5, normal BMI 18.5<25, overweight 25<30, and obese BMI 30+. Individuals responded to questions regarding weight perception, current depressive symptoms, and previous depression diagnosis history. The study's results showed that individuals who have an underweight BMI score significantly higher on a test of present depression symptoms than individuals who are overweight. Individuals who perceive themselves as underweight scored significantly higher on a test of current depression symptoms than individuals who perceive themselves as overweight. Underweight individuals had a higher current depression score and were more likely to have been previously diagnosed with depression. However, being in a higher BMI category was not always associated with being less likely to feel depressed currently or previously diagnosed with depression. Instead, obese individuals face current symptoms and previous diagnoses of depression at significantly higher rates than those who are overweight.

Poster Presentation Abstracts

Poster Presentation: College of Medicine

Abstract # B1

Type of presentation: Poster

Authors: Emily Zheng[1], Stanley Kong[1], David Arenson MD[1]
[1] College of Medicine, California Northstate University.

Title: **Covid-19 Impact on STI Incidence in Sacramento County**

Introduction: In this study, we examined trends in the incidence of gonorrhea, chlamydia and syphilis over the course of the pandemic as a surrogate marker for the impact of COVID-19 on adolescents and young adults and their compliance with social isolation mandates and recommendations. With COVID-19 severely limiting social gatherings, we expected that rates of STIs decline in 2020 compared to previous years. **Methods:** Blinded aggregate data were obtained from Sacramento County Health Department for the years 2018-2020. We looked at gonorrhea, chlamydia, and syphilis incidence in 2018-2020 and performed Chi-square analyses to determine if there was a significant difference in reported cases. **Results:** When we compared cases in 2019 to 2020, we found a noticeable drop in reported chlamydia cases but not gonorrhea or syphilis cases. There was also a greater decrease in number of reported chlamydia cases in women than men. We saw no significant decline in the number of either gonorrhea and syphilis cases in 2020 compared with 2019. If anything, there was a slight increase in total number of reported gonorrhea cases in Sacramento County in 2020 (4,465 versus 4,287 in 2019). **Conclusion:** The impact of COVID-19 on sexual health has been reported in many studies to date with varying conclusions on disruption of STD transmission. Our study suggests that social distancing recommendations did not significantly decrease STD transmission in Sacramento County, but the pandemic did interrupt diagnostic and treatment services. Further research in the future will be needed to potential consequences of delayed diagnosis of STD in association with the disruption of health services during the pandemic.

Abstract # B2

Type of presentation: Poster

Authors: Julie Eggleton[1], Kevin Yu[1], Anand Dhaliwal[1], Collin Clarke[1], Arya Afzali[1], Julia Hutchison DO[2], Leonard Ranasinghe MD PhD[1]
[1] College of Medicine, California Northstate University.
[2] Kaiser Permanante, Modesto Medical Center.

Title: **SARS-COV-2 Positive Patient with Fournier's Gangrene and Multiorgan Complications**

Introduction: Fournier's gangrene is a rare type of necrotizing fasciitis that rapidly progresses towards diffuse tissue necrosis. With this case report, the goal is to present an unusual case of Fournier's gangrene to emphasize the importance of having Fournier's Gangrene as a differential diagnosis and to further aid with future identification, management, and treatment of patients with Fournier's gangrene while bringing to light the future areas of research. **Case presentation:** A thirty-year-old obese male with asthma presented to the Emergency Department with a two-day history of bilateral testicular swelling and an associated constant "painful pressure". The patient's vital signs were BP 135/75, pulse 92, temperature 97.7 °F, respiratory rate 29, weight 172 kg, SpO2 98%. On physical exam the patient was found to have bilateral diffusely edematous scrotum encompassing the penis, mild scrotal tenderness, and a well demarcated erythematous rash. There were no bullae, pustules, ecchymosis, ulcers, crepitus, and no tenderness out of proportion to the exam, which would suggest scrotal cellulitis. An urgent CT of the abdomen and pelvis without contrast was ordered and revealed a right testicular abscess, soft tissue swelling, and subcutaneous gas. The gas within the soft tissue tracking towards the perineum suggesting Fournier's gangrene. Hyponatremia was corrected with IV 0.9% saline. Blood cultures were obtained, and the patient was started on broad spectrum antibiotics (Imipenem, Vancomycin, and Clindamycin). The patient was SARS- CoV-2 positive, and a follow up chest X-ray revealed a right sided pleural effusion. The patient underwent emergent surgical incision and debridement of the abscesses. Post-surgical debridement cultures revealed heavy growth of Peptostreptococcus magnus and Enterococcus faecalis. The patient was treated with 3 weeks of antibiotics with Unasyn. The patient had complications with intubation and extubation, likely secondary to the underlying lung pathology. The patient became septic during his hospital stay but was stabilized and discharged with a vacuum-assisted wound closure after four days. **Discussion:** This case is unique as Fournier's gangrene has not yet been routinely noted as a complication of SARS-CoV-2, though as these necrotizing skin infections are rare and the correlation warrants further investigation and meta-analysis (15).

Abstract # B3

Type of presentation: Poster

Authors: Jeremy Ahearn[1], Peter Vo[1], Prakasam Gnanagurudasan MD[2], Arpita Kalla Vyas MD[1, 2]
[1] College of Medicine, California Northstate University.
[2] Sutter Medical Center, Sacramento, CA.

Title: **Congenital Isolated Adrenocorticotropic Hormone Deficiency due to TBX19 Mutation**

Introduction: Primary adrenal insufficiencies are adrenocortical diseases resulting in decreased or absent hormone production from the adrenal gland. In contrast, secondary adrenal insufficiencies are decreased adrenal gland stimulation from insufficient ACTH production by the anterior pituitary gland. We report on Congenital Isolated Adrenocorticotropic Hormone Deficiency (CIAD), one form of secondary adrenal insufficiency. Typical presentation can include acute onset of fatigue, weakness, dizziness, nausea/vomiting, abdominal/back pain, hypoglycemia, weight loss, or fatigue. Treatment includes hydrocortisone therapy. **Case Presentation:** Patient is a 20-month term male toddler. Initial work-up showed low cortisol, but normal GH and insulin. MRI was normal. Patient was discharged on hydrocortisone. History included neonatal prolonged jaundice. No history of pituitary pathology, injury to the pituitary gland, seizures, septo optic dysplasia, or nystagmus. No family history of hypoglycemia. No hormonal replacement at birth. Initial diagnosis was neonatal hypoglycemia in September 2019. Previous labs showed low ACTH, low cortisol. IGF, free T4, TSH, and renal function panel ordered to rule out pituitary abnormalities and were normal. ACTH stimulation test showed prestimulation cortisol at 0.7 and post stimulation at 1.2. On exam he had no micropenis. Patient started on Cortef 1.25 mg BID. In December 2019, patient was growing well. He was evaluated for possible TBX19 gene mutation associated with CIAD. Cortef increased to 1.25 mg TID. At following visit, genetic report confirmed TBX19 mutation of ACTH deficiency. Parents were consulted on switching Cortef TID to BID with blood sugar monitoring. **Discussion:** Prognosis for CIAD is poor due to increased risk for seizures; however, treatment with hydrocortisone improves prognosis, with many patients living normal lives. Prompt diagnosis is crucial, as prognosis worsens with delay in treatment. In a separate case study on two siblings with TBX19 mutations, presentation included hypoglycemia with seizures and cholestasis, which differed from our patient. We hope to help clinicians recognize TBX19 mutations as a potential cause of severe hypoglycemia.

Abstract # B4

Type of presentation: Poster

Authors: Alexis Cristiano[1], Fahim Ahmed[1], Mark Marfin[1], Alla Ahmad[1], John Fitzgibbon MD[1]
[1] College of Medicine, California Northstate University.

Title: **Pneumomediastinum Secondary to Food Impaction and Spontaneous Primary Pneumomediastinum: A Comparative Case Report**

Introduction: Pneumomediastinum refers to the presence of air in the mediastinum, resulting either from trauma or secondary to situations leading to the leakage of air into the chest cavity. The most common causes of pneumomediastinum include trauma, respiratory disease, or iatrogenic, but can also present spontaneously. We herein report two cases of pneumomediastinum: the first in the setting of esophageal trauma with a history of eosinophilic esophagitis, the second presenting spontaneously in an otherwise healthy young adult. We compare the presentation, treatment, and outcomes of the two cases, and highlight the importance of recognizing symptoms that may assist with diagnosis in the clinical setting, potentially prevent the pathological state, and reduce the length of hospital stays. **Case Presentation:** The first case involves a 45-year-old Caucasian female presenting with food impaction that developed into pneumomediastinum. The patient's prior medical history included esophageal strictures and eosinophilic esophagitis. Upper endoscopy was done to remove the impaction which may have contributed to secondary pneumomediastinum via esophageal perforation. This diagnosis was verified by a chest and neck CT which elucidated air in the retropharyngeal soft tissues, right side of the neck, mediastinum, and esophageal wall. The patient was placed on strict NPO until the perforation resolved and discharged with pantoprazole for eosinophilic esophagitis. The second case involves a 20-year-old female who developed spontaneous pneumomediastinum. She presented with neck pain and tightness at the ED where she was given antibiotics and decadron. The patient had recently recovered from a URI two weeks prior with severe coughing. A X-ray and CT showed soft tissue swelling, retropharyngeal emphysema, and pneumomediastinum. An upper GI fluoroscopy confirmed no perforation. She was discharged with continued Augmentin and Fluconazole for 10 days and put on a liquid diet for 5 days. The etiology of her pneumomediastinum remains unclear. **Discussion:** The two cases of pneumomediastinum present with different symptoms, etiologies, and potential causes, however the work up and treatment was similar. This case comparison highlights the importance of CT scans in diagnosing pneumomediastinum and how those findings can be used to assess the etiology, treatment options, and need for hospitalization.

Abstract # B5

Type of presentation: Poster

Authors: Shayan Ali [1], Ankita Dharmendran[1], Fatima Israr[1], Amber Arif[1], Prakash Ramdass MD[2], Arpita K Vyas MD[1]
[1] College of Medicine, California Northstate University.
[2] St. George's University School Of Medicine, Department Of Public Health And Preventative Medicine, Epidemiology, St. George's, St. George's, Grenada.

Title: **Comparing Metformin, Inositol, and GLP-1 agonists on improving cardiovascular, metabolic, and fertility outcomes in PCOS: a meta-analysis**

Introduction: Polycystic Ovary Syndrome (PCOS) is one of the commonest endocrine disorders in reproductive age women with detrimental long-term health outcomes including type 2 diabetes mellitus, infertility, and cardiovascular disease. Aforementioned long-term outcomes are well known for their socioeconomic burden on our health care systems. Hence it is important to identify therapeutics that can collectively target these long-term complications and thereby improve quality of life in PCOS patients. Inositol, metformin, and glucagon-like peptide 1 (GLP-1) are agents that have been used in the treatment of PCOS. The goal of this project is to determine the most efficacious monotherapy that targets the long-term complications of PCOS. **Methods:** We performed a meta-analysis of randomized controlled trials reporting the effects of inositol, metformin, and GLP-1 agonists on cardiometabolic and reproductive outcomes in PCOS patients. Extensive literature search was conducted utilizing EBSCO, PubMed, and ScienceDirect databases with the following search terms: inositol, metformin, GLP-1 agonists, infertility, ovulatory dysfunction, metabolic, type 2 diabetes mellitus, and cardiovascular. Peer-reviewed publications between 2011-2021 were eligible for inclusion. Aggregate Data was used to complete the statistical analysis. **Results:** 60 peer reviewed studies were identified, 45 randomized controlled trials were selected and included in the meta-analysis. Our preliminary qualitative analysis showed improvements in fasting glucose levels, HOMA-IR, body weight, BMI, ovulation rate, systolic/diastolic blood pressure, total cholesterol, HDL, LDL, and plasma triglyceride levels with all three treatment regimens. **Summary/Conclusions:** In summary, this meta-analysis quantifies the improvement in overall health and the decrease in relative risk of developing long-term complications such a infertility, type 2 diabetes mellitus, and cardiovascular disease after administration of inositol, metformin, and GLP-1 agonists in patients with PCOS.

Abstract # B6

Type of presentation: Poster

Authors: Zeeruk Iqbal[1], Ahmad Al-Zughoul[1], Ali Ayar[1], Rohit Duda[1], Martin Rubin MD[1]
[1] College of Medicine, California Northstate University.

Title: **Investigating COVID-19 Associated Burnout in Healthcare Workers**

Introduction: The ongoing COVID-19 pandemic has played a disruptive role in society and especially the healthcare system. Burnout syndrome is defined as a combination of exhaustion, disengagement, and lower productivity because of chronic workplace stress. Our study investigates whether the current COVID-19 pandemic has exacerbated indicators of burnout among healthcare employees inside and outside the Greater Sacramento region. **Methods:** The study utilized an online survey (via SurveyMonkey) that contained questions adapted from the Oldenburg Burnout Inventory (OLBI). Through email and text messaging, the 24-question survey was delivered to, and disseminated among, healthcare workers within various clinical sites. Participants categorized themselves as either “Physicians,” “Nurses,” or “Other Healthcare Employee,” and were additionally asked if they were frontline workers. Respondents identified themselves as either working within, or outside, the Greater Sacramento region. **Results:** As of January 2022, 21 healthcare workers participated in the survey (14 Physicians, 6 Other Healthcare Employee, 1 declined to answer). 15 identified as a frontline worker (1 declined to answer); 7 respondents reported working within the Greater Sacramento region and 13 reported working outside the region (1 declined to answer). The full-scale total value, which is calculated as the mean value of each question’s score average, is reported to be 2.27. The full-scale total value was further delineated into two values as defined by OLBI: the exhaustion sub-total, calculated to be 2.03, and the disengagement subtotal, calculated to be 1.93. Using the suggested OLBI sub-total cut-off scores from Peterson, U., et al. (2008). "Burnout and physical and mental health among Swedish healthcare workers." (>=2.25 for exhaustion and >=2.1 for disengagement), we found that respondents are below the threshold for exhaustion and disengagement. **Conclusion**: Healthcare employees who completed the survey are below the threshold for exhaustion and disengagement based on statistical parameters set by Peterson, U., et al (2008).

Abstract # B7

Type of presentation: Poster

Authors: Anthony Ma[1], Kayla K Umemoto[1], Shahini Ananth[1], Peter Lo MD[2], Prakash Ramdass MD[3], Dinesh Vyas MD[4]

[1] College of Medicine, California Northstate University.
[2] San Joaquin General Hospital, Department Of Surgery, French Camp, CA, USA
[3] St. George's University School Of Medicine, Department Of Public Health And Preventative Medicine, Epidemiology, St. George's, St. George's, Grenada
[4] Adventist Health Dameron Hospital, Department Of Surgery, Stockton, CA, USA

Title: **The Impact of Hydrodissection in Laparoscopic Gangrenous Cholecystectomies**

Introduction: Gangrenous cholecystectomies (GC) are difficult procedures to perform due to an obstructed field of view and risk of intraoperative complications. In this retrospective study, we introduce the hydrodissection (HD) technique for GC, which incorporates jets of normal saline with laparoscopic cholecystectomy, to replace the currently used blunt dissection technique. Hydrodissection can dissect tissue planes without disrupting the underlying collagen matrix, allowing for visualization of key structures. In this study, we examine the effect of hydrodissection on operating time, conversion to open surgery, and estimated blood loss. **Methods**: A retrospective IRB approved study of 386 laparoscopic cholecystectomies was conducted (2018 to 2020). Patients were categorized into 4 groups: (1) surgeon A employing the HD technique for GC (AHGC), (2) group B of 5 surgeons not employing HD for GD (BNHGC), (3) surgeon A performing standard cholecystectomies (AC), and (4) group B performing standard cholecystectomies (BC). There were 14 AHGC and 10 BNHGC cases, and 14 and 10 matched cases from the AC and BC groups, respectively. Matching was performed using age, ASA score, and BMI. Chi-squared testing, t-testing, and 2-way ANOVA was done, with p-value of <0.05 as statistically significant. **Results**: The operating times (mean±SE in minutes) were AHGC (83.6±18.5), BNHGC (172.1±88.7), AC (64.4±19.6), and BC (112.2±46.6). Chi-squared testing of HD results demonstrated a statistically significant 51.4% reduction in operating time. There were two conversions to open surgeries in the BNHGC group and none in the other three groups. The estimated blood loss (mean±SE in mL) was AHGC (76.07±35.35), BNHGC (152.00±73.56), AC (39.20±13.41), and BC (26.43±17.23), representing a 50.0% reduction. **Conclusion:** Through improving the field of view in GC, HD reduces operating times, blood loss, and intraoperative complications. This represents a significant change in the way patient care is delivered; thus, hydrodissection is poised to become the mainstay technique in laparoscopic gangrenous cholecystectomy. Further studies are needed to investigate the implementation of hydrodissection in medical education and general medical practice.

Abstract # B8

Type of presentation: Poster

Authors: Leo Zhang [1], Gaurav Aulakh [1], Micah Chong [1], Jeffrey Lazarus [1], Rochelle Frank MD [1]
[1] College of Medicine, California Northstate University.

Title: **Treatment of Nocturnal Eructation through Medical Hypnosis**

Introduction: Parasomnias are a type of sleep disorder involving episodic movement, behaviors or experiences that disrupt sleep, examples of which include sleep enuresis, sleep walking, and night terrors.[1] Parasomnias are common early in life and affect 15 to 20 percent of children and 4 percent of adults.[2] Management approaches vary broadly depending on disorder characteristics, and can involve pharmacologic and behavioral therapy. Although therapy goals are aimed towards ensuring the safety of the patient and others, residual or therapy unresponsive behaviors can still have an impact on a patient's quality of life.[3] **Case Summary**: We present a case of a 51-year-old female with a 5-year history of disrupted sleep due to waking up from nocturnal eructation. Numerous medications have provided her minimal relief. Results from a sleep study were also normal. Her past medical history indicated surgery for Meckel's diverticulitis 20 years ago and is otherwise unremarkable with a healthy social, familial, and work life. Possible causes of her nocturnal eructation can be gastrointestinal muscular dysfunction following surgery, aerophagia, sleep apnea, or through a primary sleep disorder. The patient was treated using medical hypnosis through 5 sessions over 3 months time. She was taught to identify the feeling just prior to an eructation episode, transfer that feeling into a personalized visualization, and finally let the feeling go. She also utilized positive future imagery, imagining herself in the future without any disturbed sleep. After each session she was instructed to perform self-hypnosis in a similar manner at least 3 times per day, as well as track her progress using a calendar. By the end of the 5th session, the patient's rating of sleep quality has improved by 79% and eructation by 67%. **Discussion:** This case demonstrates a case of nocturnal eructation being successfully treated with medical hypnosis. Medical hypnosis has been shown to successfully treat tics in Tourette's Syndrome, involving hypnosis techniques of "transference" and "jettison". [4] Although these constitute different groups of disorders, this case demonstrates the possibility of medical hypnosis being an additional treatment option to manage disorders with behavioral symptoms.

Abstract # B9

Type of presentation: Poster

Authors: Kieu Tram-Bach[1], Tania Nasrollahi[1], Keerthi Kurian[1], Adam Rodman MD[2]
[1] College of Medicine, California Northstate University.
[2] Beth Israel Deaconess Medical Center, Boston, MA.

Title: **Pilot of Asynchronous Online-based Open Access Medical History Curriculum**

Introduction/Objective: There is an increase in the frequency of online learning methods utilized among medical schools and advanced training programs. The potential educational benefit of medical podcasts across various disciplines for medical students has also been outlined. Our study aims to collect self-reported student preferences and satisfaction with medical podcast use. We hope this serves as preliminary data and a basis for institutions seeking to implement similar integrated learning methods in their curriculum. **Methods:** We hosted a focus group to conduct a needs assessment and obtain podcast preferences and topics perceived to be important to preclinical didactic training. Based on the results, we developed 2 surveys as outcome measures to accompany the podcasts participants listen to. The pre-listening survey collects baseline demographic information related to medical training and podcast habits. The post-listening survey assesses perceptions of the podcast. **Results:** Seven medical students attended the focus group and completed the needs assessment; one additional student completed the needs assessment at a later time. To date, 8 students completed the pre-listening survey, with participants expressing interest in using podcasts to understand medical topics. Four students completed the post-listening survey, with 75% of participants (n=4) reporting the podcast improved their understanding of the material they were currently learning. **Conclusion:** Data collection is ongoing and anticipated to close at the end of February 2022. Preliminary data is promising, suggesting that the podcasts were enjoyable, accessible, and effective tools for learning medical topics. Seventy-five percent of participants (n=4) reported that podcasts were relevant to and improved their understanding of the material they were currently learning; 75% (n=4) also expressed an interest in listening to and discussing podcasts throughout the academic year to supplement their Phase A curriculum. One hundred percent of participants (n=4) believed podcasts would work best for both Medical Skills and Masters Colloquium. Our pilot study serves as a road map for medical students to formally incorporate podcasts into their preclinical training, and diversify and enrich their studying strategy.

Abstract # B10

Type of presentation: Poster

Authors: Gavin Zanella[1], Nicholas Baltar[1], Ning Zhong MD[2], Kaho Wong MD[3], For-Shing Lu MDi[1]
[1] College of Medicine, California Northstate University.
[2] Kaiser Permanente North Valley Epilepsy Program, Kaiser Permanente Northern California Regional Epilepsy Center, and Department of Neurology, Kaiser Permanente Sacramento Medical Center.
[3] Department of Neurology, Kaiser Permanente Roseville Medical Center

Title: **Heidenhain Variant Creutzfeldt-Jakob Disease Diagnosed with RT-QuIC Assay: A Case Report**

Introduction: Heidenhain variant Creutzfeldt-Jakob disease (HV-CJD) is a form of spongiform encephalopathy characterized by isolated visual symptoms that rapidly progress through a series of often non-specific CNS symptoms that ultimately result in severe dementia, myoclonus, and radically altered mental status. Due to the non-specific nature of this disease's progression, early diagnosis is challenging and can place large amounts of stress and uncertainty on the patient's loved ones. While this case is not entirely unique, it does serve to illustrate the importance of a sensitive and specific diagnostic test when trying to diagnose a patient whose clinical presentation only serves to further complicate accurate diagnosis and treatment. **Case Description:** Our case is a 61-year-old female who presented with complaints of isolated bilateral visual disturbances, which resulted in a diagnosis of occipital ischemic stroke after MRI was performed. Weeks later, she rapidly progressed from focal seizures to non-convulsive status epilepticus refractory to treatment with anticonvulsants and benzodiazepines. At this time, she was diagnosed with Creutzfeldt-Jakob disease (CJD) using a relatively new diagnostic test called "real time quaking induced conversion" (RT-QuIC). **Discussion:** Before the advent of the RT-QuIC assay, the diagnosis of CJD without brain biopsy or autopsy was complicated by the lack of a sensitive and specific test and the absence of a uniform clinical course. This case should indicate to readers that the RT-QuIC assay is a high sensitivity and specificity test available for the diagnosis of suspected CJD. The current literature does not properly recognize the importance and availability of such a test in making the diagnosis of CJD.

Abstract # B11

Type of presentation: Poster

Authors: Deyna Johana Montes Velez[1], Wiliam Bautista[1], Samantha Brophy[1], Justin Chatten-Brown MD[1], Leonard Ranasinghe MD PhD[1]
[1] College of Medicine, California Northstate University.

Title: **A Case of Botulism in an Adult Patient**

Introduction: Clostridium botulinum is an anaerobic gram-positive spore forming bacteria widely distributed in soil. The bacteria released botulinum toxin, a neurotoxin that causes botulism. This neurotoxin spreads systematically, binding irreversibly to presynaptic nerve endings at neuromuscular junctions where the toxin can enter the cell and cleave SNARE proteins, thereby preventing acetylcholine release. Diagnosis of botulism is primarily based on clinical findings caused by the blockage of voluntary motor and autonomic cholinergic junctions. These clinical manifestations include xerostomia, nausea/vomiting, diplopia, dysarthria, dysphagia, fixed dilated pupils followed by descending paralysis, and respiratory difficulty[1, 2, 3, 4, 5]. Botulism can be classified as either infant botulism, foodborne botulism, wound botulism, adult colonization botulism, or iatrogenic botulism[1]. **Case Presentation**: A 41-year-old female with a history of intravenous (IV) polysubstance abuse presented to the Emergency Department (ED) with complaints of sudden onset of difficulty speaking from early evening the previous day. The patient had been sober from heroin and meth for one year but relapsed this week. She notes that three days prior she had an abscess drained at another ED. She stated no recent illness, fever, or chills and did not clarify whether she was currently on antibiotics. Her initial vitals were blood pressure160/61 mm Hg, heart rate 116 beats per minute, respiratory rate 20 breaths per minutes, oxygen saturation 95% room air, and temperature of 36.6º Celsius. She had bilateral facial weakness, ptosis, and external ophthalmoplegia. Patient could answer questions appropriately but speech was slurred. A computed tomography (CT) without contrast and a magnetic resonance imaging (MRI) of the patient's head were done, both with no notable findings. Given the presentation of slurred speech, ptosis, facial weakness, and mild difficulty breathing, wound botulism was suspected. Patient was treated with 110mL IV botulism antitoxin and admitted to the Intensive Care Unit (ICU). **Discussion**: This case illustrates the need for prompt and accurate diagnosis of wound botulism to ensure optimal patient outcome.

Abstract # B12

Type of presentation: Poster

Authors: Nidhi Reddy[1], Hailey Begert-Hellings[1], Sohun Saleel Awsare[1], David Anthony Chirikian[1], Arpita Vyas MD[1]
[1] College of Medicine, California Northstate University.

Title: **Emergency Room Triaging Practices and Admission Criteria for Pediatric Diabetic Ketoacidosis**

Introduction: Pediatric diabetic ketoacidosis (DKA) is a life-threatening exacerbation that can arise in children or adolescents with Type 1 or Type II Diabetes Mellitus. DKA patients require extensive therapeutic intervention upon presenting to emergency rooms, and although some pediatric DKA standards of care have been established, triaging practices often widely differ between institutions across the United States. We aim to determine the contributing factors for admission of pediatric DKA patients to the pediatric intensive care unit (PICU) and the value such factors play in admission criteria and outcomes. We hypothesize that there will be variability in utilization of standardized DKA protocol in the Emergency Room (ER). **Methods:** To determine differences across California Emergency Departments, a telephone survey was created to collect demographic information, admission criteria, and treatment protocols. Surveys were conducted both over the phone and/or over an online form and primarily involved gathering information from an ER or pediatric ER physician or some other ER staff in charge. This study was deemed IRB exempt. **Results:** We identified approximately 90 ERs across the state of California, of which 30 sites also have pediatric intensive care units (PICU's). Thus far, we have surveyed 19 ERs. 27.8% of the hospitals surveyed have a designated pediatric ER and pediatric ICU; 89.5% of the surveyed hospitals have a pediatric department. At hospital sites where there is no designated pediatric ER and pediatric ICU, only 38.5% of these hospitals have pediatric endocrinologists at their institution. 68.9% of all surveyed hospitals admit all suspected pediatric DKA patients to the ICU/PICU. While all hospitals would consider a venous pH less than 7.2 and bicarbonate less than 10 mmol as meeting criteria for admission, most but not all (93.8%) hospitals considered venous pH between 7.2 and 7.3 with a bicarbonate level less than 15 mmol as meeting criteria for admission. **Conclusion:** Our data so far shows variability in triaging practices and criteria for admission of the pediatric DKA patient. There is some variability in the factors that are prioritized across hospital sites in the criteria for admitting pediatric DKA patients to the ICU. That said, factors such as altered mental status, or venous pH less than 7.2 with a bicarbonate level lower than 10 mmol/L or Kussmaul breathing, are considered criteria for ICU admission at all surveyed hospitals. Subsequent investigation, specifically that focused on the admission criteria within hospital sites that also have a PICU, is integral to fully understanding the current variation in admission criteria and practices for pediatric DKA and how it can be optimized the management of pediatric DKA.

Abstract # B13

Type of presentation: Poster

Authors: Sahib Bhatia[1], Salim Chamoun[1], Ashwin Sidhu[1], Muhammad Zafar[1], Nalin Ranasinghe MD[2], Leonard Ranasinghe MD PhD[1]
[1] College of Medicine, California Northstate University.
[2] AO Fox Hospital, Oneonta, New York.

Title: **Renal Infarction and Decreased Splenic Perfusion Secondary to a Left Ventricular Thrombus: A Case Report**

Introduction: Left ventricular (LV) thrombus can manifest as a complication of LV dysfunction. With the potential to embolize, LV thrombus can lead to complications such as stroke. It also is associated with high rates of mortality and morbidity. The natural history of LV thrombi includes resolution and endothelialization. However, embolization may occur prior to one of these outcomes. Splenic infarction can result from occlusion, via embolus or thrombus, of the splenic artery or one of its sub-branches. **Case Presentation:** A 67-year-old male with a past medical history of coronary artery disease, type II diabetes, hypertension, hyperlipidemia, chronic heart failure, diverticulitis, and gastroesophageal reflux presented with one week of abdominal pain. The pain was described as sharp and rated as an 8/10, intermittent occurrence. Clinically, the patient did not appear to be in distress, however, the presence of left lower abdomen tenderness was noted. Respiratory rate was 29 breaths/min with a blood pressure of 167/78. Physical examination exhibited an enlargement of the heart, and the initial impression was no acute abnormality. A CT with the contrast of the abdomen/pelvis confirmed the enlargement of the heart (Fig-1) and a left ventricular filling defect was observed (Fig-2). The physicians noted that the heart functionality has worsened compared with a visit three years ago. The patient was started on IV heparin. Multiple gallbladder stones are noted, and the spleen showed delayed enhancement with calcifications in the splenic artery. The physician noted the possibility of decreased blood flow. There were no significant findings observed in the right kidney, however, the left kidney exhibits a large area of decreased enhancement (suggestive of ischemia) (Fig-3 and Fig-4). The discharge medications prescribed given this patient's left ventricular thrombus were 120 mg/0.8 mL of enoxaparin (Lovenox) and 5 mg tablets of warfarin (Coumadin). **Discussion:** For patients who present with acute abdominal pain, it is important to consider splenic infarction as a potential cause. Although this patient's extensive cardiovascular medical history may have prompted the need for heart imaging and labs, it is important to explore cardiac dysfunction, especially thrombus, for all patients.

Abstract # B14

Type of presentation: Poster

Authors: M Chan , TA Allison MD PhD[2, 3]
[1] College of Medicine, California Northstate University.
[2] University of California, San Francisco, San Francisco, CA.
[3] San Francisco VA.

Title: **Remembered Music in the Context of Dementia**

Background: Quality of life (QOL) is a critical aspect of dementia care, and recent focus has targeted music as a non-pharmacological intervention to support QOL for people living with dementia (PLWD). While much is known of physiological mechanisms underlying music recall, little is known about why only certain music is remembered out of a lifetime of musical experiences. To this end, we address the following questions in our research study: What music is remembered in the context of dementia-related memory impairment? Why is such music remembered? **Methods:** We analyzed an existing qualitative data set collected 21 dementia caregiving dyads living at home, with dementia at all stages. Data set included 1452 pages of transcripts from semi-structured interviews and participant observation involving musicking. Two members of the research team conducted a focused analysis to: 1) identify all music recalled by PLWD, 2) analyze identified music for common core features (structure, scale, tempo, genre), and 3) examine the social and conversational context in which music was recalled. **Results:** Remembered music was overwhelmingly consistent with music that was popular either in the U.S. or within PLWD's family. For this primarily US-born PLWD group, music predominantly consisted of songs (e.g. music with words vs music without words) in a major scale at a medium-fast tempo (approximately 115 bpm). Additionally, these particular songs were of multiple genres and associated with different timepoints across PLWD's lifespan. We identified two closely interrelated themes. First, songs remembered by PLWD were not due to specific musical features but rather the social context and history of PLWD's song exposure. Second, the music remembered depended on the conversational context, particularly upon specific questions or non-verbal prompts from caregivers and researchers with whom PLWD interacted. **Conclusion:** For this group of PLWD, remembered music was dependent on lifelong musical experiences and associated with a meaningful past history. The songs recalled were dependent on the social and conversational context. **Implications:** These findings allow both researchers to curate an individualized, effective playlist for PLWD to improve their QoL as well as clinicians to tailor specific questions during patient encounters to help optimize PLWD music recall.

Abstract # B15

Type of presentation: Poster

Authors: Elaine Cheung[1], Roopa Judge[2], Ikjot Thind[1], Valerie Gerriets PhD[1]
[1] College of Medicine, California Northstate University.
[2] University of California, Davis Medical School, Sacramento, CA.

Title: **Assessing Stress and Burnout in Medical Students during the COVID-19 Pandemic**

Introduction: As medical students (MS), many sources of stress can come from rigorous academic work, social activities, and other social determinants of health, thus resulting in burnout. Changes to schooling in the COVID-19 pandemic could further contribute to stress and burnout. Our survey responses suggest that students attending medical school in the pandemic are negatively affected by stress and burnout but not at a different rate than those training prior to the pandemic. **Methods:** We used a survey in which we gathered demographic data and used 4 different validated scales to measure perceived stress, anxiety, depression, and burnout from students at California Northstate University College of Medicine (CNUCOM) and UC Davis School of Medicine (UCDSOM). Questions addressed students' living situations, extracurricular activities, and coping mechanisms. Data was analyzed using the overall average scores and calculated standard deviations from the perceived stress and burnout surveys using the PSS-10 and OLBI scales respectively. Comparisons will be made between schooling before and during the COVID-19 pandemic via t-test. **Results:** For the pre-pandemic survey, 271 students responded to the survey (90 MS1, 98 MS2, 38 MS3, 24 MS4, 20 skipped, 1 other). For the current survey, 25 students responded to the survey (12 male, 13 female) from each class (3 MS1, 15 MS2, 3 MS3, 4 MS4). The mean of the pre-pandemic stress scale was 15.96 with a standard deviation (SD) of 5.90. The mean during the pandemic was 16.88, SD = 5.49 (t-test = 0.22). The mean of the pre-pandemic burnout was 35.51, SD = 5.41. The mean during the pandemic was 38.32, SD= 5.09 (t-test = 0.01). A higher proportion of MS2 student responders in our pandemic survey may also have skewed data results. **Conclusion:** There is no statistically significant change in medical student burnout before and during the COVID-19 pandemic but there is a statistically significant change in stress. Limitations to this cross-sectional study comparison include smaller sample size in the survey responses obtained during the COVID-19 pandemic, selection bias, and self-reporting. One confounding factor for our survey results could be that students may be too burnt out from virtual learning during the pandemic and refuse the optional wellness survey.

Abstract # B16

Type of presentation: Poster

Authors: Alexander Chiang[1], Samantha Brophy[1], Thomas Russell[1], John Fitzgibbons MD[1]
[1] College of Medicine, California Northstate University.

Title: **Timing and Choice of Antibiotics in Reducing Sepsis Mortality**

Introduction: Sepsis is the body's response to infection and mediators include TNF-α, interleukins, and platelet activating factor, among many others. Normally the body's inflammatory response is self-limited, but in sepsis the persistent and repetitive inflammatory response results in sufficient damage to the patient's own body- downregulation can no longer occur naturally and the body can no longer mediate its own inflammatory response (3). This can cause significant tissue damage, organ dysfunction, and may lead to death. Significant roadblocks have occured when both defining and treating this condition, such that the mortality rate for patients in the US who contract sepsis is still 35-52%. Various aspects of early intervention, such as the timing of antibiotic administration and early fluid resuscitation, have been found to be a significant contributor to patient mortality. While the implementation of newer sepsis protocols has been found to reduce current mortality rates, there is still a large grey area in the definition of sepsis and as such the subsequent treatment protocol. We hope to describe the current state of research and summarize the importance of timely intervention and administration of antibiotics which is crucial to patient mortality rates as well as address further analyses and clinical correlations that should be explored further in future research studies. **Method:** We performed a comprehensive literature review of pertinent meta-analyses and papers currently published regarding antibiotic regimens currently used in the treatment of sepsis. By compiling a database in the most evidence-based way possible, we have determined the most prevalent evidence-based protocol currently advised by current literature. This consisted of peer-reviewed studies and mata-analyses on PubMed and ScienceDirect with the following terms: "Sepsis; antibiotic regimen [OR] antibiotics"; "Sepsis protocols; antibiotics"; "Infection rates; antibiotics in sepsis"; "Sepsis protocol; Meta-analysis; antibiotics [OR] antibiotic regimen". Subsequent follow-ups on three large studies recommended by Dr. Russell were also used by following references to other related publications. **Conclusion**: By providing physicians with a consolidated treatment plan, we can hope to decrease the current sepsis mortality rates. With efficient and evidence-based protocols we can bring a more concrete definition to sepsis and its treatment. Current data and research indicate that immediate broad spectrum antibiotic administration has been associated with a decreased mortality rate in large patient studies. There is some data that may indicate waiting for cultures to determine appropriate antibiotics has some benefit, but current examinations of sepsis in larger studies have not confirmed this as of now.

Abstract # B17

Type of presentation: Poster

Authors: Alan Chien[1], Rachel Lee[1], Benjamin Slobodnik[1], Nalin Ranasinghe MD[1, 2], and Leonard Ranasinghe MD PhD[1]
[1] College of Medicine, California Northstate University.
[2] AO Fox Hospital, Oneonta, NY .

Title: **Atypical Compartment Syndrome of the Thigh Following Trauma & Rupture of Quadriceps Tendon**

Introduction: Acute Compartment Syndrome (ACS) is a surgical emergency typically affecting the limbs, which presents with pain, paresthesias, and pulselessness. Physical trauma encourages inflammation and fluid accumulation that increases intracompartmental pressure. A 10-20 mmHg increase can lead to tissue necrosis and nerve damage, and irreversible tissue damage occurs as early as 8 hours of syndrome onset[2]. ACS is an uncommon injury, affecting 7.3 per 100,000 in males and 0.7 per 100,000 in females[3]. Cases of ACS following a quadriceps tendon rupture are even more rare. **Case Presentation:** We present a case of a 54-year-old male who fell down 3 steps of stairs and presented to the emergency department complaining of intense pain in his right upper thigh. His past medical history is significant for anxiety, schizophrenia, diabetes, hypercholesterolemia, hypertension, and heart disease (including a previous myocardial infarction), and stent placements. He presented to the same emergency department the prior day for chest pain although a cardiac work-up failed to show any abnormalities and he was sent home. His vitals were BP 142/77, pulse 77, temperature 97.7F, respiratory rate 16, BMI of 29.8, and O2 sat 97%. His labs showed elevated WBC (11.0k), albumin/globulin ratio (2.3), and creatinine phosphokinase (236) and a mildly low total protein (5.9). An EKG, CT of the head, abdomen and pelvis were unremarkable. CT of the right lower extremity showed a suprapatellar musculotendinous junction injury, indicating a right quadriceps tendon rupture. The anterior compartment pressure was elevated and orthopedics were consulted for urgent consideration of fasciotomy. The patient underwent an anterior compartment fasciotomy which he tolerated well with the use of IV and oral narcotics, and was given 3 units PRBCs for acute blood loss anemia. The patient returned 2 days later for a repair of the right quadriceps tendon and closure fasciotomy of the right thigh anterior compartment and was subsequently discharged after a successful procedure. **Discussion:** This case illustrates the atypical nature of compartment syndrome of the thigh following trauma of following down 3 steps of stairs and rupture of the quadriceps tendon as well as the need for urgent fasciotomy.

Abstract # B18

Type of presentation: Poster

Authors: Tanvi Chokshi[1], Ethan Wilson[1], Michael Ysit[1], Sameir Alhadi MD[2], Leonard Ranasinghe MD PhD[1]
[1] College of Medicine, California Northstate University.
[2] St. Agnes Medical Center, Fresno, CA

Title: **A Case Report of Delayed Hemothorax Complicated by Fibrothorax**

Introduction: Delayed hemothorax is a life-threatening complication of thoracic trauma, commonly including rib fractures, that carries significant morbidity [1,2]. Delayed hemothorax has been reported to develop 2 hours up until 44 days after initial injury and is therefore an easily missed sequelae of chest trauma [3]. Treatments vary from non-surgical management with tube thoracostomy and thoracentesis to operative intervention, often including video-assisted thoracoscopic surgery [4]. Management is rarely complicated by retained hemothorax with or without subsequent fibrothorax [5,6]. Fibrothorax typically requires more invasive surgical management of thoracotomy [4]. We present a case of delayed large hemothorax 11 days after blunt chest trauma complicated by retained hemothorax with fibrothorax requiring open thoracotomy. **Case Description:** A 77-year-old male was brought in by ambulance to the emergency department after sustaining a fall from his bicycle. An x-ray of the right shoulder demonstrated a comminuted, displaced and overriding fracture of the right mid-clavicle and multiple right rib fractures. Contrast enhanced chest CT demonstrated displaced fractures of the lateral right 3rd-8th ribs with small right-sided apical pneumothorax. Eleven days post initial trauma, the patient returned via ambulance with acute onset dyspnea, generalized weakness and lightheadedness. CT angiography of the chest demonstrated a large, loculated, right hemothorax, and 3 L of serosanguinous fluid was drained via a right-sided CT-guided chest-tube. Follow-up chest CT demonstrated retained right loculated hemothorax and video-assisted thoracoscopic surgery (VATS) was performed on the third day of admission. Adhesions with fibrothorax of right middle and lower lobes were found, as well as hemothorax in right pleural space, requiring a conversion to open thoracotomy. The patient remained hemodynamically stable without recurrence of pneumothorax or hemothorax and was discharged six days later. **Discussion:** Delayed hemothorax should be carefully considered and anticipated in all patients presenting with thoracic injuries. Consideration of patient-specific factors and utilization of the Quebec clinical decision rule may better inform risk stratification for the development of delayed hemothorax, and improve patient outcomes via informed education and follow up [9].

Abstract # B19

Type of presentation: Poster

Authors: Jacquelyn Combs[1], Narra Teja[1], Conway Ou[1], Deyna Velaz Monta[1], Justin Chatten-Brown[1], Leonard Ranasinghe MD PhD[1]
[1] College of Medicine, California Northstate University.

Title: **Case Report: Post-partum Eclampsia Complicated by Cerebral Venous Thrombosis**

Cerebral Vein Thrombosis associated with preeclampsia is a rare phenomenon that is not fully understood and presents a potentially challenging situation for treatment and future management. This case presents a 25-year old female with a history of gestational diabetes and hypertriglyceridemia presenting three days post-partum for an eclamptic seizure complicated by cerebral vein thrombosis and HELLP syndrome. The patient's presenting symptoms were alleviated by eclampsia procedure, anti-anxiety medication, and two different types of anticoagulation. Thrombectomy was not indicated, as imaging did not suggest any large vein clotting. Future check ins as well as careful considerations in the event of future pregnancies should be pursued by the physicians. Testing and gaining a better understanding of the pathophysiology behind cerebral vein thrombosis proves to be difficult as the occurrence is rare, but looking to previous literature to further an understanding of eclampsia and how it progresses in the body may help to provide a greater insight into similar cases and the approach that should be used in said cases.

Abstract # B20

Type of presentation: Poster

Authors: Danielle Darakjian[1], N Gajawelli[2], N Paquette[2], J Shi[2], Y Wang PhD[3], Y Lao[2], R Ceschin[4], MD Nelson MD[2], A Panigraphy MD[2], N Lepore PhD[2]
[1] College of Medicine, California Northstate University.
[2] University of Southern California, Children's Hospital Radiology, Los Angeles, CA.
[3] Arizona State University, Department of Computer Science, Tempe, AZ.
[4] UCSF Department of Pediatrics, Fresno, CA.

Title: **Effects of genetic and gestational risk factors for late onset Alzheimer's disease on neonatal brain morphology**

Introduction: Preterm birth is associated with an array of neurological deficits that can persist throughout life. The hippocampus is especially vulnerable to the effects of prematurity, and low birth rate is associated with risk of dementia later in life.
The APOE gene is involved in the etiology of Alzheimer's Disease (AD), and carriers of the E4 allele are almost twice as likely to develop late onset AD. Although there is some literature suggesting that APOE affects brain development early in life, a precise quantification of the effects is unknown. This research intends to discover the effects of APOE4 carrier status and prematurity on hippocampal morphometry. We anticipate that carriers of APOE4 will present deficits in the hippocampus as compared to non-carriers, and these deficits will be more prominent in preterm infants compared to full-term infants. **Methods:** MRI data was collected from infants in the Los Angeles area. DNA samples were collected from the infants, with the sample population divided into four groups: 1) preterm E4 carriers, 2) preterm non-carriers, 3) full-term E4 carriers, 4) full-term non-carriers. For all subjects, hippocampi were segmented using both manual and semi-automatic techniques. The semi-automated pipeline uses atlas registration to extract structures such as the hippocampus from neonatal brain MRI. Multivariate Tensor Based Morphometry (mTBM) is used to analyze anatomical differences between groups by comparing surface parameterizations representing subject brains. **Results:** Results pending. Based on the results of previous studies, we expect to find that the hippocampus is smaller in preterm infants than full term infants. We anticipate that the differences in hippocampal volume and morphometry will be more pronounced in the APOE4 carriers. **Conclusion:** If our hypothesis is proven correct, this indicates that APOE affects brain development earlier than previously theorized. These results can be used to assess risk for developing neuronal inflammation and Alzheimer's Disease.

Abstract # B21

Type of presentation: Poster

Authors: Zachary Tsai[1], Jessica Xu[1], Paolo DiSano[1], Leonard Ranasinghe MD PhD[1]
[1] College of Medicine, California Northstate University.

Title: **Superior Mesenteric Venous Thrombosis - the Impact of Inflammation and Hypercoagulability**

Introduction: Acute mesenteric ischemia (AMI) is caused by inadequate blood flow through the mesenteric vessels that can lead to end organ damage of the bowel wall. Blockage of the superior mesenteric vein (SMV) is rare as it accounts for 1 in 1000 emergency department admissions, and 6% to 9% of all cases of acute mesenteric ischemia. Delayed intervention is often lethal. Superior mesenteric venous thrombosis (SMVT) may be embolic, thrombotic, primary vasoconstrictive, or secondary to venous thrombosis. Thrombosis presents with abdominal pain out of proportion to endoscopic findings in 91-100% of cases and occult blood in 50% of cases. **Case Presentation**: A 78-year-old female with a past medical history of diabetes, epigastric hernia, gastric ulcer, hyperlipidemia, hypertension, and hypothyroidism presents to the emergency department with abdomen cramping and bloody loose stools. The patient's vital signs on physical examination include blood pressure of 134/61 mmHg, pulse 84 beats per minute, respiratory rate 18 breaths per minute, temperature 97.3 degrees Fahrenheit, and pulse oximetry 94% on room air. The abdominal physical exam was significant for the lack of abdominal tenderness with no guarding or rebound and a soft abdomen with no masses. The genitourinary showed the Guaiac testing positive for occult blood. The rest of the physical exam was unremarkable. Initial labs showed increased white blood cell count, INR, C-reactive protein and positive occult blood. After treatment, labs were within normal ranges. The CT with contrast of abdomen and pelvis showed a proximal SMV with a large clot that extended into part of the distal branches, but celiac and superior mesenteric artery branches remained patent. After diagnosis of SMVT, the consultant surgeon started her on a heparin drip. Patient was switched to Apixaban before discharge. Dark stools resolved before discharge. Patient advised to arrange additional blood tests for hypercoagulation as an outpatient at hematology. **Discussion:** This case demonstrates how an inflamed state and hypercoagulable risk factors can culminate into SMVT. Early prophylactic anticoagulation or thrombolysis, and use of CT scan for diagnosis, is integral for reducing the potential of multisystem organ failure and death in clinically suspected SMVT.

Abstract # B22

Type of presentation: Poster

Authors: Omar Elsemary[1]*, Iqbal Grewal[1]*, Nancy Le[1]*, Tin Ngo[1], Nadeem Mukhtar DO[2]
[1] College of Medicine, California Northstate University.
[2] Mercy San Juan Medical Center, Carmichael, CA, USA.

Title: **Spinal Infarction in a Young Adult without Predisposing Risk Factors: A Case Report**

Introduction: Spinal infarctions are a result of spinal artery blockage leading to spinal tissue ischemia.[1,2,3] Common presentations of spinal infarctions include paraplegia, quadriplegia, back pain, weakness, loss of sensation, and other neurological symptoms. Spinal infarction can be due to traumatic or spontaneous/idiopathic causes. Risk factors such as hypertension, diabetes mellitus, and vascular disease predispose elderly individuals to spinal infarction.[8,9]Current literature suggests spinal infarctions in young adults are rare. In this study, we report a case of spinal infarction in a 25-year-old patient who presents without any predisposing risk factors. **Case Presentation:** Patient is a 25-year-old male who presented to the ED for acute motor weakness and loss of sensation in all extremities. He was at a party when he attempted a dance move which involved him balancing on his head momentarily. Soon after he began experiencing sudden weakness and numbness in his hands, which then progressed to his legs leading to unstable gait. This is when the patient called 911 and was brought to the ED. The patient had 3/5 motor strength of bilateral shoulders and elbows, 0/5 wrist and finger strength with complete loss of fine motor ability, and 0/5 strength of lower extremities. Loss of all sensation at about T2-T3 spinal level and below. **Discussion:** The patient presents with loss of sensation at and below the T4 level along with complete paralysis of the lower extremities, suggesting all three spinal arteries were infarcted. Initial MRI displayed no injury to the spinal cord, ruling out trauma to the spinal arteries; however, another MRI displayed ischemic damage to the spinal cord at the level of C4. Extreme cases of spinal artery ischemia resulting in loss of sensation and paralysis of lower extremities are rare, and even more-so within a younger demographic, especially considering the patient lacks any predisposing risk factors such as vascular defects or coagulopathies. Raising awareness of cases of spinal ischemia in younger patients is important for prevention of irreversible damage by allowing care takers to act quickly.

Abstract # B23

Type of presentation: Poster

Authors: Arjavon Talebzadeh[1], Daniel Gentry[1], Sean Wong[1], Valerie Gerriets PhD[1]
[1] College of Medicine, California Northstate University.

Title: **The Impact of SB159 on Pharmacy Stock of HIV Prophylaxis in Sacramento County**

Introduction: Since its recognition as a pandemic in 1981 by the US Center for Disease Control, the human immunodeficiency virus (HIV) has posed a significant scientific and political challenge among many demographics across the USA, especially amongst men who have sex with men. In 2019, California governor Gavin Newsom passed into law Senate Bill 159 (SB 159), allowing pharmacists to furnish HIV pre-exposure prophylaxis (PrEP) and post-exposure prophylaxis (PEP) to patients without a physician's prescription. Despite the improved accessibility to HIV prophylaxis provided by this legislation, it is questionable if these changes are reflected in the furnishing rates of these drugs. This project seeks to investigate the source of this lower-than-expected dissemination of HIV medication by surveying California pharmacies on their understanding and experience with furnishing PrEP and PEP prophylaxis. **Methods**: 146 pharmacies in Sacramento County were called to answer a brief questionnaire. Respondent pharmacies were identified as carriers or non-carriers based on whether they carried PrEP/PEP prophylaxis and assessed for their familiarity with SB-159 and comfort with dispensing HIV prophylaxis. Two-sample z-tests for the difference in proportions ($\alpha = 0.05$) were performed to identify differences between the groups. **Results**: Eighteen out of 146 pharmacies (12%) participated in our survey. 9 out of 18 responding pharmacies reported carrying HIV prophylaxis in stock (50% carriers), and the other 9 did not (50% non-carriers). Two out of 9 (22%) non-carrier respondents stated that they have plans to stock HIV PEP and PrEP in the future. When asked, 0 out of 9 carrier respondents and 1 out of 9 non-carrier respondents (11%) stated they advertise the ability to obtain prophylaxis without prescription. One out of 9 carriers (11%) and 2 out of 9 (22%) non-carriers expressed plans for training to furnish PEP and PrEP, and a two-tailed two-sample z-test for the difference in proportions failed to identify a statistically significant difference between the proportions of those with plans for training (**z = - 0.6396, P-value = 0.5224). Conclusion:** With such a low response rate, our analysis suffered from a small sample size, and thus these data ought to be interpreted with caution. With current COVID 19 vaccination efforts, pharmacies have been inordinately busy with immunizations and other similar efforts. Regardless, survey participants identified as either carriers or non-carriers showed similar responses to such questions related to familiarity with SB-159, comfort with dispensing HIV prophylaxis, advertising, and plans for training. Future iterations of this survey should consider economizing the number of questions asked to reduce survey length with hopes of enhancing response rates. If response rates do not improve, an even greater number of pharmacies may need to be called.

Abstract # B24

Type of presentation: Poster

Authors: Stella Knowlton[1], Ghalib Alkhatib PhD[1]

[1] College of Medicine, California Northstate University.

Title: **Elucidating the most important epitope in the receptor binding domain of the Sars-Cov-2 spike protein**

Introduction: The causative agent of COVID-19 is the Sars-CoV species has a spike protein on the capsule that is essential for receptor binding and cell fusion (1). The spike protein binds to the ACE2 receptor expressed on human cells which allows it to be in the proximity of a protease TMPRSS (2,3). TMPRSS cleaves the spike protein allowing for the virus to fuse with the cell membrane and release its genome into the cell (4). We believe there is a span of amino acids within the receptor binding domain (RBD) of the spike glycoprotein that is most important for binding to the receptor and therefore allowing fusion. **Methods:** Peptide fragments of the spike glycoprotein were acquired from a synthesis company to be used for this experiment. The HELA effector cell will be transfected with S2 WT spike DNA and the HEK 293 target cells will be transfected with ACE receptor and TMPRSS protease DNA. After transfection, the cells are infected with 21-R and 7-3 viruses. The cells are combined to allow for fusion and %fusion was measured with CPRG assay. One peptide fragment will be added at the time of combination. Eleven RBD peptide fragments and will be tried and comparisons for each peptide was made at concentrations at 30ug as % fusion relative to the control. **Results:** RBD 1 at 30ug has a 58.04% fusion relative to the control. RBD 2 at 30ug has a 57.0% fusion relative to the control. RBD 3 at 30ug has a 49.69% fusion relative to the control. RBD 4 at 30ug has a 45.55% fusion relative to the control. RBD 5 at 30ug has a 48.57% fusion relative to the control. RBD 6 at 30ug has a 47.37% fusion relative to the control. RBD 7 at 30ug has a 58.04% fusion relative to the control. RBD 8 at 30ug has a 50.19% fusion relative to the control. RBD 9 at 30ug has a 47.02% fusion relative to the control. RBD 10 at 30ug has a 73.74% fusion relative to the control. RBD 11 at 30ug has a 73.73% fusion relative to the control. BioM1 at 30ug has a 45.42% fusion relative to the control. BioM2 at 30ug has a 42.06% fusion relative to the control. **Conclusion:** All the peptides show a decrease in fusion from the control, but no peptide shows a significant reduction of fusion relative to the others.

Abstract # B25

Type of presentation: Poster

Authors: Michael Sparks[1], Daniel Williams[1], Mildred Min[1], Kasey Garrett[1], Virag Shah MD[2], Leonard Ranasinghe MD PhD[1]
[1] College of Medicine, California Northstate University.
[2] Kaiser Permanente, South Sacramento, CA.

Title: **An Unusual Case of Pediatric Stroke**

Introduction: When a child presents to the Emergency Department (ED) with symptoms that raise suspicion of a stroke, evaluation of the patient must begin immediately (2). We present the evaluation of a 14-year-old male brought to the ED with a sudden onset of severe stroke symptoms who was ultimately treated with Intravenous Alteplase (tPA). This clinical case report aims to aid physicians in the evaluation of a possible pediatric stroke and navigating thrombolytic use in pediatric patients. **Case Presentation:** A 14-year-old male was brought to the ED by ambulance presenting with a sudden onset of left facial droop, left upper and lower extremity weakness, dysarthria, and drooling that started approximately sixty minutes prior to ED arrival. Less severe neurological symptoms were reported to have started two days prior, described as sudden onset constant loss of pain sensation from the left wrist distally. The patient otherwise had no significant past medical history. Initially, the patient was considered not to be a candidate for thrombolysis by adult neurology due to onset of symptoms two days prior to presentation, but due to the sudden onset of major symptoms, the patient was reconsidered for thrombolysis. The patient's facial droop began to temporarily improve, and the left upper and lower extremities were mobile against gravity, but with some persistent weakness. Shortly after, the patient's left sided symptoms returned. The patient's family consented to proceed with thrombolysis as recommended by pediatric stroke specialists. Intravenous-Alteplase was administered. The patient was ultimately transferred to another facility for further acute care and consideration of thrombectomy. **Discussion:** This patient was determined to be a candidate for treatment with tPA given their new onset of neurologic symptoms in addition to their previous 48-hour history of waxing and waning symptoms. The progression of the patient's neurologic symptoms and subsequent laboratory exams are consistent with a middle cerebral artery occlusion. Thrombolytics and thrombectomy are still considered first-line treatment despite literature suggesting increased risk of adverse events in pediatric patients. Further evaluation on the safety of thrombolytics and mechanical thrombectomy in the pediatric population is necessary to improve outcomes of pediatric AIS going forward.

Abstract # B26

Type of presentation: Poster

Authors: Saifullah Nasim[1], Valerie Gerriets PhD[1]
[1] College of Medicine, California Northstate University.

Title: **Stress Among Various Ages of Medical Students**

Introduction: Medical students all handle their stressors very differently, but it seems that the older the individual is the more they can handle the stress of balancing school, work, and personal lives. Therefore, the observation suggested the hypothesis that the older a medical student the less stress they experience. If the hypothesis is found to have a positive correlation, then further studies can be done to determine specific factors that allow for older students to have a lower perceived stress. **Methods:** Medical students that chose to participate in a wellness survey at CNUCOM were put in this study. Each student was asked roughly 40 questions that covered a broad area of disciplines. 10 of those questions focused on stress that each individual perceives they are feeling. Each individual answer to the question was associated with a score on the perceived stress scale: never, almost never, sometimes, fairly often, and very often. Total scores between 0-13 were considered low stress, scores between 14-26 were considered moderate stress, and scores between 27-40 were considered high perceived stress. The scores of all the medical students that participated where analyzed and compared among the age ranges of 18-21, 22-25, 26-29, and 30-33. **Results:** Two Hundred Seventy-Two Medical students participated in the wellness survey. The average perceived stress score is about 16.23, which equates to moderate stress. The 18-21 age group had a score of 17.64 which is within the moderate perceived stress range. The 22-25 age group had an average score of 15.72 which is within the moderate perceived stress range. The 26-29 age group had an average score of 16.14 which is within the moderate perceived stress range. The 30-33 age group had an average score of 15.4 All of the age groups fell within the moderately stressed range The four age groups 18-21, 22-25, 26-29, 30-33 had p- values of .133, .128, .089, ,886, respectively ($p > 0.5$). The p value shows the data is not significant. **Conclusion:** There is no significant correlation between age and medical students perceived stress.

Abstract # B27

Type of presentation: Poster

Authors: Hasan Nasir[1], Darren Nguyen[1], Hamza Sultan[1], Nalin Ranasinghe[1], Leonard Ranasinghe MD PHD[1]
[1] College of Medicine, California Northstate University.

Title: **A Rare Case of Acute Onset of Hydrocephalus in a Nineteen-Year-Old Patient**

Introduction: Hydrocephalus, a rare disorder defined by the accumulation of cerebrospinal fluid inside the ventricles, has several etiologies, including neoplasms, congenital malformations, and infections. The presentation of acute onset hydrocephalus includes headache, blurred vision, papilledema, and ataxia. Based upon studies evaluating the long-term management of this condition in adolescent populations, the mortality rate was 21.7% within two decades, and of those who received treatment via shunts, 56% required revision. When concurrent with a clotting disorder, surgical management is incredibly complicated and requires preoperative management, timely diagnosis, and evaluation of comorbidities. **Case Presentation:** The patient was a 19-year-old male with a history of depression and drug use who presented to the emergency room with dizziness along with unfocused vision for the last 2-3 weeks. The patient was prescribed intravenous fluids, acetaminophen, bacitracin ointment for the bruising. In addition, 1 gram of acetazolamide, and 10 milligrams of dexamethasone were prescribed. Eventually, the patient was transferred to a tertiary hospital for more intensive treatment. An MRI of the patient displayed non-communicating hydrocephalus with obstruction at the corticomedullary junction. After several unsuccessful operations to relieve the hydrocephalus, it was discovered that the patient had a factor VII deficiency, predisposing him to postoperative bleeds. 44 days after admission to the tertiary hospital, the patient passed away two days after signing a DNR. **Discussion:** Although the presence of a ventricular lesion is most likely, there were no obstructive masses seen on imaging. The elevated intracranial pressure is likely due to cerebral aqueduct stenosis judging from the pattern seen on the CT. The treatment of the patient was complicated by the presence of an underlying Factor VII deficiency. If this disorder were diagnosed earlier, proper measures could have been taken to prevent perioperative hemorrhage.

Abstract # B28

Type of presentation: Poster

Authors: Nandita Shankar[1], Alyssa Nguyen[1], Craig Wetterer PhD [2], Rochelle Frank MD[1]
[1] College of Medicine, California Northstate University.
[2] College of Psychology, California Northstate University.

Title: **Awareness of and Preferences for Management Techniques for Functional Neurologic Disorder Amongst Neurologists**

Introduction: Functional Neurological Disorder (FND) describes genuinely experienced motor and sensory symptoms inconsistent with an organic etiology. Literature indicates that in neurology practices, FND is the second most common cause for patient visits. Multidisciplinary management involving physical therapy and behavioral therapy are essential for treating FND. However, reported literature suggests limited awareness of techniques to manage FND. We aimed to describe the awareness of management techniques for FND amongst neurologists. **Methods:** This survey-based research design involved an anonymized self-administered IRB-approved study-specific questionnaire-based survey administered to a cohort of US neurologists. Questions included number of patients seen, neurologist diagnosis of FND, proportion of patients referred to other specialties, treatment paradigms to address chronic symptoms of FND. Questionnaire-based outputs were characterized using descriptive statistics. **Results:** Preliminary data from 18 responses received to date were analyzed. 94% of practices were located in Northern California, with a mean of 194 patients per month (range: 80-350), making a diagnosis of FND in 9% (range: 0-29%), and with follow-up scheduled for 51% (range: 0-100) diagnosed. 66.7% of respondents indicated opting for education and referral to another specialty, with 44.4% opting to include symptomatic treatment. 16.7% referred patients to physical therapy alone, another 16.7% to behavioral medicine alone, while 61% referred patients to both. 61% referred patients to 3 or more services with 50% referring to physical therapy with behavioral medicine and other services. 38.9% of respondents agreed that FND management fell within the scope of their practice, 44.4% disagreed and 16.7% were neutral. **Conclusions:** Among those surveyed, awareness of management techniques for FND is greater than that reported. However, proportion of patients diagnosed with FND is lower than reported. Taken together, these data suggest that although there appears to be a conservatism in the diagnosis of FND amongst neurologists, there is no apparent gap in awareness of management techniques for FND.

Abstract # B29

Type of presentation: Poster

Authors: Onkar Sandhu[1], Bipin Joshi MD[2]
[1] College of Medicine, California Northstate University.
[2] University of California, San Francisco, Fresno, CA.

Title: **Prevention of Sudden Cardiac Death in Hypertrophic Cardiomyopathy: A Case Report**

Introduction: Hypertrophic cardiomyopathy is the most common primary cardiomyopathy, with an estimated prevalence in the general adult population of 1:500. It is an important cause of sudden death, heart failure, and stroke. Two-dimensional echocardiography can be used to reliably diagnose patients with hypertrophic cardiomyopathy. Hypertrophic cardiomyopathy is the most common cause of nonviolent sudden death in patients less than 35 years of age. **Case Presentation:** We present a case of a 36-year-old Caucasian male with history of dizzy spells and syncopal episode. Physical examination was normal except for a cardiac murmur, which was a grade 2/6 crescendo-decrescendo systolic murmur best heard in the left lower sternal border. This murmur increased in intensity with standing and decreased in intensity with squatting and handgrip. EKG was normal. Echocardiography revealed evidence of hypertrophic cardiomyopathy, and there was asymmetrical septal hypertrophy with septal thickness of approximately 30 mm. There was no significant gradient across the left ventricular outflow tract. There was systolic anterior motion of the mitral leaflet. Holter monitor revealed episodes of wide complex tachycardia suggestive of nonsustained ventricular tachycardia consisting of up to 19 beats each at the rate of 160 beats per minute. Cardiac MRI revealed evidence of asymmetric hypertrophy with maximal septum thickness of 2.6 cm. There was patchy fibrosis of the hypertrophied segments along with prominent inferior insertion site fibrosis consistent with hypertrophic cardiomyopathy. This represents less than 15% of the overall scar burden. The aforementioned findings of 2D echocardiography, Holter monitor, and cardiac MRI were discussed with the patient, and the patient subsequently underwent ICD implantation. **Discussion:** This case illustrates the accurate diagnosis of hypertrophic cardiomyopathy as well as the high-risk features for sudden cardiac death. Based on the high-risk features for sudden cardiac death, this patient underwent ICD implantation for prevention of sudden cardiac death. Genetic testing for hypertrophic cardiomyopathy was positive in the patient's 7-year-old son and 76-year-old father. Screening tests, including genetic testing, echocardiographies, and EKGs, for family members aid in the early diagnosis of hypertrophic cardiomyopathy and prevention of sudden cardiac death.

Abstract # B30

Type of presentation: Poster

Authors: David Looi[1], Krista L Harrison PhD[2], Sarah B Garrett PhD[2], Alexander K Smith MD[2,3]
[1] College of Medicine, California Northstate University.
[2] Division of Geriatrics, University of California, San Francisco, San Francisco, CA.
[3] VA Medical Center, San Francisco, CA.

Title: **End-Of-Life Caregiving Experiences in Alzheimer's Disease and Rapidly Progressive Dementias**

Background: The objective of this study was to compare end-of-life caregiving experiences in Alzheimer's Disease and Related Dementias (ADRD) and the rapidly progressive Sporadic Creutzfeldt-Jakob Disease (sCJD). **Methods:** This was a secondary analysis of interviews with bereaved caregivers (N = 27, 16 female, 11 male, mean age 65). Participants were caregivers of people who were assessed at a tertiary outpatient neurology clinic before dying from dementia (N = 27, 15 ADRD, 12 sCJD). Interviews were structured to allow for comparison of end-of-life caregiving experiences and levels of professional caregiving involvement. Specific focus was given to three domains of caregiving: duration, setting, and extent of paid caregiving support. **Results:** The mean duration of illness (from time of diagnosis to death) for ADRD patients was 67.1 months, compared to 6.3 months for sCJD patients. Characteristic caregiver experiences included moving patient to a professional care facility (ADRD, 73%; sCJD, 58%), patient dying in a facility (ADRD, 47%; sCJD, 42%), and transferring patient between home and a facility more than once (ADRD, 27%; sCJD, 8%). Characteristics of caregiver support included employing paid in-home caregivers (ADRD, 73%; sCJD, 75%) and whether they were part-time (ADRD, 64%; sCJD, 89%), full-time (ADRD, 27%; sCJD, 11%), or 24/7 live-in (ADRD, 9%). **Conclusions:** Given the challenges of caring for a family member with dementia, especially the rare and rapidly progressive sCJD, it is important for families to involve professional help specializing in neurodegenerative diseases as soon as possible. These findings highlight an opportunity to improve anticipatory guidance for sCJD caregivers, so that they are better equipped to make end-of-life preparations for their loved ones. Future studies with larger sample sizes are needed to assess how mean duration of illness and other characteristics of ADRD versus sCJD impact caregiver quality of life and utilization of paid caregiving support.

Abstract # B31

Type of presentation: Poster

Authors: Justin Tak[1], Yennie Shyu[1], Arpita Vyas MD[1], Ulhas Nadgir MD[2]
[1] College of Medicine, California Northstate University.
[2] Sutter Medical Center Sacramento, CA.

Title: **Pediatric Gigantism Secondary to Pituitary Macroadenoma**

Introduction: Pituitary adenomas in children are a rare diagnosis which account for 3% of supratentorial tumors in childhood. While growth hormone deficiency is a common diagnosis made by a pediatric endocrinologist, growth hormone excess due to a pituitary macroadenoma is an extremely rare diagnosis with an obscure presentation. oto 20% of hormone secreting pituitary adenomas. In a review of patients, reported that.
Case Presentation: We present a case of a 8 year old female, with no family history of pituitary disorders, who was referred to her local pediatric endocrinologist with concerns about rapid growth and weight gain. Height at presentation was 151.1 cm with weight 43.1 kg. She presented with fatigue, abdominal discomfort, colic, abnormal sweating, occasional rashes on her forearms and upper extremities, gradual incoordination, lankiness, dry skin, intolerance to heat, and occasional piercing headaches with a frontal pattern. The diagnosis of gigantism caused by a pituitary macroadenoma was made by performing a glucose load test that did not suppress growth hormone levels and a MRI imaging study confirming a sellar mass of 2.2 x 1.4 x 1.5 cm with mild displacement of the optic chiasm and involvement of the right cavernous sinus. A transsphenoidal resection was performed followed by chronic suppressive therapy and Gamma knife radiosurgery for the cavernous sinus part of the tumor. It was expected that this would take a 5-6 year period to reduce hormonal levels but allow the patient to obtain full adult height. The patient's postoperative labs revealed elevated IGF- 1 levels of greater than 2 SD above the mean. She was managed by increasing dosages of Somatuline to suppress her GH level of 13 to a range of 1.1 to 3.4. Somatuline doses were increased from 60 mg to 90 mg to 120 mg. Successful treatment of the unresected tumor was achieved without incident. Discussion: The patient's elevated IGF-1 levels post surgery posit treating growth hormone secreting pituitary macroadenomas with a more aggressive administration of growth hormone suppressing medication before attempting transphenoidal resection or gamma knife stereotactic radiosurgery.

Abstract # B32

Type of presentation: Poster

Authors: Steven Wright[1], Hao-Hua Wu MD[2], Andrew Logan MD[3], Richard Yonge PhD[2], Sigurd Berven, Lionel Metz MD[2]

[1] College of Medicine, California Northstate University.
[2] University of California, San Francisco, Department of Orthopedic Surgery, San Francisco, CA
[3] Spaulding Research Hospital, Department of Physical Medicine and Rehabilitation, Charlestown, MA

Title: **Patient Mobilization with Activity Trackers Following Lumbar Fusion and Decompression**

Introduction: There remains a dearth of literature evaluating the use of continuous activity trackers to monitor recovery from spine surgery. The potential advantage of using mobile activity trackers is the ability to provide continuous, objective data of ambulatory function and activity level. The objective of this study is to prove the viability and utility of wearable devices for remote recovery monitoring after spinal surgery. The secondary goal is to assess the effect of post-operative instructions on ambulation distance. **Methods**: Adult patients undergoing one-level or two-level lumbar decompression or fusion operations were enrolled between March and June 2017. Each patient was given a mobile activity tracker with an accelerometer to be worn daily. Half from each group were given specific ambulation instructions, while half were given general instructions. Step trajectory, weekly steps, and total steps achieved were measured continuously for 12 weeks. A regression analysis using generalized estimating equations techniques (GEE) to examine the association between group assignment and number of steps walked. **Results**: There were 24 patients enrolled in this study (19 fusion, 5 decompression). Decompression patients walked significantly more steps at each time point (Weeks 1-12) compared to fusion patients. At week 1, decompression patients took an average of 3230 steps compared to 2841 steps for fusion patients. Decompression patients achieved 12,810 average weekly steps by week 11, compared to 8312 weekly steps for fusion patients. Regression analysis showed that increased number of weeks post-surgery were predictors for increased number of steps taken. Age, BMI, and patient educational information were not predictive. **Conclusions**: Patients undergoing lumbar decompression can reach up to 12,810 weekly steps within 3 months of surgery while patients undergoing lumbar fusion can reach up to 8,312. Patients undergoing lumbar decompression demonstrated significantly improved mobility compared to their lumbar fusion counterparts.

Abstract # B33

Type of presentation: Poster

Authors: Kyle Taing[1], Lawrence Chen[1], Han-Rong Weng MD PhD[1]
[1] College of Medicine, California Northstate University.

Title: **The Role of GPR109A Receptor in Neuroinflammation, Neurological Diseases, and Pathologic Pain.**

Introduction: Neuroinflammation is a key factor in the pathogenesis of multiple neurological disorders. Microglia activation and increased amounts of pro-inflammatory cytokines are hallmarks of neuroinflammation, and they are associated with the development of many neurologic diseases. GPR109A, originally an orphan receptor, has recently been found to be activated by various endogenous agonists including niacin, butyrate, and hydroxybutyrate. Emerging data suggest that GPR109A activation ameliorates various inflammation conditions. The objective of this study was to review the current literature about the role of GPR109A receptor in regulating the pathology of inflammation in the central nervous system (CNS). **Methods:** A narrative literature review was performed on PubMed and Google Scholar using a publication timeline between 1980 and 2022 as well as the following Medical Subject Heading (MeSH) words: “GPR109A”, “HCAR2”, “NIACR1”. Furthermore, we added the following research keywords to specify our article search: “neuroinflammation”, “pain”, “Alzheimer’s disease”, “Parkinson’s disease”, “systemic lupus erythematosus”, “epilepsy”, “stroke”, “multiple sclerosis”. **Results:** Seventy-five articles were found and analyzed for the correlation between GPR109A activation and the amelioration of CNS inflammation. Among these publications, we discovered 4 articles on Alzheimer’s disease, 9 articles on Parkinson’s disease, 3 articles on epilepsy, 2 articles on stroke, 1 article on lupus, and 1 article on multiple sclerosis that investigate the implications of GPR109A activation in regulating these respective neurological disorders. These in vitro and in vivo animal studies showed that GPR109A activation produces beneficial effects in relieving symptoms caused by Parkinson’s disease, Alzheimer’s disease, multiple sclerosis, and pain caused by lupus disease. GPR109A regulates neuroinflammation by suppressing activation of microglia and reducing the levels of IL-17, NF-kappa-beta, IL-18, and IL-1-beta. In addition, activation of GPR109A alleviates chronic pain induced by lupus disease by attenuating glutamatergic synaptic activity. **Conclusion:** GPR109A is a promising target for developing novel therapeutics in treating neurological diseases.

Abstract # B34

Type of presentation: Poster

Authors: Alexandra S. MacHugh[1], Thomas H. Nguyen MD[2], Kuldip Sandhu MD[3], Trevor M. Williams MD[3], Costanzo A. DiPerna MD[3]
[1] College of Medicine, California Northstate University.
[2] Atrium Health Navicent Department of Surgery, Macon, GA.
[3] Mercy San Juan Medical Center Department of Thoracic Surgery, Carmichael, CA.

Title: **Surgical Management of an Atypical Esophageal Leiomyoma**

Esophageal leiomyomas are the most common benign esophageal tumor. They classically appear as homogeneous esophageal masses with occasional calcifications in the mid to lower esophagus on computed tomography (CT) imaging. They are typically encapsulated intramural masses that lend themselves to treatment with surgical enucleation. Large, eroding leiomyomas often require treatment with esophagectomy if there is extensive mucosal damage. This report describes a patient with a 9 cm leiomyoma with cystic-appearing radiographic features and significant erosion through the mucosa. This atypical leiomyoma was successfully treated with thoracotomy excision and primary closure of the esophageal mucosa. This is evidence that excision with primary esophageal repair is a feasible curative treatment option in otherwise healthy patients with large eroding leiomyomas.

Abstract # B35

Type of presentation: Poster

Authors: Jasminder Malhi[1], Mildred Min[2], Raja Sivamani MD[1,2]

[1] College of Medicine, California Northstate University.
[2] Pacific Skin Institute

Title: **Pediatric Quality of Life and Dermatologic Skin Conditions**

Introduction: Pediatric dermatologic conditions may negatively impact child and parent life quality. The purpose of this study is to explore how this impact varies by diagnosis and determine which aspect of child life quality is most impacted. **Discussion:** Patients aged 7 to 18 years and their parents were recruited to complete the Family Dermatology Life Quality Index (FDLQI) and Children's Dermatology Life Quality Index (CDLQI) via SurveyMonkey at Pacific Skin Institute. FDLQI/CDLQI scores and scores for CDLQI life quality domains were computed. CDLQI sample size is 100; Diagnoses include: acne (43), eczema (24), psoriasis (9), undiagnosed (6), vitiligo (2), warts (4), cysts (1), port-wine stain (2), mole (2), pityriasis rosea (1), keratosis pilaris (1), cafe-au-lait spots (1), birthmark (1), multiple diagnoses (3). FDLQI sample size is 98. CDLQI scores for the following diagnoses, in descending order, indicate moderate effect on child life quality: eczema, acne, cyst, keratosis pilaris, undiagnosed, acne/molluscum contagiosum and birthmark. CDLQI scores for the following diagnoses, in descending order, indicate small effect on child life quality: psoriasis, pityriasis rosea, vitiligo, wart, cafe au lait spots and acne/eczema, port-wine stain and moles. CDLQI scores stratified by domains revealed the area of child life quality most impacted on average was "symptoms and feelings", followed in descending order by "leisure", "personal relationships", "treatment", "school or holidays", and "sleep". FDLQI scores show that life quality was most impacted for parents of children diagnosed with cyst, followed by keratosis pilaris, eczema, psoriasis, pityriasis rosea, acne, birthmark, acne/molluscum contagiosum, undiagnosed, wart, vitiligo, and acne/eczema, cafe-au-lait spots, port-wine stain, and mole. **Conclusion:** The negative impact of dermatologic conditions on child and parent life quality varies by diagnosis. Negative feelings and symptoms contributed most to lower child life quality. Life quality is an aspect of wellbeing that is important for physicians to address.

Abstract # B36

Type of presentation: Poster

Authors: Ara Alexanian[1], Rhobe Brager DO[2], Maria Mendoza MD[3], Rhonda Keosheyan MD[2]
[1] College of Medicine, California Northstate University.
[2] Department of Pediatrics, Valley Children's Hospital.
[3] Department of Pediatrics, UCSF Fresno.

Title: **Pediatric Fever of Unknown Origin and Pericarditis Associated with Actinomyces Pneumonia**

Introduction: Actinomycosis cases can involve the thorax and Actinomyces pneumonia has been described with tamponade in adults and purulent pericarditis in children. The bacteria can be found in the oral, gastrointestinal, and vaginal tracts, and are associated with poor dentition, oral surgery, and difficulty swallowing. Actinomyces pneumonia often has a delayed diagnosis due to subacute clinical course as well as lengthy time needed for bacterial culture. Although purulent pericarditis with Actinomyces pneumonia has been previously discussed, a literature search found no other associations with the Coxsackie B virus or immunosuppression therapy. **Case Description:** Our case is a presentation of Actinomyces meyeri pneumonia in a pediatric patient associated with recurrent pericarditis and positive Coxsackie B titers. She was treated with colchicine, ibuprofen, and a short course of oral steroids. She underwent cardiologic, infectious, rheumatologic, and immunologic workup before A. meyeri was isolated from chest tube culture. Immunologic workup did not find a primary immunodeficiency. Patient was treated with IV antibiotics and then discharged. Later, it was discovered that the patient had poor dentition. **Discussion:** We believe that awareness of the presentation of pneumonia with pericarditis may make diagnosis of A. meyeri easier in the future. Patients with a similar presentation should be examined for poor dentition and have Coxsackie B virus titers checked. They should also undergo CT as well as echocardiographic imaging. Providers should be cautious when giving steroids or colchicine to such patients, but these medications may have made ultimate diagnosis possible in our case. Infectious Disease consultation should be recommended to clear patients before giving them immunosuppressive medications.

Abstract # B37

Type of presentation: Poster

Authors: Viacheslav Viatchenko-Karpinski[2], Lingwei Kong[2], Han-Rong Weng MD PhD[1,2]*,
[1] College of Medicine, California Northstate University.
[2] Department of Biomedical Sciences, Mercer University School of Medicine, Macon, Georgia, USA.

Title: **Activation of spinal GPR109A attenuates spinal neuroinflammation and chronic pain in a lupus mouse model**

Many patients with systemic lupus erythematosus (SLE) live with chronic pain despite advances in medical management in reducing mortality related to SLE. Few animal studies have addressed mechanisms and treatment for chronic pain caused by SLE. In this study, we provide the first evidence for the analgesic effects of a GPR109A specific agonist (MK1903) and its action mechanisms in chronic pain in female MRL/lpr mice, an SLE mouse model. We show that MRL/lpr mice at age 11 to 16 weeks had a higher sensitivity to heat stimuli. This was accompanied with significant microglial activation, increases in p38 MAPK and glutamatergic synaptic activities in the spinal dorsal horn. We demonstrate that chronic pain in MRL/lpr mice was significantly attenuated by intrathecal injection of MK1903. Activation of GPR109A receptors attenuated glutamatergic synaptic activity via suppressing production of interleukin-18 (IL-18). We provide evidence that activation of GPR109A attenuated chronic pain in the SLE animal model via suppressing p38 MAPK activity and production of IL-18. Our study suggests that targeting GPR109A is a potent approach for reversing spinal neuroinflammation, abnormal excitatory synaptic activity, and management of chronic pain caused by SLE.

Abstract # B38

Type of presentation: Poster

Authors: Aleeha Noon[1], Lillian Jundi[1], Forshing Lui MD[1], John Geraghty MD[2]
[1] College of Medicine, California Northstate University.
[2] Kaiser Permanente Roseville Medical Center, Roseville, CA.

Title: **Adult-Onset MELAS in a 28-year-old Female Presenting with Visual Loss and Uncontrolled Type 1 Diabetes Mellitus: A Case Report**

Purpose: To present the case of MELAS with initial onset in a 28-year-old female with recently diagnosed type 1 diabetes mellitus with medication noncompliance. **Introduction:** Mitochondrial encephalopathy with lactic acidosis and stroke-like episodes (MELAS) refers to a condition of mitochondrial inheritance that presents primarily with neurologic symptoms, such as visual loss. Most cases of MELAS present in childhood or before the age of 20. This study presents a case of MELAS with initial presentation at 28 years old in a patient with recently diagnosed type 1 diabetes mellitus with medication noncompliance. **Case Summary:** A 28-year-old Caucasian right-handed female presented to the emergency room with sudden-onset occipital headache and vision loss. In the ER, she experienced a complex tonic-clonic seizure responsive to 1 mg lorazepam. Neurological exam revealed evidence of left homonymous hemianopsia. Neuroimaging found evidence of a right inferior temporal/occipital lesion, initially thought to be consistent with posterior reversible encephalopathy syndrome. Repeat imaging and further laboratory workup was indicated to evaluate for metabolic etiologies given her persistence of symptoms and diabetes history. Serum lactate was then found to be markedly elevated. A molecular genetics report demonstrated that the patient was heteroplasmic in the MT-TL1 gene (37.6%) for a sequence variant designated m.3243A>G. These new results aligned with a final diagnosis of MELAS. The patient has subsequently developed depression and an ongoing seizure disorder; she is currently prescribed lamotrigine and lacosamide for treatment. Diabetes management regime was also restarted with glipizide and insulin. **Conclusion:** Though rare, MELAS may present adulthood, as exhibited in this patient. In these cases, measurement of lactate and genetic studies significantly contribute to diagnosis. Furthermore, concurrent metabolic comorbidities such as recently diagnosed type 1 diabetes strengthen the case for MELAS.

Abstract # B39

Type of presentation: Poster

Authors: Abha Sathe[1], David Lindars[1], Pranav Sathe[1], Rithvik Nallapareddy[1], Tim Grennan MD[1]
[1] College of Medicine, California Northstate University.

Title: **Bilateral Renal Oncocytoma: Active Surveillance vs. Partial Nephrectomy**

Renal oncocytomas (RO) are benign tumors comprising 16% of renal masses. Due to the overlapping phenotypes seen in RO and chromophobe renal cell carcinoma (chRCC) and the lack of specific clinical and laboratory characteristics of RO, physicians face a challenge when arriving at a definitive diagnosis of renal oncocytoma. ROs additionally appear indistinct from renal cell carcinomas (RCC) on CT scan, contributing further to the difficulty of arriving at a clear diagnosis of RO. This study aims to highlight new techniques to manage ROs. This case is a 66-year-old man who presented with flank pain found to be related to bilateral renal oncocytomas and underwent bilateral partial nephrectomies (PN). ROs are benign small renal masses (SRMs) that often pose a diagnostic challenge since preoperative diagnosis can be difficult to achieve. Given advancements in technology, active surveillance (AS) with core renal biopsy is a promising approach to accurately diagnose and manage ROs conservatively. The application of these techniques has wide-reaching implications for patients and physicians by reducing the need for a potentially harmful surgery and creating a cost-effective way to manage a diagnosis. We present a case of bilateral ROs in which the patient underwent bilateral partial nephrectomies instead of the conservative management due to the inability to clearly diagnose RO.

Abstract # B40

Type of presentation: Poster

Authors: Mengyao Liu[1], Hongbin Wang PhD[2]
[1] College of Medicine, California Northstate University.
[2] College of Pharmacy, California Northstate University.

Title: **C4a/C4a^{desArg} functions distinctively from thrombin on protease activated receptor (PAR) 1/4**

Protease-activated receptor (PAR) 1 and 4 belong to a family of G protein-coupled receptors. They can mediate thrombin responses in platelets, immune cells, and endothelial cells contributing to hemostasis, thrombosis, inflammation, and the development of blood vessels. Thrombin can activate PAR1/4 by unmasked tethered ligands generated by thrombin via the proteolytic cleavage of the N-terminal exodomains of the receptors. Synthetic peptides that mimic the tethered ligands can function as agonists of PAR1/4 independent of receptor cleavage. We recently identified that C4a/C4a^{desArg} acts as an untethered ligand for PAR1/4 and demonstrated that C4a could activate extracellular-signal regulated kinase (ERK) through $G\alpha_i$-independent signaling pathway. It is still undetermined whether C4a/C4a^{desArg} acts on the downstream signaling pathway of PAR1/4 in the same way as thrombin does. In this study, we examined whether C4a/C4a^{desArg} and thrombin act on PAR1/4 to generate the same downstream signaling effector functions. **Methods:** Human endothelial cells (Ea.Hy926) were treated with C4a (0.3 mM), C4a^{desArg} (1 mM), or thrombin (0.1, 0.3, and 1 nM) for detecting downstream effector activities. Western blots assay was utilized to detect the activations of Akt and ERK that are downstream signaling effectors of PAR1/4. The Akt activation was assessed by anti-phospho-Akt antibodies (Ser473 and Thr308) and the ERK activation was assessed by anti-phospho-p42/p44 antibody. Total ERK level was used as loading control and examined by anti-total p42/p44 antibody. To test the specificity of C4a/C4a^{desArg} on PAR1 or PAR4, Ea.hy926 cells were pre-treated with PAR1 antagonist (SCH79797, 1 mM) or PAR4 antagonist (ML354, 1 mM) for 30 minutes before adding the C4a/C4a^{desArg}. **Results:** C4a/C4a^{desArg} could cause the activations of Akt and ERK in a time-dependent manner, which can be blocked by the pre-treatment of the specific antagonist for PAR1 or PAR4, implying C4a/C4a^{desArg}-mediated activations of ERK and Akt are through PAR1 and PAR4. In addition, our data demonstrated that thrombin significantly inhibited Akt activation, whereas C4a/C4a^{desArg} can cause the sustained Akt activation for 30 minutes in human endothelial cells. Both C4a/C4a^{desArg} and thrombin could cause the ERK activation with different kinetic. **Conclusion:** Our present data confirmed that C4a/C4a^{desArg} can act on PAR1/4 to trigger ERK and Akt activation in human Ea.hy926 cells. In addition, C4a/C4a^{desArg} acts distinctively from thrombin on PAR1/4 to trigger the activations of downstream signaling effector Akt and ERK , implying C4a/C4a^{desArg} acts as a non-canonic agonist for PAR1/4 and might generate b-arrestin biased downstream signaling that is distinctive from thrombin.

Abstract # B41

Type of presentation: Poster

Authors: Annica Stull-Lane[1,2], Kimberly Lau[1,3], Monica Keiko Lieng[1,2], Raquel Selcer[2], Jericho Hallare[3], Andrew Maneval[3], Tanya Talwar[3], Kirk Harter[3], Jason Tang[3], Ellen Shank[2], Christina Lowry[2], Silvia Bastea[2], Lillian Jundi[3], Nikita Sanghavi[2], Karli Matter[2], Tess Hill[3], Erika Jane Adams[2], Corinne Cushing[2], Nitya Janardhan[3], Duane Kim[2], Fransia De Leon[2], Azaam Mamoor[3], Michael Wilkes MD PhD[2]
[1] These authors contributed equally
[2] School of Medicine, University of California, Davis, 2315 Stockton Blvd, Sacramento, CA, 95817, USA
[3] College of Medicine, California Northstate University.

Title: **COVID-19 Response and the Unhoused Communities in Sacramento: A Mixed Methods Study with Policy Implications**

Background: In an emergency response to the coronavirus disease 2019 (COVID-19) pandemic, cross-sector public health collaborations in Northern California involved volunteer medical students to help facilitate emergency hotel room placements for people experiencing homelessness (PEH). The objective of this study was to assess the impact of the disaster response on the unhoused communities surrounding Sacramento in order to inform a Health-in-All-Policies (HiAP) approach. **Methods**: This interdisciplinary team-based convergent parallel mixed methods study included both quantitative and qualitative data collection and analysis, followed by an integrated analysis and interpretation. This poster focuses on the qualitative arm. Semi-structured in-person interviews focused on perspectives on the COVID-19 pandemic and public health interventions, experience with access to health care and preventative measures, and personal priorities. Interview recordings were transcribed and coded using thematic analysis. Integration was guided by the "following a thread" approach. **Results:** We surveyed 100 people living outdoors ("outside PEH") and 100 people staying indoors in temporary hotel room placements ("hotel PEH"); interviews were conducted with 18 and 17 individuals, respectively.Multiple themes were identified; this poster will focus on the subthemes of dignity and trust with institutions and healthcare providers. An integrated comparison of outside PEH and hotel PEH demonstrated that hotel placements improved access to information, health care, resources, hygiene and sanitation, hope and safety. An integrated interpretation placed recommendations within these disaster response guidelines: 1) Prioritize housing; 2) Maintain safe and healthy living environments; 3) Improve health and access to integrated health care services; 4) Increase collaboration and input in providing and maintaining services. **Conclusions:** Comprehensive disaster responses necessitate understanding the experiences, perspectives and priorities of vulnerable and underserved populations such as PEH. Student-led team science addresses complex questions, revealing lessons from the pandemic emergency response and how to inform a HiAP approach to the ongoing pandemic and other disasters.

Poster Presentations: College of Pharmacy

Abstract # B42

Type of presentation: Poster

Authors: Quoc-Anh Tran[1], Nhi Duong[1], Vy Tran Luu[1], Hou Mai Xiong[1], Linh Ho PhD[1]
[1] College of Pharmacy, California Northstate University.

Title: Hepatoprotective Effects of Astragaloside IV and Formononetin Against Oxidative Injury

The mitochondrial SIRT3 is a major deacylase protein that regulates important mitochondrial biology, including reactive oxygen species detoxification. AML12 (alpha mouse liver 12) cells were used and tert-butyl hydroperoxide (t-BHP) were used to induce oxidative stress. Cells were treated under three conditions, pre-treatment, post-treatment, and both pre-treatment and post-treatment with AST-IV at 2.5, 5, and 10μM or FMR at concentrations of 5, 10, and 20μM in parallel with untreated control, negative control, and positive control for assessments, otherwise stated. t-BHP at 250μM was identified as appropriate concentration for inducing oxidative stress in AML12. Both pre- and post-treatment significantly increased cell proliferation and reduced ROS level on induced-oxidative stress AML12 cells compared to no treatment and control. Pre- or post-treatment of AML12 cells before or after induction of oxidative stress with AST-IV or FMR also shown cell proliferation and reduced ROS but was less significant compared to AML12 cells that received both pre- and post-treatment with AST-IV or FMR. Furthermore, SOD activity was higher in treated cells with AST-IV or FMR, especially AST-IV at 10 μM compared to untreated and t-BHP treated cells. AST-IV and FMR increased transcriptional level of genes that regulate oxidative stress including nuclear respiratory factor 1 (Nrf1) and superoxide dismutase 1 (Sod1). Moreover, AST-IV and FMR activated PGC-1α (peroxisome proliferator-activated receptor gamma coactivator 1-alpha) and AMPK (5' AMP-activated protein kinase) by immunoblotting. In addition, SIRT3 protein expression was induced in cells treated with AST-IV or FMR as well as in t-BHP treated cells with pre- and post- treated with AST-IV or FMR. In conclusion, AST-IV and FMR protected hepatocytes against oxidative stress through induction of SIRT3 protein expression and activation of antioxidant mechanism as well as mitochondrial biogenesis. The findings suggest AST-IV and FMR as SIRT3 modulators can be beneficial in treating oxidative injury hepatocytes.

Abstract # B43

Type of presentation: Poster

Authors: Adriana Dermgrdichian[1], Alexander Akerlund[1], Sanel Velic[1], Robert Yang[1], Yvonne Cunningham[1], Peter Tenerelli PharmD[1], Tiffany-Jade Kreys PharmD[1], Eugene Kreys, PharmD, PhD[1]
[1] College of Pharmacy, California Northstate University.

Title: Identifying Country Characteristics Associated with the Discrepancy between Reported COVID-19 Mortality Rate and Excess Mortality Rate

Background: The COVID-19 pandemic has resulted in a substantial increase in excess mortality around the world. The method by which countries report COVID-19 related mortality varies and may be a result of the government's attempt to minimize the perception of the severity of the pandemic in their respective citizenry. This phenomenon may be identified by determining the discrepancy between excess deaths during the pandemic and the reported number of COVID-19 deaths. **Objective**: To determine the degree of discrepancy between reported COVID-19 mortality and excess mortality during the COVID-19 pandemic worldwide and to identify country characteristics associated with the reporting discrepancies. **Methods**: This was a retrospective analysis of publicly available databases. The primary outcome was the difference between excess death and reported COVID-19 mortality in 2020. Independent variables included GDP per capita, population density, government COVID response, corruption, democracy index, life expectancy, and human development. The association between the discrepancy in reported deaths and independent variables were measured using linear regression model. To control for confounding a multivariable regression analysis was performed. **Results/Conclusion**: Based on bivariate analysis, it was determined that GDP per capita (R^2 = 0.1305, p-value: 0.008), corruption (R^2 = 0.1455, p-value: 0.006), democracy (R^2 = 0.1812, p-value: 0.002), life expectancy (R^2 = 0.2328, p-value: <0.001), and human development R^2 = 0.1117, p-value: 0.013) were statistically significantly negatively associated with the discrepancy in reported mortality. This can be interpreted as richer countries with a lower level of corruption, higher level of democracy, higher life expectancy, and greater human development being associated with a reduced level of discrepancy in reported mortality. This implies that countries with these characteristics tend to respond to a global pandemic with greater levels of transparency. Multivariable analysis confirmed the association between democracy (p-value= 0.003) and GDP per capita (p-value= 0.41) on the discrepancy in mortality.

Abstract # B44

Type of presentation: Poster

Authors: Patrick huynh[1], Justin Roth[1]
[1] College of Pharmacy, California Northstate University.

Title: Initial Heparin Rate for VTE Treatment in Patients on Factor Xa Inhibitors

Introduction: Unfractionated heparin (UFH) is an established treatment for venous thromboembolism (VTE), however dosing UFH can be complicated in patients that are transitioning between different anticoagulation agents. Factor Xa inhibitors are commonly used anticoagulant agents, but there is limited guidance on how to transition to UFH pertaining to initial dosing. The purpose of this study is to assess the therapeutic anticoagulation efficacy of different initial heparin infusion rates when used to treat patients diagnosed with acute deep vein thrombosis (DVT) or pulmonary embolism (PE) who are transitioning from the factor Xa inhibitors rivaroxaban, apixaban, and edoxaban. **Methodology**: A retrospective chart review was conducted at Alta Bates Summit Medical Center in Oakland, California, Eden Medical Center in Castro Valley, California, and Sutter Delta Medical Center in Antioch, California. Subjects are adult patients admitted between 9/1/2018 and 12/1/21 who required an UFH infusion for the treatment of VTE and are transitioning from factor Xa inhibitors. Patients were divided into two cohorts based on an initial infusion rate of 12 units/kg/hr or 18units/kg/hr. Efficacy will be measured by comparing the time required to achieve the first therapeutic partial thromboplastin time after the initial heparin infusion has been administered. Secondary objectives are to assess the adverse and safety outcomes of the differing rates including comparing rates of cardiovascular incidents such as stroke (ischemic or hemorrhagic), myocardial infarction, systemic embolization, major bleeding, minor bleeding, and all-cause mortality. **Results**: Results will be presented upon completion of analysis. **Conclusion**: Results will be presented upon completion of analysis.

Abstract # B45

Type of presentation: Poster

Authors: Ruth Vinall, PhD[1], Jacquelyn Jee[1], Marissa Kumar[1], Jenny Tiet[1], Vivi Le[1], Jeffrey Nehira, PharmD[1], Jennifer Courtney, PharmD[1], Bin Deng, PharmD[1], Tibebe Woldemariam, PhD[1], Blythe Durbin-Johnson[2], PhD, Moon S. Chen Jr., MD[2], Erika Titus-Lay, PharmD[1].
[1] College of Pharmacy, California Northstate University, [2] University of California Davis.

Title: Identification & Mitigation of Factors Contributing to Increased Cancer Health Disparities due to the COVID-19 Pandemic

Objectives: 1). Identify factors which are contributing to cancer health disparities in minority populations within our community and which are occurring and/or increasing due to the Covid-19 pandemic and 2). To design and implement culturally and linguistically appropriate outreach materials, tools, and strategies which can help mitigate these factors. **Methods:** A validated questionnaire was administered to 1,000 community members to identify the changes in behaviors known to impact cancer outcomes that have occurred in minority populations in our community since the start of the Covid-19 pandemic; changes in number of doctor visits (online or in person) and cancer screenings, medication non-compliance for anti-cancer medication, delays in cancer-related surgeries, worse diet, decreased physical activity, and increased tobacco or marijuana use. Demographic data, including race and primary language, were also collected. Pharmacy students who are bi- or multi-lingual helped with patient recruitment and served as patient navigators. The collected data was entered into SurveyMonkey and statistical analyses will be performed at the UCDCCC biostatistics core facility. **Results:** Participants were primarily female (60.48%) and White (46.63%) or Asian (30.54%). Only 6.12% reported ever being diagnosed with cancer. Though 45% reported engaging in less physical activity, a majority of participants reported no changes in consumption of fruits and vegetables (68.52%), amount of alcohol consumed (61.26%), and frequency of tobacco and/or marijuana use (67.37%). A majority of participants reported a preference of receiving health information either in person (30%) or in written material (30%). **Conclusions:** Ongoing data analysis is taking place. Data will be used to design and implement culturally and linguistically appropriate outreach materials, tools, and strategies which can help mitigate factors contributing to cancer risk in our community.

Abstract # B46

Type of presentation: Poster

Authors: Robert Moir[1], Xiaodong Feng PhD PharmD[1], Jun Hu[1], Tibebe Woldermariam PhD[1]
[1] College of Pharmacy, California Northstate University.

Title: Qualitative Analysis of the Major Constituents in Chinese Medical Preparation, Lianhua-Qingwen Capsule (LQC), by HPLC-DAD

Objective: Lianhua-Qingwen capsule (LQC) developed from the two classical traditional Chinese medicine (TCM) formulae Maxing-Shigan-Tang and Yinqiao-San has a long history of clinical application in the treatment of influenza and also played a very important role in the fight against severe acute respiratory syndrome (SARS) in 2002-2003 in China. It has been recently went to clinical trial to treat infections caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). For a classical and complex Chinese medical preparation like LQC, which is composed of 11 herbs, the comprehensive quality evaluation method should be based on its multiple chemical constituents. Therefore, it is necessary to develop a rapid and sensitive method to identify the chemical constituents and evaluate the quality of LQC. **Methods**: A method for the rapid identification of wide range of compounds in 70% ethanol extract of LQC was developed using a Supelco Discovery HS ODS HPLC column (150×4.6 mm i.d; particle size, 3 μm), using a methanol: water gradient 100:0 to 0:100% v/v as a mobile phase, with a flow of 1 mL per minute over 20 minutes. The RP-HPLC LaChrom Elite® Hitachi System is equipped with a photodiode-array detector (L-2455). **Results**: In this study, the method provided important information on the range of compounds classes in LQC extract in the form of “chromatographic fingerprints” by comparing the retention times, UV spectral or literature data. **Conclusion**: The method developed in this study was found to be simple, reproducible, and suitable for rapid routine analysis, identification, and quality control of herbal medicines. This method also points a way forward to identifying potential pharmacologically active products, by comparing the chemical profiles of similar herbal products to their clinical effectiveness. This study provided further pharmaceutical evidence for the ongoing clinical trial and future drug target development for SARS-CoV-2.

Abstract # B47

Type of presentation: Poster

Authors: Julie Nguyen[1], Justin Lenhard PharmD[1]
[1] College of Pharmacy, California Northstate University.

Title: Comparison of Vancomycin AUC Versus Trough-Based Dosing

Vancomycin is a glycopeptide antibiotic used to treat various infections caused by susceptible strains of aerobic and anaerobic Gram-positive organisms. It is excreted primarily via glomerular filtration as unchanged drug. Systemic exposure may result in nephrotoxicity and risk of acute kidney injury (AKI) increases as serum levels increase. This highlights the importance of appropriate monitoring strategies to ensure that drug levels remain in therapeutic range. Until recently, vancomycin was traditionally monitored using trough level as a surrogate marker for the target area under the curve over 24 hours to minimum inhibitory concentration (AUC/MIC). However, trough-based dosing lacks interpatient variability and may result in unnecessary drug exposure, leading to increased nephrotoxicity. Recent data suggests therapeutic drug monitoring guided by AUC/MIC optimizes efficacy and safety of vancomycin therapy. Based on the 2020 joint consensus guidelines on monitoring of vancomycin therapy, Adventist Health Lodi Memorial switched from trough concentration-guided dosing to AUC-guided dosing. The primary objective of this study was to compare the rate of nephrotoxicity after switching from a trough-based to an AUC-based dosing strategy as part of the institution's vancomycin-per-pharmacy protocol. A total of 80 patients were separated into pre-implementation or post-implementation comparison groups. A retrospective chart review was conducted to assess the incidence of AKI between both groups to determine the impact of converting to AUC-guided dosing. Results of this study are pending, and data is currently being collected. It is expected that incidence of AKI associated with AUC-based monitoring will be significantly lower than trough-based monitoring. If the hypothesis of this study is supported by the results, it would further add to the evidence that AUC-guided dosing improves efficacy and safety of vancomycin therapy when compared to trough-guided dosing.

Abstract # B48

Type of presentation: Poster

Authors: Thao Do[1], Eugene Kreys PhD PharmD[1]
[1] College of Pharmacy, California Northstate University.

Title: Prescribing Pattern for the Treatment of Agitation in Patients with Alzheimer's Dementia

Objective: A Black Box Warning (BBW) was issued by the FDA for the use of antipsychotics in elderly patients which was included in the 2007 and 2014 updates to the original 1997 treatment guideline for Alzheimer's Dementia (AD) by the Americian Psychiatrist Association. This study aims to analyze such impact on the treatment of agitation in AD over 16 years. **Method**: A retrospective, cross-sectional, multivariable analysis study using data from the National Ambulatory Medical Care Survey database. Data from 2007 to 2018, excluding 2017, were analyzed. Patients with a diagnosis code of AD and other dementias were included in the analysis. There were 49,754,051 subjects in this sample. Six groups of medication were analyzed: antipsychotics, antidepressants, anticonvulsants, benzodiazepines, buspirone, and zolpidem. The primary outcome was the proportional use of each agent compared between before and after the 2007 guideline update and the issuance of BBW for antipsychotics. With the subpopulations being the patient's visits before and after 2007, we analyzed the proportion of patients being prescribed the predefined medications. A multivariable logistic regression analysis was also performed. All analyses were done using the IBM SPSS Statistics software version 28. **Results**: The use of antipsychotics before and after 2007 significantly decreased with the odds ratio (OR) of 0.727 (95% Confidence Interval [CI] 0.538-0.982, p-value=0.037). Similarly, the use of buspirone also declined after 2007 with OR 0.878 (95% CI 0.315-2.452, p=0.804). In contrast, we observed an increase in prescribing antidepressant with OR 1.439 (95% CI 1.111-1.865, p=0.006), benzodiazepines (OR 1.773, 95% CI 1.168-2.692), p=0.007), anticonvulsant (OR 1.548, CI 0.956-2.507, p=0.073), and zolpidem (OR 1.196, 95% CI 0.444-3.221, p=0.723). **Conclusion**: After 2007, the use of antidepressants and benzodiazepines in Alzheimer's Dementia increased while the use of antipsychotics declined.

Abstract # B49

Type of presentation: Poster

Authors: Raymond Chau[1]
[1] College of Pharmacy, California Northstate University.

Title: Analysis of insulin use in the ED in non-DKA, non-HHS hyperglycemia

Introduction: Insulin is the mainstay of treatment for hyperglycemia in the emergency department due to its quick onset. However, there is a lack of evidence-based literature and guidelines for the management of hyperglycemia outside of the hyperglycemic emergencies such as diabetic ketoacidosis. Insulin is identified as a high alert medication by the Institute For Safe Medication Practices (ISMP) with insulin related medication errors associated with high risk of harm to the patient. Hypoglycemia is an adverse event that increases lengths of stay, cost of care, and increased risk of mortality. This exploratory study aims to evaluate provider's prescribing patterns of the rapid and short acting insulin given subcutaneously or intravenously and analyze safety and efficacy of insulin administration in the emergency department. **Methodology**: A retrospective chart review will be conducted using Sutter Electronic Health Record (Sutter HER) at Alta Bates Summit Medical Center at Oakland and Berkley, CA and Sutter Delta Medical Center at Antioch, CA from January 2021 to July 2021. The study population consists of adults receiving either insulin lispro or insulin regular for hyperglycemia unrelated to DKA or HHS within the emergency department. The primary outcomes are emergency department length of stay and magnitude of blood glucose reduction. Secondary outcomes include blood glucose prior to discharge from the emergency department, amount of point-of-care glucose testing, administration of dextrose, and number of admissions due to insulin related hypoglycemia. Patients with hyperkalemia defined as serum potassium ≥ 5.6 mEq/L were excluded from this study. **Results**: Data is in the process of being collected. Results will be presented upon completion of analysis. **Conclusion**: Conclusion will be presented upon completion of data collection and analysis.

Abstract # B50

Type of presentation: Poster

Authors: Vy Tran Luu[1], Xinge Zheng, Azza B. El-Remessy PhD PharmD[1], Islam Mohamed PhD[1]
[1] College of Pharmacy, California Northstate University.

Title: Role of TXNIP in Development of High Fat Diet-Induced Inflammation & Early Markers for Alzheimer's Disease

Introduction: Obesity and Insulin resistance are established risk factors for Alzheimer Disease (AD). Several studies have shown upregulation of pro-inflammatory Toll Like Receptors (TLRs) and downstream Thioredoxin Interacting Protein (TXNIP) and NOD-like 1-7 receptor protein 3 (NLRP3) inflammasome axis in models of AD. Therefore, we hypothesized that genetic deletion of TXNIP would protect against activation of TLR pathway and TXNIP-NLRP3 inflammasome axis in the brain of a mouse model of high fat diet (HFD)-induced obesity. **Methods**: Six-weeks old age- and gender-matched wild-type mice (WT) and TXNIP knock out (TKO) mice were randomized for normal diet (WT-ND & TKO-ND) or HFD (WT-HFD & TKO-HFD) for 8-weeks. Frontal cortex brain samples from all groups were analyzed using western blot analyses for expression of TLR pathway, NLRP3 inflammasome activation and markers of AD. Two-way ANOVA was used for statistical analysis between all groups. **Results**: After 8 weeks of HFD, there was a trend towards increased TLR4 receptor expression, which was associated with significantly increased levels of downstream HUR & IRF3 signaling pathways in WT-HFD versus WT-ND group, but not in the TKO-ND nor TKO-HFD groups. In parallel, there were a trend towards increased levels of cleaved caspase-1 and significantly increased levels of cleaved IL-1b in WT-HFD versus WT-ND group, but not in neither the TKO-ND nor TKO-HFD groups, indicating increased NLRP3 inflammasome activation. Phosphorylated Tau protein levels were also higher in in WT-HFD versus WT-ND group but were not significant in the TKO groups. On the other hand, HFD resulted in similar trend of increased levels of amyloid beta monomers in both WT-HFD & TKO-HFD groups versus WT-ND group ($n=6$, $P<0.05$). **Conclusion/Implications**: Our results support the critical role of TXNIP in protecting against HFD-induced insulin resistance and associated systemic inflammatory response. Our Findings suggest a direct causal role for TXNIP in mediating HFD-induced activation of the pro-inflammatory TLR pathway and NLRP3 inflammasome response in mouse brain tissue. Further studies are warranted for dissecting the interplay between TXNIP-mediated activation of the TLR pathway and accumulation of amyloid beta and phosphorylated Tau protein levels using immunohistochemical methods, in addition to the evaluation the cognitive function of all groups under both ND and HFD conditions.

Abstract # B51

Type of presentation: Poster

Authors: Emiliano Llave III[1] Ashley Yuen[2], Ruth Vinall PhD[1]
[1] College of Pharmacy, California Northstate University.
[2] College of Medicine, California Northstate University.

Title: PARP Inhibitors in the Treatment of Metastatic Castration-Resistant Prostate Cancer

The objective of this research is to review recently FDA-approved PARP (poly-ADP ribose polymerase) inhibitors (olaparib and rucaparib) in the treatment of prostate cancer, specifically metastatic, castration-resistance (mCRPC). Methods will include a side-by-side comprehensive review and analyses of olaparib and rucaparib and their role(s) in treating prostate cancer, including mechanism of action, specific dosing, and other vital drug information, using clinical trials, NCCN guidelines. In previous years, clinical trials have shown olaparib to be effective in treating germline BRCA-mutated (gBRCAm) breast and ovarian cancers (LIGHT trial) and rucaparib in treating gBRCAm ovarian cancer (ARIEL3 trial). For mCRPC, olaparib dosed at 300 mg twice daily to current approved hormonal therapy (abiraterone [Zytiga], enzalutamide [Xtandi]) and olaparib was found to be superior (PROfound, PROPEL, TOPARP trials). It was also noted in the PROfound trial that olaparib is not recommended for patients with PPP2R2A mutations as they experienced an unfavorable risk-benefit profile. Per NCCN Guidelines in the Treatment of Prostate Cancer, olaparib is used for patients with mCRPC and a germline/somatic HRR gene mutation (commonly in BRCA1 and BRCA2), who have previously been treated with androgen receptor-directed therapy, regardless of taxane-based chemotherapy. For rucaparib, this PARP inhibitor is dosed at 600 mg twice daily for patients with mCRPC with deleterious or suspected deleterious germline/somatic BRCA1 or BRCA2 mutations, previously treated with androgen receptor-directed therapy and prior taxane-based chemotherapy (TRITON2 trial). Both PARP inhibitors have been proven to be efficacious in the treatment of mCRPC with BRCA1 or BRCA2 mutations, however it is noted that patients with such prostate cancer should be tested for DNA alterations with next-generation sequencing in tumor cells, in order to recommend and consider the PARP inhibitors relatively early in the treatment sequence of mCRPC with BRCA1 or BRCA2 mutations.

Abstract # B52

Type of presentation: Poster

Authors: Abneet Sangha[1], Ion Tudos[1], Matthew Todd[1], Melanie Rose[1], James A. Lugtu[1], Michael Abala[1], Tibebe Woldemariam PhD[1], Ashim Malhotra PhD[1]
[1] College of Pharmacy, California Northstate University.

Title: Identifying Mitochondrial Molecular Targets of Sumac Extracts in KRAS-mutant Pancreatic Cancer

Pancreatic cancer kills 57,000 Americans and 250,000 people worldwide each year. We aim to identify natural, small molecule compounds that are synthetic lethal in cellular models of mutant KRAS-dependent pancreatic adenocarcinoma. We hypothesized that sumac's cytotoxicity was a consequence of mitochondrial targeting, specifically a derangement of mitochondrial membrane potential, leading to mitochondrial compromise, and eventually apoptosis. To test our hypothesis, we treated MIA PaCa-2 and PANC-1 cells *in vitro* with increasing concentrations of aqueous extracts of sumac (0, 0.03, 0.3, and 3.0 mg/mL) for varying time points and measured 1) mitochondrial membrane potential using TMRE assays, 2) ROS production using DHT assays, 3) ATP levels using fluorimetry, and 4) activated caspases 3 and 7. Our data show that sumac treatment 1) ameliorated ROS production, 2) abrogated mitochondrial membrane potential, 3) activated caspases 3 and 7, and 4) reduced cellular ATP levels in a dose-dependent manner. These changes were accompanied by a dose-dependent change in the protein expression of the energy-sensing mitochondrial PGC-1α, which increased in both cell lines, the anti-apoptotic protein Bcl-2, which decreased in the PANC-1 cell line but not in the MIA PaCa-2 cell line, the pro-apoptotic Bax, and mitofusin-1, which is responsible for the fusion of the mitochondrial outer membranes. We also hypothesized that the observed ATP reduction would alter levels of SIRT3, which is major mitochondrial physiology regulating deacetylase enzyme. Immunoblot data show a paradoxical increase in SIRT3 in a dose-dependent manner, suggesting other roles for SIRT-3 in this pathway. Furthermore, using HPLC-based NMR spectroscopy, we identified the active compound in the aqueous sumac extract to be [(2R, 3R, 4S, 5R)-3, 4, 5, 6-tetrakis [(2-deuterio-3, 4, 5-trihydroxybenzoyl)oxy]oxan-2-yl] methyl-2-deuterio-3, 4, 5-trihydroxybenzoate. In conclusion, sumac targets hitherto unknown mitochondrial signal transduction pathways and is synthetic lethal for the KRAS mutant G12V and G12D.

Abstract # B53

Type of presentation: Poster

Authors: Haneul (Tony) Kim PharmD[1], Cory Schlobohm PharmD[1]
[1] College of Pharmacy, California Northstate University.

Title: Effect of Initial Bolus and Average Daily Glucocorticoid Dosage on Hospital Length of Stay in COPD Exacerbation

The purpose of this study is to test the hypothesis that a low initial glucocorticoid bolus (less than 40 mg prednisone equivalents) and a low average daily dose of systemic glucocorticoid treatment for COPD exacerbation is as effective as medium, high and ultra-high dose systemic glucocorticoid treatment in decreasing hospital length of stay, while reducing adverse events. A retrospective chart review will be conducted through Epic electronic health records at Sutter Alta Bates Summit Medical Center in Oakland and Sutter Alta Bates Medical Center in Berkeley. The study will include adult patients who were admitted for COPD exacerbation and received glucocorticoid therapy during the admission between March 1st, 2019 and December 31st, 2019. Each enrolled patient will be assigned to one of four cohorts based on the initial bolus glucocorticoid given during admission: low (less than 40 mg prednisone equivalents), medium (40-80 mg prednisone equivalents), high (81-160 mg prednisone equivalents) and ultra-high (greater than 160 mg prednisone equivalents). Each enrolled patient will then be assigned to a second cohort (low, medium, high or ultra-high) based on the average daily glucocorticoid dose received after the initial bolus dose. The primary outcome of this study will be hospital length of stay. The secondary outcomes will include rate of post-discharge bacterial pneumonia, hyperglycemia, hospital days with non-invasive ventilation and mechanical ventilation, and total glucocorticoid dose received. Data is in the process of being collected. Results and conclusion will be presented upon completion of analysis.

Abstract # B54

Type of presentation: Poster

Authors: Peter Tenerelli PharmD[1] Jason Bandy PharmD[1], Tuan Tran PhD[1]
[1] College of Pharmacy, California Northstate University.

Title: A Pilot Program to Enhance Professional Identity Formation Within the Experiential Education Experience for PharmD Students

Study Objective: The study seeks to assure that CNUCOP experiential sites provide students with the experiences best suited to develop the students PIF as a means to create sustainable professional behaviors. **Methods**: Additional survey questions will be added to the students' CORE ELMS self and site evaluations. These questions are designed to measure the students' PIF progression resulting from their rotation experience. Existing questions are designed with ACPE guidance however no questions currently seek to measure PIF. The newly added questions will fill this void. These questions will utilize the same Likert scale that students currently use on their experiential education evaluations. Participants will be the class of 2023 cohort. Data will be collected after the class completes rotations. Data will be analyzed using descriptive statistics. Students survey responses will be used to determine experiential site suitability in developing student PIF. The assessments will be reviewed noting sites with constructive or deconstructive identity impact. Sites determined unsuitable will be scheduled for further preceptor training or discontinuance. Prior to rotations, preceptors will be trained on the elements of PIF and given strategies to facilitate its formation within their individual rotation sites. **Results**: Pilot results will be available after the conclusion of the class of 2023 rotations. **Conclusion**: Professional Identity Formation is an approach of instilling lifelong professional behaviors within students by seating an intrinsic practitioner's identity within the psyche of the individual. This intrinsic identity helps to create the resilience to maintain professional behaviors now as a PharmD student and as a future practitioner. The process of PIF requires a deliberate strategy to ensure the student is exposed to the experiences that promote and reinforce the norms and ideals of the profession. This Pilot serves to fill a void in the development of student PIF.

Abstract # B55

Type of presentation: Poster

Authors: Trieu Nguyen PhD[1], Fakhrul Ahsan PhD[1]
[1] College of Pharmacy, California Northstate University.

Title: A tissue chip device for investigating pediatric pulmonary arterial hypertension (PAH) pathophysiology and developing age-specific therapy

Pulmonary arterial hypertension (PAH) affects 2-16 children per million pediatric populations. If left untreated, children with idiopathic PAH (IPAH) die within 12 months of diagnosis. Treatment and diagnosis of pediatric PAH patients remain challenging because the roles of the three major cell types of the pulmonary arteries - endothelial cells (ECs), smooth muscle cells (SMCs) and adventitial cells (ADCs) - are complexly intertwined in the evolution of PAH in children. Thus many of the cellular processes implicated in PAH pathogenesis in children remain unelucidated. Currently, no anti-PAH drugs are approved for use in children except inhaled nitric oxide. Thus, clinicians rely on their experience, data or algorithms concerning adult patients or resort to off-label use of anti-PAH drugs. The controversies surrounding the off-label use of medications, experience versus scientific data, and age-tailored therapy for pediatric PAH can be settled by deploying validated experimental models that can assess the therapeutic response in pediatric patients. In this work, we propose to deploy the microfluidic technology to test the hypothesis that a pediatric-PAH-on-a-chip can imitate the pathophysiology of PAH in children, and thus help illuminate pediatric PAH pathogenesis and develop therapies tailored to patient age. We thus develop and validate a tissue-chip device made from soft-photolithography for investigating pediatric pulmonary arterial hypertension (PAH). This microfluidic tissue-chip device is used to mimic PAH in pediatric patients to study the PAH biology and therapy in children. The results show that the device can recreate various pathological features of pediatric PAH including arterial remodeling and muscularization, which allows studying the effect of exogenous substance on PAH pathogenesis.

Abstract # B56

Type of presentation: Poster

Authors: Sorosh Kherghehpoush PharmD[1]
[1] College of Pharmacy, California Northstate University.

Title: The Missing Link? Mental Illness, Substance Misuse, HIV and Hepatitis C: The Role of Pharmacy in connecting individuals experiencing homelessness to care – A cross-sectional analysis

Over half a million people experience homelessness on any given night in the United States. As a result of increased exposure to disease, violence, stigma, substance misuse and limited accessibility to health services, individuals experiencing homelessness are disproportionately affected by communicable diseases such as HIV and HCV with prevalence estimates as high as 21% and 36%, respectively. The study intervention includes a Risk Determination interview, administration of HIV and HCV point-of-care antibody test, comprehensive diseases state education and personalized risk mitigation counseling. Participants are then referred to a local health clinic for confirmatory testing, anonymous partner notification, and evaluation for pre-exposure prophylaxis if indicated. A total 50 participants were included in final data analysis. 44% (n = 22) had a reactive HCV screening and one individual had a reactive HIV screening. 92% of participants reported diagnosis of any mental illness with 87% reporting recreational drug use as a method of coping with mental illness diagnosis. 94% reported active drug use of any kind with 74% reporting IVDU and 66% reporting sharing needles within the last 6 months. 70% of participants who reported being in a current sexual relationship did not know their partners HIV or HCV status and 60% reported unprotected sexual intercourse in the last 6 months. A total of 28 referrals were made and of those, 70% were confirmed to have attended their appointment and established care outlining the success of the pharmacist intervention. Study participants were highly receptive to pharmacist-provided point-of-care screening services in the community pharmacy. Combining HIV and HCV point-of-care testing with comprehensive patient-centered education and risk mitigation counseling may result in lower rates of community transmission, improve linkage to care and may lead to long-term retention of marginalized populations such as those experiencing homelessness.

Abstract # B57

Type of presentation: Poster

Authors: Uyen Le PhD[1] Tarek Kassem PharmD[1], Anhao Sam PharmD[1]
[1] College of Pharmacy, California Northstate University.

Title: Development of Self-Directed Learning and Reinforcement Strategies for Effective Teaching and Learning in Pharmaceutical Calculations

Objectives: To enhance the effectiveness of teaching and learning in pharmaceutical calculations for pharmacy students. **Methods**: Firstly, we identified the current curriculum of pharmaceutical calculations across accredited colleges of pharmacy (COPs). Secondly, we developed innovative self-directed learning (SDL) and self-reinforced assessment (SRA) modalities. In the SDL, we provided students with materials of calculations longitudinally from the admission time to the fourth year. Students practice quizzes for their self-learning under the guidance of instructors. In the SRA, pre-remediating quizzes were provided, and students wouldn't be allowed to take their remediation exam if they could not achieve least 80%. Lastly, assessments for the outcome of SDL/SRA are evaluated in term of course's overall grades, course evaluation, and student perception. **Results**: Less than 50% of COPs showed calculations as a standalone course in the curricular. All survey-responded instructors agreed that understanding questions is the most challenging issue to students and further practice was the best strategies to help struggling students. After the SDL/SRA was implemented in our institution, the resulting average grade scores increased 18%($p<0.05$) as compared to the one in previous year. Furthermore, only one student was under remediation as compared to eight remediated students in the previous year. Students' averagely positive evaluation in term of strongly agree/agree for the course increased 9% as compared to the one in previous year (92.8% vs. 85.1%, $p<0.05$). In another anonymous survey, 73.8% of students thought that the SDL/SRA was helpful, 87.8% thought that problem sets in the SDL was useful, and 78.6% rated the SDL at 7-10 on a scale of 1 (least favor) to 10 (most favor). **Conclusion**: The implementation of SDL and SRA demonstrated an improvement of student learning in pharmaceutical calculations. Successful results from the study can be a modality expanded to other courses for optimal teaching and learning outcome.

Abstract # B58

Type of presentation: Poster

Authors: Jennifer Courtney PharmD[1], Ashim Malhotra PhD[1]
[1] College of Pharmacy, California Northstate University.

Title: Enhancing Community Pharmacy Practice Readiness by Embedding Professional Identity Forming Curriculum

Objective: Professional identity formation (PIF) is crucial for pharmacy students to transition from an undergraduate mindset and adopt the attitudes and behaviors of pharmacists. However, PIF is challenging to implement and assess. We created and assessed an active-learning, community pharmacy-centered, practice-readiness curriculum for enhancing first-year students' PIF, IPPE readiness, and community pharmacy familiarity. We implemented and integrated a series of team-based and case-based community pharmacy simulations in 1) community pharmacy operations, 2) resolution of medication errors, 3) medication reconciliation, 4) pharmacy law, 5) patient advocacy, and 6) IPPE readiness. Additionally, aspects of the top 200 drugs, self-care, and over-the-counter medication selection were included. **Methods**: In 2021, we conducted a pilot to test feasibility and learner impact. The pilot had 79 P1 students and included two three-hour-long lectures on calculation exercises and community pharmacy concepts, two practice community pharmacy laboratory simulations, and a community pharmacy laboratory assessment. In 2022, we added additional practice concepts and patient counseling. Team-Based Learning pedagogy was employed. Learner acquisition was measured through pre-and-post formative quizzes, summative exams, and perception and confidence survey instruments premised on published and validated PIF surveys. The PIF survey had 61 responses and measured learners' attitudes, aptitude, behavior, and understanding of the roles and responsibilities of a pharmacist. **Results**: In the 2021 pilot, learners performed better in calculations (88%) and community pharmacy simulation (89%) compared to medication dosing (53.8%) and days' supply calculations (64.6%),) with 9 remediating in calculations. Following remediation, an improvement in student scores was not observed in the days' supply calculations (59%) but was in the area of medication dosing (72%). **Conclusion**: PIF-based, community pharmacy-oriented learner-centered programs can be instituted to foster practice readiness for P1 pharmacy students.

Abstract # B59

Type of presentation: Poster

Authors: Jeffrey Nehira PharmD[1] Jennifer Courtney PharmD[1], Erika Titus-Lay PharmD[1]
[1] College of Pharmacy, California Northstate University.

Title: An Overview of the Roles of Pharmacy Students and Preceptors in a University Run Community Based COVID-19 Vaccination Clinic

Objective: Describe the roles of pharmacy students and preceptors in this innovative unique university run, community based COVID-19 vaccination clinic. **Methods**: Pharmacy students, medical students, and Masters in Pharmaceutical Sciences students were recruited to staff the university run, community based COVID- 19 clinic. First year pharmacy students and Masters in Pharmaceutical Sciences students were assigned to the patient check in and pre-screening station, while second, third, and fourth-year pharmacy students rotated between counseling, vaccine drawing, and vaccine administration stations. Medical students were assigned to the post vaccination monitoring station.
Internal pharmacy and medical school faculty were the primary source of preceptors during the early stages of this clinic. As the clinic continued to expand, external community clinical preceptors were recruited to staff the clinic and precept our students in conjunction with the internal preceptors. **Results**: From 1/8/2021 to 4/2/2021, a total of 27,000 doses were administered in this clinic, which estimated at roughly 7% of the total COVID-19 vaccines given to the Sacramento County population. A total of 400 students (300 College of Pharmacy and Masters in Pharmaceutical Science students and 100 College of Medicine) participated in this clinic. In addition, a total of 175 preceptors participated in this clinic. **Conclusions**: A university run, community vaccination clinic was created after two weeks of planning and fully staffed by students and faculty in the college of pharmacy and college of medicine, as well as community preceptors and non-clinical volunteers. Inventory management and daily functions of the clinic were primarily managed by three College of Pharmacy faculty. The primary clinic was in operation for about 3 months with over 27,000 vaccinations provided. The clinic allowed pharmacy students to complete curricular and co-curricular requirements and allowed students from multiple programs to gain a better understanding of the COVID-19 pandemic response regarding vaccination efforts.

Abstract # B60

Type of presentation: Poster

Authors: Ashim Malhotra PhD[1]
[1] College of Pharmacy, California Northstate University.

Title: Enhancing Practice Readiness: Embedding DEI Constructs and Social-Behavioral Contexts in An Immunopharmacology Course

Objective: Immunology and Immunopharmacology courses offer multiple opportunities to bridge theoretical exposition to “hands-on” practice. **Methods**: We leveraged the topical relevancy of COVID-19 to engage third-year pharmacy students to devise strategies for overcoming vaccine hesitancy. Using published review articles and Team Based Learning pedagogy, we introduced 19 student teams of 6 pharmacy students (119 students) to complex social-behavioral barriers to vaccination. Vaccine hesitancy factors included 1) lack of vaccine awareness, 2) vaccine fear and mistrust, 3) distrust of health care professionals, 4) misinformation specific to COVID-19 vaccines, 5) faith-based and personal reasons for vaccine hesitancy, 6) misinformation about COVID-19, and 7) historical reasons, such as the Tuskegee experiment for the prevailing mistrust in African American communities. Using a design thinking approach, student teams divided into “anti-vaxxers” and “pro-vaxxers” presented resistance factors and solutions to vaccine hesitancy. Teams debated each of the vaccine hesitancy reasons using specific data and examples from the review articles, also examining the effect of the prevailing state and federal laws in the United States on vaccine outcomes. Student teams offered 1) patient education, 2) counseling, 3) partnership with local community leaders, 4) researching literature on vaccine side effects such as those related to autism or the anaphylaxis due to albumin in older influenza vaccines, and 5) “sponsored awareness” programs such as “walk for COVID” as novel mechanisms for overcoming barriers to vaccination. **Results**: Student perception surveys indicated 90% of the students found the activity interesting, engaging, and challenging, while 93% found it an effective use of their time. 98% of students felt that the activity helped them appreciate their professional identity as future pharmacists while allowing them to apply foundational science knowledge to overcome problems encountered in real-life situations. **Conclusion**: DEI-related; peer-reviewed literature offers an excellent mechanism to scaffold social-behavioral learning in immunopharmacology.

Abstract # B61

Type of presentation: Poster

Authors: Tiffany Kreys PharmD[1], Rochelle Frank MD[2], Sandra Nevis PhD[3], Eugene Kreys PharmD PhD[1], Ashim Malhotra PhD[1], Forshing Lui MD[2]
[1] College of Pharmacy, California Northstate University.
[2] College of Medicine, California Northstate University.
[3] College of Psychology, California Northstate University.

Title: A Collaborative Approach to Managing a Migraine Patient: A Virtual Interprofessional Case Conference for Medical, Pharmacy

Objective: Interprofessional education provides cross-disciplinary training opportunities for students in healthcare fields. Interprofessional case conferences (ICC) encourage collaborative discussion, teamwork dynamics, and the exchange of different professional perspectives to establish an integrated care plan that optimizes patient outcomes. However, the COVID-19 pandemic disrupted interprofessional learning. To close this learning gap, we created, implemented, and assessed a virtual, synchronous, live, and interactive case-based neurology ICC focused on clinical problem-solving. **Methods**: Built using Team-Based Learning pedagogy, our spring 2022 ICC focused on migraine headaches and included 114, 116, and 12 students from the CNU colleges of Medicine, Pharmacy, and Psychology, respectively. Learning objectives centered on 1) diagnostic criteria, 2) epidemiology, 3) psychosocial and environmental risk factors, 4) pathophysiology, 5) pharmacological and non-pharmacological management, and 6) medication overuse headaches. During the ICC, interprofessional student teams assessed a patient presenting with migraine headaches and worked with their pre-assigned IPE teams to present slides answering questions about treatment plans. Emphasis was placed on adopting a holistic approach and clinical pearls were shared by the lead faculty facilitator. Students' perceptions of the ICC were measured using confidence and perception survey instruments, while pre-and post-ICC quizzes tested content acquisition. **Results**: Of the 193 survey respondents, 69% agreed and strongly agreed that the format was effective, 71% felt they learned from their peers, with 74% acquiring knowledge on migraine assessment and management, and 76% reporting that the facilitator-led discussions helped their understanding. About 77% of the respondents indicated improvement in their understanding of migraine pathophysiology. About 80% felt a thorough review of pharmacology was provided, 81% indicated learning about patient education pearls, and 80% felt they learned about medication overuse headaches. **Conclusion**: The neurology ICC offered an interactive virtual platform for teaching interprofessional clinical problem-solving during the ongoing pandemic.

Abstract # B62

Type of presentation: Poster

Authors: Welly Mente PharmD[1]
[1] College of Pharmacy, California Northstate University.

Title: IV Sterile Compounding Practices Taught During Didactic Years as Students Learn Key Roles in a Culture of Patient Safety

Introduction: Essential knowledge and skills in IV sterile compounding (IVSC) is an important area of pharmacy practice. There is clear need to implement instructions early during didactics due to complexity of intravenous therapy, risk of errors or patient harm, and new biologic therapies which all demands higher level expertise in sterile compounding. USP Chapter 797 and other efforts have increased focus on quality of compounded sterile preparation (CSP). Practice knowledge and skills training in IVSC are necessary to prevent harm, including death, to patients that could result from microbial contamination (nonsterility) and excessive bacterial endotoxins. **Methods**: CNUCOP provides IVSC knowledge and training taught over three years during didactics which requires use of a mock lab resulting in completion of 20+ hours for students including transfers. LAFW Horizontal Cleaning and Disinfecting video tutorial for students are available on demand. Skills lab modules require passing of 70% or better and remediation for students scoring < 70%. Championed by IVSC experienced faculty, training is provided to faculty and resident assessors during new employee Orientation. **Results**: Students are provided with knowledge of proper garbing and gowning for IVSC practices and introduction to assigning beyond-use date (BUD) for CSPs. Students are assessed as they gain hands-on compounding practice sessions to perform pharmaceutical calculations, develop a sense of attention to detail, realize that good communication skills are important in the IV lab, and apply critical thinking at every step of the way throughout the sterile compounding process in order to protect patients and the compounding personnel. **Conclusion/Implications**: CNUCOP has demonstrated ability to incorporate entire IVSC modules into didactics for experiential readiness knowledge of regulations and aseptic technique skills which supports quality and quantity of educated student graduates who will assume important patient safety roles. Upon completion, students are hereby recognized as having earned a Basic IVSC Certificate of Completion.

Poster Presentations: College of Health Sciences

Abstract # B63

Type of presentation: Poster

Authors: Ihab Abed[1], Kit Keane PhD[1]
[1] College of Health Sciences, California Northstate University.

Title: Contribution of hydrological features to bee habitats

Previous studies have indicated that there is a negative correlation between bee community abundance and variation when compared to relative impervious surface area. One similarly integral environmental feature that may affect bee populations is the hydrological mapping. Bee species are widely impacted by effects such as soil moisture, and temperature, which are impacted by the available ponds and water features in the surrounding areas. This research explores the effect of these features on local bee populations. Utilizing vane traps surrounding the Sacramento area, we were able to collect samples from a variety of locations with different water features and measure the distances from the closest hydrological feature available. No correlation was found between these features and the bee variance or abundance to hydrological features. While differences were found between the populations collected, it seemed that other features were more relevant to these populations than the hydrological features of the area. Further studies may be necessary to elaborate more on the relevance of hydrology to bee populations.

Abstract # B64

Type of presentation: Poster

Authors: Emily Jean-Baptiste[1]
[1] College of Health Sciences, California Northstate University.

Title: Association Between Water Quality and High Heart Disease Rates in Sacramento County

Sacramento County has had a history of high heart disease rates due to various factors, many of them still unbeknownst or mere speculation. In 2016, the Sierra Health Foundation released the Sacramento County Community Health Needs Assessment and reported high rates of ED visits for heart disease exceeding state standards by 50%. A study done for the Pakistan Journal of Science illustrated exposure to higher concentrations of calcium, TDS, chloride, magnesium, water hardness, and various other parameters potentially lead to heart disease development. In this study, a correlation between water quality and heart disease rates in Sacramento was tested. To have this achieved, a longitudinal analysis of water quality data from 2016 to 2020 was compared to heart disease rates in the corresponding areas from 2016 to 2020 was assessed. Additionally, an at-home water quality testing kit was used to test water quality from three areas: Rancho Cordova, Downtown Sacramento, and Carmichael. A Two-Factor ANOVA was used to determine if either location or year had any significance. Using a 0.5 significance level, the test found a weak correlation between water quality and heart disease rates. Future research should entail a focus on arsenic concentrations. Studies have shown increased levels of arsenic by nearby dormant volcanoes, such as the ones in Lassen Volcanic Nation Park, during periods of volcanic unrest.

Abstract # B65

Type of presentation: Poster

Authors: Peter Katz PhD[1]
[1] College of Health Sciences, California Northstate University.

Title: Experiencing Empathy: How performance ethnography illuminates the data

Traditionally, empathy has been understood either to be an outgrowth of imagination (Adam Smith) or of one body resonating with another (David Hume). To align data with one of these theories, however, neuroscience and psychology must often perform philosophical or semantic gymnastics that runs contrary to the data. In neuroscience, “empathy” describes a mechanism of mirrored representation In psychology, “empathy” includes others’ intentions and our ability to both think and feel our way around them. And in philosophy, “empathy” almost always implies others’ suffering and our endeavors to alleviate it. Imprecise terminology across the field of perspective-taking and empathy studies muddies the data, and leads scholarship to make claims unsupported by the data. Performance ethnography considers the disjuncture between the theory and phenomenology—what it feels like to have a body in real life. If we instead recognize that those who have the most bodily expertise may be outside traditional academia, we might uncover new models of what experience can teach us about what a body can do. This uncovers new and better questions about the data we science gathers on empathy. What ethical and psychological lessons can we learn from thinking about empathy relationally and epiphenomenally (as greater than the sum of its parts) rather than something that happens in a single person? How could we go about testing the viability of this definition, and by what expertise would we judge that viability? Martial Arts Studies clarifies how we conceive of empathy by utilizing experts on body-to-body interaction and encouraging scholars to use performance ethnography—that is, to physically inhabit the space and actions studied. Experiential expertise challenges the idea that empathy occurs in an individual; it is better understood as an emerging moment of integration between bodies.

Abstract # B66

Type of presentation: Poster

Authors: Kit Keane PhD[1], Alec Landau[1], Rohan Datir[1]
[1] College of Health Sciences, California Northstate University.

Title: Male territoriality and alternative mating strategies in Eastern Carpenter Bees

There are over 4000 species of native bees in North America, and most of them remain understudied despite their keystone role in the pollination of flowering plants. Males in the carpenter bee genus Xylocopa are famous for their aggressive territorial behavior in which they hover in the air and intercept any small objects which enter their airspace, including but not limited to female bees, male competitors, small rocks thrown toward them, and even human heads. Male competition has long been identified as a key component driving variation in mating systems, so by exploring the dynamics of male-male interactions, we hope to develop a deeper understanding of how bee mating systems fit into the existing theory. Specifically, our objectives are to determine what criteria males use to choose territories as well as ascertain whether there is variation in territorial/reproductive strategies with respect to male size (a rough indicator of male quality). For example, are larger males better able to defend more desirable territories? In most species of Xylocopa, males patrol territories based on availability of females – often near either floral resources or female nesting sites. In order to explore the decision processes involved in male territoriality behavior, we perform a basic mark-recapture study. We then utilize network analysis constrained by the spatial location of territories and analyze whether there are patterns guiding males movement between sites. Predictably, results suggest that the most desirable territories are those closer to a greater number of female nests. Male mass does not seem to play a role in how often an individual was captured nor how many different sites males visited. However, males are highly selective over which sites they patrol, often returning over and over again to the same territory.

Abstract # B67

Type of presentation: Poster

Authors: Khalil, Ramy[1]
[1] College of Health Sciences, California Northstate University.

Title: Social Media as a Tool

COVID-19 has caused millions to adapt to different lifestyles both at home and in the workplace. Unfortunately, some of the measures employed to maintain public safety have been met with resistance. Here in the United States, throughout this pandemic, conspiracies, misinformation, and mistrust have surrounded attempts to mitigate the spread of the virus. Investigation of social media platforms and online forums (e.g. YouTube) was performed and resulting data concerning misinformation was gathered and categorized. The top three categories of misinformation identified were “Gap in Scientific Knowledge”, “Conspiracy”, and “Government Mistrust”. A “snowball method” was utilized to develop a more thorough understanding of the virus’ transmission and mechanisms by connecting with microbiology experts. A pamphlet was generated employing the findings surrounding COVID-19 misconceptions. Development of the pamphlet required careful consideration of word choice and jargon use to reach as large an audience as possible, especially individuals that may have conflicting and firm, pre-existing beliefs. Future studies will see the created pamphlet used as an instrument to collect survey information from individuals of different demographics. Ultimately, survey questions will gather insight into the spread of misinformation, what populations are especially susceptible to misinformation, and what kind of interventions are effective at combatting misinformation.

Abstract # B68

Type of presentation: Poster

Authors: Alisha Mehta[1], Nicholas Valley PhD[1], Gloria Poveda MA[1]
[1] College of Health Sciences, California Northstate University.

Title: Designing an ACE Inhibitor Alternatives

Designing drugs, on a large scale, appears daunting. However, the development of software programs makes the process easier by aiding in an easier conceptualization of drug and target interactions. The Renin-Angiotensin-Aldosterone pathway is one of the blood pressure regulatory mechanisms in our body, working to raise blood pressure in the event of hypotension. In this pathway, the angiotensin-converting enzyme (ACE) converts angiotensin I to angiotensin II, which then causes blood vessels to narrow and the kidneys to absorb sodium, thereby raising blood pressure. The ACE receptor, therefore, is a target for medications aimed to lower blood pressure in patients with hypertension. Most current ACE inhibitors produce a chronic cough in users, that results in some patients discontinuing use. Potential drug leads were explored computationally using UCSF Chimera, AutoDock Vina, Swiss ADME, and TEST. Predictions of the target affinity and the viability of the drugs inside of the body were thus obtained. The computational studies provided a deeper understanding of the drug-discovery process and valuable insight into research execution. The project described expanded to include community interaction, specifically pre-health high school students, by communicating the opportunities presented to undergraduate research students and providing them with an introduction to the interdisciplinary perspective with which they should approach undergraduate research.

Abstract # B69

Type of presentation: Poster

Authors: Yasoda Satpathy[1], Kit Keane PhD[1]
[1] College of Health Sciences, California Northstate University.

Title: Factors correlated with Xylocopa size

Given the importance of Xylocopa species in promoting and maintaining ecological health, the identification of links between specific demographic factors and Xylocopa size can be used to create more targeted conservation plans. Various sites in Sacramento were sampled for bee species; Xylocopa bee head and wing sizes were measured calipers. Census data and tree cover data were collected and used to create correlation matrices to describe the relationships between environmental variables, demographic variables, and bee sizes. Xylocopa wing sizes were found to be statistically different across the Interstate 5 highway. Wing sizes are generally affected by environmental factors to a greater extent, so this may indicate differences in environment quality across the two regions. Xylocopa wing size was most strongly correlated with household income, age, and percent Caucasian, and the variable was weakly correlated with sex ratio, education, and tree cover. These correlations can be used to guide conservation plans, but they might also indicate differences in environmental conditions associated with variation in demographic variables. Due to the bidirectional link between environment health and population characteristics, further research is still necessary to clarify the environments that are best for Xylocopa habitats and conservation plans.

Abstract # B70

Type of presentation: Poster

Authors: Sonya Talwar[1], Nicholas Valley PhD[1], Gloria Poveda MA[1]
[1] College of Health Sciences, California Northstate University.

Title: Development of an Illustrated Children's Book on Psoriasis and Computational Analysis of Pertinent Pharmacology

Psoriasis is a common chronic inflammatory skin condition that primarily affects adults. Pediatric patients affected by psoriasis often do not receive adequate clear and digestible information regarding their diagnosis and the physiology behind it. A short book has been written and illustrated to fill this gap as a resource to communicate information found in the literature on psoriasis as well as relevant pharmacotherapy. The creation of the book was informed by reviewing existing literature and performing computational drug discovery. The literature informed background on the clinical presentation and medical management of psoriasis. The computational calculations allowed exploration of pertinent biochemistry and pharmacology via analysis of the interaction of various ligands with TNF-alpha, a cytokine protein associated with symptoms of psoriasis. Information gathered from the methods above provided a framework for development of the illustrated book. The book is in the process of undergoing printing and distribution in order to increase patient education, especially for those who are given a diagnosis of psoriasis at a young age.

Abstract # B71

Type of presentation: Poster

Authors: Aishwarya Vemulapalli[1], Nicholas Valley PhD[1], Gloria Poveda MA[1]
[1] College of Health Sciences, California Northstate University.

Title: Epilepsy: Drug Discovery and Psychosocial Factors in the Sacramento Community

Epilepsy is a common neurological disorder that affects people of all ages. As with any other illness, it is important to analyze biological, social, and psychological aspects of the disorder in order to gain a more complete, holistic understanding of it. To embrace this approach, two avenues of addressing different aspects of the disease were used. Using several visualization and computational programs, computational drug design (CDD) was performed, yielding numerous novel molecular compounds that could potentially act as anti-epileptic drugs and their theoretical efficacies. Biochemical properties of the disease were thus revealed, and to enhance understanding of the disease, efforts were taken to venture out into the Sacramento community to uncover more intimate and sociological details about epilepsy. Communication with professionals in the community brought to light several matters concerning the disease, including the fact that individuals with epilepsy are uncomfortable informing others about their illness due to existing stigmas. It was found that, when individuals avoid informing others about their epilepsy, they may face diminished social support and safety, demonstrating how damaging the public perceptional of epilepsy can be. To address this issue, flyers that encouraged those with epilepsy to inform others about their condition were created and shared with a local epilepsy organization. Altogether, investigating molecular characteristics of epilepsy through CDD and social characteristics of the disease through community interaction led to the development of a comprehensive perspective on epilepsy.

Poster Presentations: College of Graduate Studies

Master of Pharmaceutical Sciences program

Abstract # B72

Type of presentation: Poster

Authors: Tiffany Wong[1], Catherine Yang PhD[1]
[1] Master of Pharmaceutical Sciences, California Northstate University.

Title: Therapeutic Delivery Systems for Biologics and Biosimilars

Objective: To review biological therapy delivery including recent vaccine development. Methods: A PubMed search was performed using keywords including biologics, biosimilars, nanomedicine, vaccine review, Trojan-Horse technology, invasive and noninvasive drug delivery, oral, subcutaneous, transdermal, inhalation, intranasal, and buccal delivery. Reviews, overviews, and advances of biological therapy were included with publications earlier than 2012 excluded as most drug delivery advances occurred in the past decade. Administration routes for biological therapy focusing on less invasive and noninvasive delivery were analyzed. Nanomedicine increasingly used to improve biological therapy delivery was also reviewed. Vaccine platforms and delivery methods were also summarized, including SARS-CoV-2 vaccines. 42 articles were included in the review.

Abstract # B73

Type of presentation: Poster

Authors: Farah Hakim[1], Abdelbasset Farahat PhD[1]
[1] Master of Pharmaceutical Sciences, California Northstate University.

Title: Risperidone as Treatment for Autism

Autism, a developmental disability that seems to continue to rise as the years past. Autism adopted the name autism spectrum disorder (ASD) in 2013 to categorize a list of developmental disabilities such as Asperger's syndrome, Rett syndrome etc. Individuals suffering from ASD undergo communication, behavioral and social challenges however there is currently no medical test to diagnosis an individual with ASD. The diagnosis for ASD is based on observable characteristics which is based on the behavior of the individual. Risperidone, a drug approved by FDA in October of 2006. Risperidone is known to have short term effects on children who suffer from Autism. It is expected to be a treatment for aggression, temper outbursts and self-injurious pertaining to an individual suffering from Autism. A study was conducted in children aging from 5 to 17 years with autism who also suffered from severe tantrums, aggression, and self-injurious behavior. The study was divided into a two-part study. Part 1 of the study consisted of a 4-month open label treatment with Risperidone at optimal dose which included 63 patients. The second part consisted of a randomized, double blind, placebo substitution study of Risperidone withdrawal consisting of 32 patients. The results reflected the mean of Risperidone dose was 1.96mg/day at entry and remained the same over 16 weeks of open treatment. It was brought to attention that the change on the Aberrant Behavior Checklist arability subscale was small and clinically insignificant. Part 1 was known to be discontinued included loss of efficacy (N=5) and adverse effects (N=1). Now moving into part 2 results, the relapse rate was 62.5% for gradual placebo substitution and 12.5% for continue Risperidone which was known to be significant. In conclusion, Risperidone showed efficacy and tolerability for short term effect for treatment for children with autism.

Abstract # B74

Type of presentation: Poster

Authors: Sadaf Zarechian[1], Abdelbasset Farahat PhD[1]
[1] Master of Pharmaceutical Sciences, California Northstate University.

Title: Synthesis and anti-influenza activity of five member heterocycles containing compounds

This is on the chemistry of synthesis of five membered heterocycles containing compounds and the anti-influenza activity that they show. It is a mini review that looks through published literature data. The five-membered heterocyclic compounds that we examined were triazoles, oxadiazoles, triazoles, thiadiazoles, pyrazoles, imidazoles, and tetrazoles. This review will be informative to researchers that are contributing to the development of anti-influenza agents.

Abstract # B75

Type of presentation: Poster

Authors: Beeta Boushehri[1], Guy DiSibio, MD[2]
[1] Master of Pharmaceutical Sciences, California Northstate University.
[2] College of Medicine, California Northstate University.

Title: HPV Vaccination for the Prevention and Treatment of Non-Melanoma Skin Cancers

Background: Squamous cell carcinomas are the second most common form of skin cancer, with incidence rates increasing. Basosquamous carcinoma is a rare aggressive epithelial neoplasm with characteristics similar to that of both basal and squamous cell carcinoma with a tendency for local recurrence and distal metastases. Gardasil-9 is approved for the prevention of cervical, anal, vulvar, and vaginal cancers caused by the human papilloma virus. **Methods:** We conducted a literature review according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. **Results:** Studies suggest protective features of Gardasil-9 against certain non-melanoma skin cancers, especially in immunocompromised patients. P16, a genetic marker, is suggested to be present in cancerous lesions that may benefit from the systemic and direct injection of Gardasil-9. **Conclusion**: Gardasil-9 is suggested to have a protective effect against non-melanoma cutaneous cancers. The HPV vaccine may have therapeutic utility for non-melanoma skin cancers in patients who are poor surgical candidates, multiple lesions, or defer surgical therapeutic methods.

Poster Presentations: College of Psychology

Abstract # B76

Type of presentation: Poster

Authors: Megan Miller[1], Jason Lillis PhD[1]
[1] College of Psychology, California Northstate University.

Title: The Association between Socioeconomic Status and Alcohol Use

Pre-existing inequalities in the United States have been exacerbated by the onset of the coronavirus pandemic. It has brought with it, unprecedented financial crisis, further growing the wealth gap. In addition, with the onset of the pandemic there has been a significant increase in alcohol sales in the United States. School closures, heightened stress, loss of income, and social isolation resulting from the pandemic has increased the risk for child abuse and neglect. Now more than ever, it is warranted that we begin to understand the complexities of the association between socioeconomic status, childhood maltreatment, and alcohol use disorders. Notably, the vast majority of research to date has focused on either SES or childhood maltreatment as risk factors for increasing the probability and development of alcohol use disorders. However, little research has been done exploring the interaction between all three of these variables. This secondary data analysis of Add Health sought to answer these three questions: Is lower SES associated with higher rates of alcohol use disorders? Is childhood maltreatment associated with higher rates of alcohol use disorder? Is alcohol use disorder more common amongst young adults that have experienced child maltreatment regardless of socioeconomic status? The results of this study indicated that alcohol dependence symptoms were more likely amongst participants that had a lower socioeconomic status. In addition, childhood maltreatment increased the likelihood that one would experience higher rates alcohol dependence symptoms as an adult. Notably, this indicates that alcohol use disorders are more common amongst adults that have experienced childhood maltreatment regardless of socioeconomic status. This research is aimed to inform future policies and public health messages.

Poster Presentations: College of Medicine and College of Health Sciences

Abstract # B77

Type of presentation: Poster

Authors: Talwar, Sonya; Talwar, Tanya; Waheed, Abdul MD; Al-Obaydi, Sarah MD MPH; Bhadurihauck, Anjuli DO MS; Khan, Sameena MD and James DeMaio MD

Title: A Rare Presentation of Pulmonary and Hepatic Kaposi Sarcoma in the Era of Highly Active Antiretroviral Therapy

Kaposi Sarcoma (KS), a malignancy known to cause soft tissue lesions, is often associated with HIV and is characterized as an AIDS-defining illness. Extensive KS in a patient after the introduction of highly active antiretroviral therapy (HAART) is rare. We report a 26-year-old African American bisexual male who presented with gingival bleeding, weight loss, and raised gingival and truncal lesions for the past 6 months. He was found to have KS on biopsy, with pulmonary and hepatic infiltration shown by CT of the abdomen and pelvis. Despite platelet transfusions to address thrombocytopenia and management of dwindling respiratory status, the patient passed after bleeding profusely from his oral and respiratory lesions. We aim to emphasize the necessity of early diagnosis and management of KS, and the complications that may arise when detection is delayed.

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