14th Annual
Scholarly Activity and Research Program (SARP) Symposium

October 11th and 12th 2023

9:00 AM - 12:00 PM

Room: MSBII-1A105

2023 SARP Symposium Schedule & Abstracts

2022 SARP SYMPOSIUM

SARP team:

- Dr. Jessica Chacon (Course director)
- Dr. Nathan Holland (Course director)
- Dr. Curt Pfarr (Course director)
- Mr. Michael Mercado (Unit Associate Director)

Special thanks to all the judges, timekeepers and support staff for their help and dedication to our students, and to all the students and their mentors for their hard work and scholarship.

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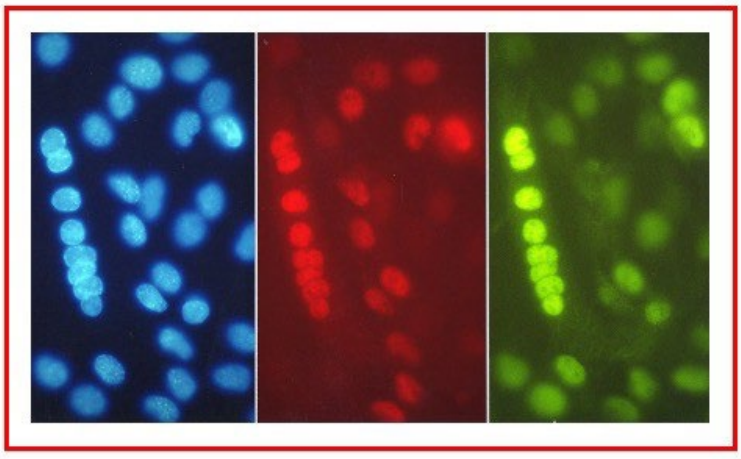

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ABSTRACTS
October 11
9:00 a.m. – 12:00 p.m.

Characterizing TKI resistance in FLT3+ Acute Myeloid Leukemia Cell Lines

Student: Tapia, Desiree N
Mentor: Anna M. Eiring
Group: 1 Date: 10/11/2023 Time: 09:00 a.m.

Abstract:
Acute myeloid leukemia (AML) patients with mutations in the FMS-like tyrosine kinase 3 (FLT3) gene are associated with poor prognoses and outcomes. While tyrosine kinase inhibitors (TKIs) target FLT3 are an option, the emergence of resistance to these inhibitors poses a significant challenge in the treatment of these high-risk patients. Thus, there is an immense need for continued research into discovering new alternative therapies that may circumvent the issue of TKI resistance in FLT3+ AML. We developed FLT3 inhibitor-resistant cells by treating the FLT3+ human AML cell lines, MOLM-13 and MOLM-14, with increasing doses of the FLT3 tyrosine kinase inhibitor (TKI), midostaurin. After long-term culture with TKI, we performed colony formation and apoptosis assays to confirm and characterize resistance. We found that the developed resistant cells had decreased rates of cell death and increased proliferation when exposed to midostaurin compared to parental AML cells, confirming the establishment of TKIresistant AML cells. This model of resistance serves as a valuable tool and has future implications for subsequent research in understanding the mechanism by which AML cells acquire TKI resistance, which will help identify novel therapeutic targets in the treatment of AML.

Compensatory hyperinsulinemia as a risk factor cardiovascular disease

Student: Farooq, Sarah
Mentor: Dr. David Cistola
Group: 1 Date: 10/11/2023 Time: 09:30 a.m.

Abstract:
Early compensatory hyperinsulinemia (ECH) is the body's initial response to insulin resistance. Elevated blood insulin compensates by maintaining fasting glucose, triglycerides and high density lipoprotein cholesterol (HDL-C) within normal limits. Thus, individuals with ECH do not meet the harmonized criteria for metabolic syndrome and elude screening for cardiovascular risk

Construct validity of the electronic Veterans Affairs Frailty Index against clinician frailty assessment

Student: Hennis, Robert
Mentor: Ariela Orkaby
Group: 1 Date: 10/11/2023 Time: 10:00 a.m.

ABSTRACT:
The Veterans Affairs Frailty Index (VA-FI) is an electronic frailty index that has demonstrated predictive validity in determining risk of morbidity and mortality among U.S. Veterans. However, the degree to which the VA-FI is associated with a clinician's frailty assessment is unknown. We sought to validate the VA-FI against a clinician-derived frailty index based on a comprehensive geriatric assessment (CGA-FI) and other clinical measures of frailty.

2'-3'-dehydrosalannol (DHS) as a novel therapeutic agent for pancreatic cancer

Student: Durrani, Sanaa
Mentor: Ramadevi Subramani
Group: 1 Date: 10/11/2023 Time: 10:30 a.m.

Abstract:
Pancreatic cancer therapy is a complex concept that depends on a multitude of factors including cancer stage, patient health status, adverse effects, patient lifestyle, and others. Pancreatic cancer therapy traditionally includes surgery, chemotherapy, radiation, and targeted therapy, like many other cancers. Novel cancer therapeutics have been explored to potentially slow the growth of cancer cells, completely irradiate them, or aid in the early detection of certain cancers.
Pancreatic cancer is a highly aggressive cancer with limited treatment options and high fatality. Pancreatic ductal adenocarcinoma (PDAC) makes up majority of the pancreatic cancer diagnoses. PDAC therapeutic progression has not had a lot of success due to the aggression and dissemination of the cancer. This understanding provides reasonable motivation to explore novel therapeutics for the disease. 2-3-DHS, a compound obtained from the extract neem tree, is currently being explored for its role in manipulating the ATR-CHK1 pathway. The ATR-CHK1 pathway is a signaling pathway that is activated by DNA damage or cell stress.
The ATR-CHK1 pathway is critical in preventing the accumulation of DNA damage, an underlying cause of cancer development. If the ATR-CHK1 pathway is overactive in promoting cell survival, it can cause mutated cell survival and proliferation. To evaluate DHS's anti-cancer potential, Western Blot assays were done using different pancreatic cell lines, including MIA-PaCa-2, HPAC, PANC-1, ASPC-1, and were compared to a healthy pancreatic cell line, hTERT HPNE. The Western blot results were inconclusive due to inadequate standardization of Beta Actin. They will be repeated with the same pancreatic cell lines. In silico modeling suggested higher survival rates with lower expressions of ATR, CHEK1, CHEK2, and ATM proteins. This study illuminates the potential of 2-3 DHS as a promising candidate for a novel therapeutic for pancreatic cancer

A role for G0/G1 switch gene 1 (G0S2) in normal myeloid development

Student: McCall, Emily
Mentor: Anna Eiring, PhD
Group: 1 Date: 10/11/2023 Time: 11:00 a.m.

ABSTRACT:
Chronic myeloid leukemia (CML) is a type of myeloproliferative cancer that effects hematopoietic stem cells, resulting in an overexpression & overabundance of cells of the myeloid lineage, specifically granulocytes, within the body. The Philadelphia chromosome, a reciprocal translocation of chromosomes 9 & 22, producing the BCR-ABL 1 fusion gene, is a key feature of this cancer. This fusion results in the uncontrolled activation & upregulation of BCR-ABL 1 tyrosine kinase, which contributes to the clonal proliferation & plethora of myeloid lineage granulocytes within patient's blood & bone marrow. Tyrosine kinase inhibitors (TKIs) are currently the mainstay treatment option for CML, having helped improve its prognosis from a fatal to now often chronic disease. However, TKI resistance is a growing problem in the treatment of CML, & the search for alternative therapies continues to rise. The G0/G1 switch gene 2 (G0S2), a tumor suppressor gene involves in numerous cellular functions, such lipid metabolism, apoptosis, & quiescence, is proving to be one such potential alternative. The overarching goal of this project is to increase our understanding of the role G0S2 plays as a tumor suppressor in both CML advancement & TKI resistance by trying to determine its effects upon neutrophil differentiation of murine 32Dcl3 myeloid precursor cells in response to granulocyte colony-stimulating factor (G-CSF) & attempting to confirm subcellular localization of G0S2 within K562 CML cells via immunofluorescence stating. Results show that loss of G0S2 resulted in an impairment of neutrophil differentiation in the presence of G-CSF & proved localization of G0S2 within the mitochondria, endoplasmic reticulum, & perinuclear regions of the cell. Attempts also made to quantify the amount of immunofluorescence staining present in the K562 cells the in order to compare different treatment effects upon G0S2 & additional staining targets, though results are indeterminate at this time

Analysis of the Anti-Cancer Effect of Nimbolide in the Diabetes Pathway of Non-Stem Cells Triple-Negative Breast Cancer Cell Lines

Student: Ganesh Senthil Kumar, Sangavai
Mentor: Rajkumar Lakshmanaswamy
Group: 2 Date: 10/11/2023 Time: 09:00 a.m.

ABSTRACT: Given its high proliferative and metastatic rate, triple-negative breast cancer (TNBC) continues to have a high mortality rate among women. Compounds derived from flora, such as nimbolide, are beginning to be researched for the treatment of various cancers, including TNBC. Of the cells within a tumor, the cancer stem cells (CSC) and non-stem cells (NSC) play a unique role in the cancer microenvironment, and targeting them could be the key to curing TNBC. Diabetic patients with TNBC have a poor prognosis, and nimbolide is an effective antidiabetic agent. The mechanism of action of nimbolide against TNBC remains mostly unknown. This study aimed to determine the drug's role in the gene expressions of the proteins involved in the diabetic pathway in TNBC. In this study, three cell lines (MDA-MB-231, MDA-MB-468, and BT20) of TNBC were treated with nimbolide. Then, NSCs were isolated using flow cytometry. Lastly, gene expression was determined using a diabetic pathway microarray. The results showed a decrease in the number of TNBC cells following nimbolide treatment in all cell lines. The downregulation of IL-6 and CCL5 in the MDA-MB-231 cell line, upregulation of DUSP4 in the MDA-MB-231 and BT20 cell lines, and the downregulation of CCR2 in the MDA-MB-231 and MDA-MB-468 cell lines further supports the anti-cancer role of nimbolide. Future research could determine the gene expression of nimbolide-treated cancer stem cells of TNBC to compare to the drug's role within NSCs. Also, the role of nimbolide within other metabolic pathways could be studied to determine its mechanism of action further. Nimbolide is still in the initial stages of research. However, it is proving to be a promising chemotherapeutic agent in the treatment of TNBC.

Associations between medical school personal essays and admission rates through sentiment analysis.

Student: Zhou, Dan Lei
Mentor: Cynthia Perry
Group: 2 Date: 10/11/2023 Time: 09:30 a.m.

Abstract: It is hard to categorize how much impact a personal statement has on medical school admissions– however, it is possible to analyze a batch of personal statements and see whether there are any correlations between personal statements and matriculation ratesThis project aims to find the associations between medical school application essays and admissions for PLFSOM Class of 2026 through sentiment analysis in Python

BISS and YMRS as measures to assess bipolar disorder in children and adolescents

Student: Reasons, Tiffany
Mentor: Aisha Shariq
Group: 2 Date: 10/11/2023 Time: 10:00 a.m.

Abstract:
Bipolar disorder's impact on children and adolescents is of paramount importance, given its prevalence and the concerning delays in diagnosis. Epidemiological data reveals that approximately 2.2% of US adolescents suffer from bipolar spectrum disorders. However, despite its prevalence, bipolar disorder is frequently misdiagnosed, leading to an average diagnostic delay of 10 years. This study aims to address this critical issue by evaluating the effectiveness of the Bipolar Inventory of Symptoms Scale (BISS) and the Young Mania Rating Scale (YMRS) in assessing bipolar disorder in young individuals. Data was sourced from the Early Interventions for Bipolar Disorder and Schizophrenia in At-Risk Youth study (EIS), focusing on at-risk youth in South Texas and El Paso. Cluster and factor analyses were conducted to identify relevant symptom clusters and factors for assessment. The results reveal that the depression portion of the BISS can be significantly shortened from 22 measurements to 13 measurements, primarily from factor 2. These shortened measurements are as effective, if not slightly more so, in predicting bipolar depression in children and adolescents than the original BISS depression score. In contrast, both the mania portion of the BISS and the YMRS did not demonstrate significant improvements when using factors compared to their full-length versions. This study emphasizes the advantages of employing a shortened BISS in assessing bipolar disorder in young individuals. It enhances efficiency without compromising accuracy, offering practical implications such as time efficiency and better alignment with the attention spans of young individuals. The shortened BISS can significantly aid early diagnosis, potentially improving the trajectory of the disorder and mitigating its severe consequences. In conclusion, this research addresses the critical need for early intervention in pediatric bipolar disorder. It highlights the effectiveness of the shortened BISS as a valuable tool for assessing bipolar disorder in children and adolescents, providing a more efficient and accurate means of diagnosis compared to existing scales.

Identifying Proteins that Interact with G0S2 in Myeloid Leukemia using Mass Spectrometry-based Proteomics

Student: Rubio, Andres
Mentor: Anna M. Eiring
Group: 2 Date: 10/11/2023 Time: 10:30 a.m.

Abstract: Chronic myeloid leukemia (CML) is a hematological malignancy characterized by the constitutionally active tyrosine kinase produced by the chromosomal translocation, t(9;22), leading to expression of the BCR::ABL1 oncoprotein within CD34+ hematopoietic stem cells (HSCs). After the introduction of tyrosine kinase inhibitors (TKIs) in the early 2000s, management of CML has seen great success and has improved patient prognosis. Unfortunately, like most cancers, CML is susceptible to TKI drug resistance, and the necessity to identify alternative therapeutic targets is essential to deter the progression of disease. While half of TKI resistance in CML is due to mutations in the BCR::ABL1 kinase domain, approximately half of TKI-resistant patients have kinase-independent resistance, meaning the cells survive despite TKI-mediated BCR::ABL1 inhibition. Notably, gene expression analysis of TKI-resistant CML demonstrated that the gene encoding for G0/G1 switch gene 2 (G0S2) is significantly downregulated. G0S2 is responsible for a variety of vital cellular functions related to apoptosis, quiescence, lipolysis, lipogenesis, and oxidative phosphorylation. Additionally, epigenetic silencing of G0S2 in multiple cancer cell lines have implications to the protein's role in carcinogenesis. Our studies have demonstrated that restoring G0S2 expression in CML cell lines results in sensitization to TKI therapy, alluding to a tumor suppressor role. I hypothesized that G0S2 in CML engages with uncharacterized protein partners that contributes to oncogenesis. To identify interacting proteins of G0S2 in the context of CML, we initially began through a co- immunoprecipitation (CO-IP) approach where we developed cell lines that ectopically expressed G0S2 in K562 CML cells. Regrettably, we were unable to isolate G0S2 through the CO-IP procedure, so we used an alternative approach. Rather than sending co-IP lysates for mass spectrometry, we analyzed total protein lysates by mass spectrometry (MS)-based proteomics analyses. By analyzing K562 cells expressing ectopic G0S2 or an empty vector control, pathway enrichment analysis revealed that G0S2 may be involved in cellular processes pertaining to regulation of endocytosis, small molecule catabolic process, monocarboxylic acid metabolic process, positive regulation of catabolic process, and cellular response to nitrogen compounds. Altogether, our data suggest that restoring G0S2 expression combined with BCR::ABL1 inhibition may be a novel strategy to promote TKI-sensitivity in otherwise TKI-resistant CML patients.

Identifying proteins that interact with G0S2 in myeloid leukemia using mass spectrometry-based proteomics

Student: Dang, Sara
Mentor: Anna Eiring
Group: 2 Date: 10/11/2023 Time: 11:00 a.m.

ABSTRACT:
G0/G1 switch gene 2 (G0S2) is a small 11 kDa protein known to regulate multiple cellular functions, including lipolysis and lymphocyte activation. Its role as a tumor suppressor in acute and chronic leukemia is currently being implicated in the Eiring laboratory; however, little is known about its interacting proteins. Unknown interacting protein partners of G0S2 need to be identified to explore why downregulation of G0S2 contributes to TKI resistance in chronic myeloid leukemia (CML) and how restoring G0S2 expression levels in scenarios of TKI resistance may have therapeutic use in resensitizing CML to TKIs. Identification of G0S2's novel protein partners will be conducted through immunoprecipitation, co-immunoprecipitation with immunoblotting, and followed by liquid chromatography/mass spectrometry-based proteomics analysis. Immunoblotting will be used for confirmation of protein-protein binding interactions. Unfortunately, the coimmunoprecipitation experiments were unsuccessful in reaching appropriate protein-to-antibody binding. As an alternative approach, mass spectrometry-based proteomics data was analyzed instead. Results showed pathways associated with downregulating G0S2 have significant effects on protein polyubiquitination and that upregulating pathways regulate nucleocytoplasmic transport. Altogether, our data suggests that more experiments will need to be performed to elucidate the mechanisms of these proteins to find ways to inhibit their downregulation or encourage upregulation to increase G0S2 expression and increase the survival likelihood in TKI-resistant CML patients.

Impact of Prenatal PFAS Exposure on Adipogenesis of Umbilical Cord Mesenchymal Stem Cells

Student: Kavya, John
Mentor: Kristen Boyle
Group: 3 Date: 10/11/2023 Time: 09:00 a.m.

Abstract:
Perfluoroalkyl substances, also known as PFAS chemicals, have been found at increasing concentrations within the environment and in many consumer products. In the early 2000s, perfluoroalkyl octane (PFOA) and perfluorooctane sulfonic acid (PFOS) were first detected to be present in the blood of 98% of humans1. Consequently, many investigators started looking at the potential health impact of these fluorinated substances. There have been recorded immunological, neurological, and metabolic effects associated with PFAS substances. The metabolic implications of PFAS exposure, particularly on birthweight, BMI, and waist circumference appear to be the most widely studied effect, but the exact characterization of the relationship between these variables is uncertain. Recent epigenetic data suggest that lipid content may be a more valuable indicator of metabolic outcomes and obesity risk2. Gestational PFAS exposure has been associated with methylation changes in genes that mediate lipid metabolism3. The lab that discovered this relationship has another study currently under review that shows gestational PFAS exposure is linked to adiposity changes in children 4 to 6 years old. Unpublished RNA-seq data from Boyle et al. has also shown alterations in the cell cycle of mesenchymal stem cells associated with gestational exposure to PFAS chemicals. Certain cell cycle genes have a dual role in mediating adipogenesis, so this data further hints at a connection between prenatal PFAS exposure and adiposity. Thus, we hypothesized that in vitro exposure of umbilical cord mesenchymal stem cells (MSCs) to PFAS chemicals may cause changes in the lipid content of these cells.

Investigation of Involvement of Protein Kinase D in VEGFR2 Trafficking and Permeability Change in Human Retinal Endothelial Cells

Student: Kim, Ryungrae
Mentor: Kaori Yamada
Group: 3 Date: 10/11/2023 Time: 10:00 a.m.

Abstract:
The process of forming a new vasculature, angiogenesis, plays an important role in the development of the organisms and the pathogenesis of diseases like Wet age-related macular degeneration (Wet AMD). Vascular endothelial growth factor (VEGF) plays an important role in the angiogenesis. To respond to environmental VEGF, endothelial cells need to express the corresponding receptors to VEGF on their surface. KIF13B is a kinesin 3 family cellular motor that transports vascular endothelial growth factor receptor 2 (VEGFR2) to the cell surface. Regulating the trafficking of the receptors themselves could be a potential therapeutic target in wet age-related macular degeneration (Wet AMD). However, the mechanism of VEGFR2 trafficking to the cell surface is not fully understood.
Protein kinase D1 (PKD1) phosphorylates KIF13B and thus regulates KIF13B-VEGFR2 interaction. In this pilot study, we investigated the effects of PKD1 inhibitors on KIF13B-VEGFR2 interaction and VEGFR2 vesicular dynamics, and finally, PKD1's effects on endothelial permeability. Endothelial cells were transduced with a vector carrying a VEGFR2 fluorescent marker to monitor VEGFR2 vesicular trafficking using live cell imaging. Additionally, vascular permeability with and without PKD inhibitor was tested by comparing trans-endothelial electrical resistance (TEER). This project aims to elucidate the underlying mechanism of VEGFR2 trafficking because potential alterations of this pathway can progress therapy development of target diseases related to abnormal angiogenesis, such as Wet AMD

Local Effects of Intramedullary Reaming

Student: Schulz, Shayli
Mentor: Thabet Hagag
Group: 3 Date: 10/11/2023 Time: 10:30 a.m.

ABSTRACT:
Intramedullary reaming is the gold standard for midshaft long bone fracture treatment. It decreases the rate of nonunions by recruiting osteogenic growth factors and stem cells to the fracture site. However, it is accompanied by potential complications such as heat related injuries and compartment syndrome. In addition to its role in autografting, the newer Reamer Irrigator Aspirator system alleviates some of these complications but is associated with various complications itself. A review of the current literature was performed using the PubMed database which initially yielded 542 articles. Implication of exclusion criteria identified 82 articles. These were used based on their relevance to local effects of intramedullary reaming. Results showed that reamed intramedullary nailing and the Reamer Irrigator Aspirator system have an osteoinductive effect compared to nonreamed intramedullary nailing and external fixation. Though, nonunion rates were indeterminant in reamed intramedullary nailing compared to other methods. Compartment syndrome declines with the use of the Reamer Irrigator Aspirator, however, heat related injuries was indeterminant. This literature review demonstrated that intramedullary reaming is safe and comparable to other forms of fixation in terms of nonunions and healing. Further, the Reamer Irrigator Aspirator system reduces the incidents of compartment syndrome and heat related injuries. This review aimed to present the local physiological effects of intramedullary reaming when compared to other forms of fixation. The use of the newer Reamer Irrigator Aspirator system, its indications, and complications were also reviewed

Low frequency and rare variants in kidney disease genes identified through whole genome sequencing in the Million Veteran Program

Student: Mendez, Carolina
Mentor: Hung, Adrianna
Group: 3 Date: 10/11/2023 Time: 11:00 a.m.

Abstract:
Nearly 37 million Americans have kidney disease.[2] The onset of chronic kidney disease is often asymptomatic, and patients present late into their disease course. Diagnostic interventions such as percutaneous renal biopsy are frequently contraindicated or challenging to obtain. Genetic testing may hold clinical utility in uncovering the etiology of CKD and ESKD if no obvious antecedent is present. Moreover, current studies show that a family history is present in 30% of patients with CKD, revealing the vital role of genetics.[3] As diagnostic genetic testing in nephrology increases, genetic causes of kidney disease are identified significantly in the adult population. A molecular diagnosis has numerous advantages for patient care, including facilitating treatment decision-making, enabling familial testing, providing information for safe kidney allograft donation, and uncovering insights into the pathogenesis of kidney diseases.

Longevity and trafficking of monocytes in naïve mice vs. septic mice

Student: Chaparro, Stephanie
Mentor: Wendy Walker
Group: 4 Date: 10/11/2023 Time: 09:00 a.m.

Abstract:
The innate immune system is the body's first line of defense against pathogens. It can eliminate a pathogen using myeloid cells, particularly neutrophils, monocytes, and macrophages until adaptive immunity kicks in. However, there are times when the innate immune system cannot control a pathogen, and immunity becomes dysregulated, leading to organ damage. This condition is referred to as sepsis. Even though monocytes share several phenotypic and functional characteristics with other immune cells, they are unique cells in that they can function as both a precursor and effector cells. Therefore, it is beneficial to investigate the monocyte's trafficking and longevity in the body during health and sepsis to understand sepsis at a cellular level further, possibly aiding in sepsis's diagnosis and treatment.
This project aimed to determine how quickly monocytes leave the bloodstream during health and sepsis and if they travel to the peritoneum and differentiate or return to the bone marrow. To help with this effort, we induced sepsis in B6.SJL mice (carrying the CD45.1 allele) and C57BL/6 mice (carrying the CD45.2 allele) via cecal ligation puncture (CLP). We isolated monocytes using magnetic beads—the B6.SJL acted as monocyte donors, and C57BL/6 mice acted as recipients of those monocytes. Then, we analyzed blood, bone marrow, and lavage samples post-injection via staining cells and flow cytometry. We present data comparing the location and longevity of naïve and septic mice monocytes

Early Interventions for Bipolar Disorder and Schizophrenia in At-Risk Youth

Student: Serefine, Andrew
Mentor: Sarah Martin, MD
Group: 4 Date: 10/11/2023 Time: 09:30 a.m.

Abstract:
Bipolar Disorder is a serious psychiatric illness that greatly impacts an individual's ability to function in areas related to independent living, vocational and educational pursuits, recreation, and the ability to sustain stable social and family relationships over time. The National Institute of Mental Health estimates the prevalence of bipolar disorder to be 2.8% in the United States.1 While the prevalence rate for this disorder in the total population is relatively low, the risk of developing it rises to 1 in 3 for children with a parent who carries the diagnosis.2 Given the severity of the problems faced by the individuals diagnosed with bipolar disorder in terms of psychosocial problems, legal issues, and ultimately shorter lifespans, it has been the goal of research to determine ways to identify and intervene, early, with at-risk children and youth, to improve outcomes and possibly prevent disease.3 Research is focused on identifying risk factors for bipolar disorder and schizophrenia among children and youth and effective interventions and therapies as a means of prevention. To identify and provide early intervention to at-risk children and youth, a study was performed at Texas Tech University Health Sciences Center (TTUHSC) in El Paso, Texas. This study utilized protocols based on a similar study performed in Colorado. While the Colorado study in 2013 included a sample that was 4.3% Hispanic, the TTUHSC study was performed in a population known to be 82.6% Hispanic4. The data from this TTUHSC study has yet to be fully analyzed and it is this data that was utilized for this project.
Among children with a first-degree relative who suffers from bipolar disorder, the literature suggests that there is a positive correlation between those children being diagnosed with behavioral, mood, and psychotic disorders in childhood and developing bipolar disorder in later adolescence or adulthood.5 However, the studies have not looked at largely Hispanic populations and the childhood disorders with which they may or may not be diagnosed.

Effect of Green Tea Extract ECGC on Sensory Neurons Under Hyperglycemia

Student: Mcgrath, Katharine
Mentor: Munmun Chattopadhyay
Group: 4 Date: 10/11/2023 Time: 10:00 a.m.

Abstract:
Diabetic painful neuropathy has become an increasing problem as the incidence of diabetes rises worldwide. Though it is known that neuropathy occurs as a result of chronic inflammation that damages peripheral neurons, treatment options for controlling the progression of pain are limited. Epigallocatechin gallate (EGCG), a component of green tea, has demonstrated amelioration of inflammation in other inflammatory disorders, so it may hold therapeutic benefit for patients with diabetic neuropathy. The effects of EGCG on neuronal cells were explored through in vitro studies of F11 and ND7/23 DRG neurons exposed to a hyperglycemic condition before and after treatment with EGCG. EGCG appears to promote the expression of Growth-associated protein 43 (GAP43), Protein Gene Product (PGP9.5), and Nuclear-Factor-Erythroid-2-Related Factor 2 (NRF2), while reducing the expression of Calcitonin-Gene-Related-Peptide (CGRP), Glucose Transporter Type 4 (GLUT-4), Nerve-injury-induced Protein (Ninjurin), Transient-Receptor-Potential-Ankyrin-1(TRPA1) and Histone deacetylase 2 (HDAC2). Nuclear Factor Kappa B (NFκB) did not show any reduction after EGCG treatment. With a better environment for growth, DRG neurons had greater expression of cytoskeletal elements, Neurofilament Light Chain (NeuroL) and Neurofilament Heavy Chain (NeuroH). Microtubule-related factors, Beta-III-Tubulin antibody (TUJ-1) and Microtuble-associated-Protein-2 (MAP2), demonstrated increased expression with hyperglycemic exposure that corresponded to an increased neuroprotective response to inflammation. This expression of microtubules decreased after EGCG treatment signifying a removal of the inflammatory impetus for a neuroprotective response. Given the improved growth of peripheral neurons, EGCG treatment may be a possible therapy for controlling the progression of diabetic painful neuropathy.

Evaluating the Performance of El Paso High Schools in Relation to Medical School Matriculation and Completion

Student: Zaragoza, Victoria
Mentor: Cynthia Perry
Group: 4 Date: 10/11/2023 Time: 10:30 a.m.

Abstract:
As the number of applicants to medical schools grows yearly, there is an overwhelming call to diversify education and medicine. Though enrollment has increased, a physician shortage is projected by 2034 [1]. This study intends to examine the performance of El Paso, Texas, high schools concerning their graduates' matriculation to Texas medical schools. This study evaluated all Texas applicants to the Texas Tech University Health Science Centers El Paso Paul L. Foster School of Medicine (TTUHSCEP PLFSOM) from 2018-2023 who graduated from an El Paso high school. Rates for applications, interviews, success rate in enrolling with Paul L. Foster Medical School, and success rate in receiving offers to other Texas medical schools were calculated. Data collected in this study identified which high schools are matriculating graduates to medical school. The implication of this data can contribute to interventions targeting underserved schools and a more holistic review of applicants.

Identifying Barriers in Pediatric Asthma Outcomes among Hispanic and African American Populations: A Systematic Review

Student: Godinich, Brandon
Mentor: Nathan Holland
Group: 4 Date: 10/11/2023 Time: 11:00 a.m.

Abstract:
Asthma is a prevalent chronic inflammatory disease affecting children and adults, with complex etiological factors influenced by genetics, host characteristics, and environmental exposures. This review examines barriers to pediatric asthma outcomes within Hispanic and African American populations and synthesizes a range of research articles to explore the role of social determinants of health (SDOH) in shaping pediatric asthma outcomes. Despite geographic variations, asthma's high morbidity and low mortality make it a significant public health concern. The pathophysiology of asthma involves airway inflammation, bronchoconstriction, and increased airway responsiveness, with immune responses triggering the release of inflammatory mediators. A comprehensive search strategy following PRISMA guidelines identified 12 relevant studies with 1,198,860 participants. Race/ethnicity, socioeconomic status (SES), and neighborhood environment were determined as influential SDOH contributing to these disparities. While this systematic review provides valuable insights into the barriers impacting pediatric asthma outcomes in Hispanic and African-American populations, it acknowledges certain limitations. Publication bias, varying study quality, language bias, and the dynamic nature of healthcare systems were noted as potential limitations. Nonetheless, this review contributes to a deeper understanding of pediatric asthma disparities' complexities and calls for continued efforts to develop and implement strategies that promote equitable asthma care within minority populations. Further research should magnify differences among minority populations and examine the impact of these barriers within each minority group

Female Authorship in Orthopedics: JBJS Study

Student: Alba, Raul
Mentor: Dr. Signh
Group: 5 Date: 10/11/2023 Time: 09:00 a.m.

Abstract:
Our team recognized a primarily male centered presence throughout the orthopedic divisions of medicine. Through detailed research and analysis, our focus was to present accurate statistics highlighting trends and historical factors which have led to the considerable lack of female authorship within orthopedic sectors of medicine. Utilizing a cross-sectional analysis of various publications concentrating on 5-year intervals, we have gained a deeper understanding of how female authorship in orthopedic publications has increased within the past 10 years as well as the specific areas which have expanded most. Our findings revealed common causes for the low percentage of female authorship including unattainable work life balance, perceived physical demands and a shortage of female mentorship. However, despite these motives the results also conveyed areas in which certain metrics have gradually improved, with the most substantial growth taking place within the areas of spine, sports, trauma and pediatric publications. It is our understanding that increasing the amount of orthopedic doctors overall will ultimately improve patient accessibility to efficient and superior orthopedic care

Gedunin as an anti-cancer agent for hepatocellular carcinoma

Student: Neela, Nishkala
Mentor: Ramadevi Subramani
Group: 5 Date: 10/11/2023 Time: 09:30 a.m.

Abstract:
Liver cancer ranks among the most aggressive forms of cancer and stands as the sixth most prevalent worldwide. Despite notable strides in chemotherapy, surgical interventions, and diagnostic methods, hepatocellular carcinoma (HCC) remains the second leading cause of cancer-related fatalities. The naturally derived phytochemical Gedunin holds promise as an alternative therapeutic option for HCC.
To evaluate Gedunin's anti-cancer potential, Western blot assays were employed using hepatocellular cell lysates from Huh7 and HepG2 cells to gauge protein expression. Additionally, an immunofluorescence assay was carried out with Hep3B cells to examine protein levels and their distribution in Gedunin-treated groups versus controls. Finally, scratch assay and invasion were conducted to assess Gedunin's impact on HCC metastasis.
The results demonstrated a substantial reduction in the invasive and migratory capabilities of hepatocellular carcinoma cells with Gedunin treatment. Notably, the results demonstrated that while HCC normally disrupts the tumor-suppressing HIPPO signaling pathway, cells treated with Gedunin exhibited markedly improved regulation of this pathway.
In summary, these findings indicate that Gedunin, a phytochemical, exerts potent inhibitory effects on HCC progression by regulating critical signaling pathways associated with tumor suppression

Healthy Living: The Health Needs of Every day El Pasoans

Student: Atuegbu, Chukwudumebi
Mentor: Dr. Leah Whigham & Dr. Ashley Mulcahy Toney
Group: 5 Date: 10/11/2023 Time: 10:00 a.m.

Abstract:
El Paso lies on the border of Texas and Mexico, a city deeply rooted in a mix of Mexican and American culture. The uniqueness of El Paso lies within the community members and as a border town El Paso has its own unique set of health needs. An understanding of the health of El Pasoans is beneficial for long term implications. It is well known that obesity, diabetes, hypertension, and hyperlipidemia have afflicted the El Pasoan community. Hispanic individuals comprise the El Pasoan community, as high as 81% based on the 2020 census. This particular study is a subset of a larger study, "Transit Oriented Multilevel Intervention (TOMI)". The larger TOMI study aimed to understand how the built environment affects El Pasoan health, including access to healthcare, healthy food, and other needs. All participants were recruited at a grass-roots level through the use of fliers and word of mouth at local community centers and libraries. A subset of those individuals (n=30) were invited to participate in a virtual interview to capture their individual health statuses. This qualitative study explored questions about the health needs, health barriers and health concerns of everyday El Pasoans as well as their satisfaction with the health care services they receive in this city. In analyzing the qualitative interviews, we used an abductive approach to derive the following themes: barriers to healthcare access, health care provider services and chronic health conditions and concerns. The results revealed the need for more interpersonal understanding between health care providers and their patients to encourage a sense of self efficacy. An additional result showcased, chronic illnesses and the implication this has on the El Paso community. Furthermore, this qualitative study explores whether health-related concerns can be attributed to any ethnic predispositions, cultural traditions including food and familial dynamics, and proximity to the Mexican border to leverage healthcare in both countries (i.e., United States and Mexico). As future clinicians these concepts matter when evaluating patients in a holistic, case by case manner. No two individuals have the exact same health needs, barriers or concerns. However, a better understanding makes for a better patient-physician relationship and hopefully more promising health outcomes

Systemic Effects of Intramedullary Reaminig

Student: Beales, Joseph
Mentor: Dr. Thabet
Group: 5 Date: 10/11/2023 Time: 10:30 a.m.

Abstract:
Intramedullary nailing is used to treat long-bone fractures and can be accomplished with or without reaming. Reaming involves widening the intramedullary canal for passage of a larger nail, allowing greater union rates. Advances in the reaming technique include the reamer-irrigator-aspirator (RIA) system that allows collection of reaming debris and potentially alters complication rates of reaming. In addition to treating long-bone fractures, reaming has been applied in treating intramedullary infections and in harvesting bone grafting materials.

ABSTRACTS
October 12
9:00 a.m. – 12:00 p.m.

The Association of Ambient Temperature and Suicide in Young People: An Ecological Study

Student: Jayaraman, Pranav
Mentor: Sarah Martin
Group: 1 Date: 10/12/2023 Time: 09:00 a.m.

Abstract:
While the relationship between higher ambient temperatures and rates of suicide has been shown in the general population, this association remains unclear in young people (those < 20 years old) despite evidence that young people have difficulties acclimatizing to heat stress and that suicide is the second leading cause of death of this age group. This ecological study hoped to assess 1) if monthly mean county temperatures are significantly associated with suicide rates in young people; 2) if this association differs from the relationship observed in adults, 3) if there are geospatial hotspots of suicide-temperature associations 4) and whether there is evidence of impaired acclimatization impacting the relation of temperature and suicide rates in young people and adults

The Disparities in Health Outcomes of Diabetic Patients with Foot Ulcers and Infections in Texas from 2019-2020

Student: Owusu, Frederick
Mentor: Dr. Fatma Dihowm M.D.
Group: 1 Date: 10/12/2023 Time: 09:30 a.m.

Abstract:
Diabetes is a severe chronic disease with systemic complications such as cardiovascular disease, peripheral neuropathy, and diabetic foot ulcer (DFU). In this study we primarily focused on the efficacy and cost associated with diabetic foot ulcer treatments and how they vary across different demographics such as race/ethnicity, age, and public health region. A retrospective cohort study using the Texas Hospital Inpatient Discharge Public Use Data File, 2019-2020 was performed. A total of 401,770 persons hospitalized for diabetic foot disease were identified using ICD-10 codes and their records were analyzed for factors including age, race, hospital length of stay, and cost of care. The health outcome was determined based on hospital length of stay, illness severity, and patient status. Additionally, procedure codes related to six categories of diabetic foot ulcer treatments were identified and used to determine the types of procedures admitted patients received.
Results showed that of the patients hospitalized, 54.62% were 65 years old and up, 32.02% were 50-64 years old, and 10.96% were 35-49 years old. Of these patients 70.67% were White, 16.07% were Black, and 13.27% were Asian/American Indian/Other. More patients were seen in non-border cities (285769 or 73.45%) compared to those seen in border cities (103312 or 26.55%). Among all patient seen, the predominant illness severities were moderate (31.42%) and major (45.74%). Within all racial categories, the risk of mortality was mostly considered major and high, and worsened with age. The mean hospital length of stay was 7.32 (SD=8.01) and increased with age. After hospital stay, 45.73% of patients were discharged to home/self-care, whereas 54.25% were designated as other (transferred, expired, hospice, etc.). The average total charge in a non-border city was $87,668 and $108,183 in a border city. The six categories of DFU treatments identified were excision, extraction, amputation, skin graft, drainage, and repair. Patients with major illness severity had the most amputations (55.77%), followed by moderate severity (24.86%), and extreme (18.63%). The average length of stay for patients who underwent the DFU procedures increased by 3.65 days compared to those who did not undergo procedures. Lastly, across all six categories of DFU procedures identified, more procedures were performed in non-border city hospitals than in border city hospital.
The results indicate that a majority of the patients seen across each age group were White and had more patients with moderate, major, and extreme illness severity when compared with other racial groups. However, Asian/American Indian/Other patients had the highest length of hospital stay (7.83 days), followed by African-Americans (7.56 days), and then Whites (7.18 days). Although it was more costly for patients to be treated at border cities compared to non-border cities, the average hospital length of stay for border cities was longer (7.52 days) than for non-border cities (7.25 days). These results give credence to the notion that inefficiencies and inequalities exist in the treatment of patients with diabetic foot disease and warrants further study.

The Effect of Senescence on Arteriovenous Fistula Failure

Student: Anderson, Nathaniel
Mentor: Sanjay Misra
Group: 1 Date: 10/12/2023 Time: 10:00 a.m.

Abstract:
Chronic Kidney Disease (CKD) is expected to be the 5th leading cause of years of life lost worldwide by 2040, and currently, between 4.90 and 7.08 million patients are projected to have end-stage kidney failure (ESKD). 1,2 Hemodialysis is often performed in these patients and the preferred vascular access is an arteriovenous fistula (AVF). However, increased shear stress, inflammation, fibrosis, oxidative stress, and other processes provoke VNH and VS, causing 40% AVF failure within the first year.3 Previous studies from our lab show that there is increased, inflammatory cell proliferation and tissue fibrosis associated with decreased cell death in AVF outflow veins (GV).3 A recent study by Nath et al. (2018) showed that AVF placement results in a senescent phenotype.4 However, the kinetics of senescent changes and the localization to the outflow vein's layer is unknown

The epidemiology and costs of hospitalized optic neuritis in Texas

Student: Guido, Julia
Mentor: Dr. Fatma Dihowm
Group: 1 Date: 10/12/2023 Time: 10:30 a.m.

Abstract:
Optic neuritis is an inflammatory demyelinating condition that often causes eye pain and monocular vision loss. This disease can present with comorbidities or as an isolated event. No matter the presentation, the condition's effects can be costly for the patient, especially if the patient lacks adequate health insurance. Healthcare costs are one of the greatest barriers to care for both the patient and the provider, and these costs can often intersect with other issues, such as socioeconomic status, ethnicity, and patient location. This project examined the demographics, and insurance type when looking at costs associated with medical care for optic neuritis in border cities as opposed to non-border cities

The Impact of Access to Vision Care on Learning Disabilities in Children in 2021

Student: Dharan, Abhishek
Mentor: Sarah Martin
Group: 1 Date: 10/12/2023 Time: 11:00 a.m.

Abstract:
Previous studies have shown the relationships between vision and learning disabilities in children. In 2021, the National Survey on Children's Health (NSCH) began asking new questions about a child's vision care. In this study, we analyzed using the Chi-square test or Fisher's exact test survey responses from the 2021 NSCH to determine if children with or without access to vision care would be more or less likely to report a learning disability. Unadjusted and adjusted logistic regression was used to find the association of 'Access to Vision Care' with 'Learning Disability'.
With the health insurance coverage status of children significantly associated with both access to vision care and reporting a learning disability, results demonstrated children with access to vision care were more likely to have a learning disability than children without access to vision care. Children without access to vision care are 27% less likely than children with access to vision care to report having a learning disability. After adjusting for sex, age range, health insurance status, the highest level of household education, primary language spoken at home, and race and ethnicity, children without access to vision care are 22% less likely than children with access to vision care to report having a learning disability. Future studies investigating the impact of health insurance status on children reporting a learning disability or access to vision care would be warranted.

AN EVALUATION OF OUTCOMES IN PRETERM NEONATES PRE- AND POST-INITIATION OF A FEEDING PROTOCOL USING EXCLUSIVE HUMAN MILK DIET IN THE NEONATAL INTENSIVE CARE UNIT (NICU)

Student: Mudekunye, Gabriella
Mentor: Sadhana Chheda
Group: 2 Date: 10/12/2023 Time: 09:00 a.m.

Abstract:
Preterm births are associated with a large burden to the healthcare system although they account for only a small portion of births yearly. This is because preterm infants, especially, very low birth weight (VLBW) infants are often born with many comorbidities that require long hospital stays in the NICU. Numerous studies have shown that human milk is the ideal enteral feeding option for all infants including those that are premature. Human milk (HM) is associated with a decreased incidence of several life-threatening complications of prematurity, including late-onset sepsis, necrotizing enterocolitis, periventricular leukomalacia, and chronic lung disease. Human milk also promotes gut development and maturation and has many anti-inflammatory and anti-infective properties. Even though, human milk boasts these great advantages, if often does not meet the nutritional requirements for preterm infants and it must be fortified. Prior to the advent of a human milk fortifier, most preterm babies' milk was fortified with a bovine fortifier. Although this helped growth, it also resulted in worse outcomes such as higher incidence of NEC and nosocomial sepsis. After opening their NICU in 2012 and using bovine formula and/or bovine milk fortifier, The El Paso Children's Hospital noticed higher rates of NEC as compared to the national average. So, in 2014, they decided to implement an exclusive human milk diet (EHMD). In this retrospective chart review, we show that babies post-EHMD initiation have better outcomes as evidenced by less TPN, CVL, and antibiotic days. They also had less rates of NEC and were fortified on average 3 days earlier than the infants before the implementation of an EHMD. This study provides evidence that implementation of a standardized human milk protocol improved outcomes in very low birth weight infants in the EPCH NICU

The Incidence and prevalence rate of mental health disorders in children from single parent households.

Student: Mofor, Kelly A
Mentor: Sarah Martin
Group: 2 Date: 10/12/2023 Time: 09:30 a.m.

Abstract
Mental disorders are a wide range of illnesses that affect ones thought process, mood, and behavior. There are many different types and according to the World Health Organization, one in every eight people in the world has a mental disorder and most people do not have access to effective treatment (Pramesh). Children with mental disorders have problems at home, in school, and with forming friendships. It interferes with the child's healthy development, which results in more problems in their adulthood. A study conducted in 2005 analyzing adolescent behaviors showed that 50% of children born in the 80s have spent part of their developmental years in single-parent households and, they had a higher incidence of conduct disorders and suicidal ideations (Ferguson). Other variables such as race, ethnicity, SES, and adult education also significantly contribute to the increased incidence and prevalence of mental health disorders in children and adolescents.

The role of progesterone on glucose metabolism of triple negative breast cancer cell lines

Student: Ada, Rishi
Mentor: Rajkumar Lakshmanaswamy
Group: 2 Date: 10/12/2023 Time: 10:00 a.m.

ABSTRACT
Breast cancer, particularly the aggressive triple-negative breast cancer (TNBC) subtype, presents challenges in treatment due to the lack of targeted therapies. Progesterone Receptor Membrane Component 1 (PGRMC1), encoded by the PGRMC1 gene, has emerged as a potential therapeutic target in TNBC. This study explores the multifaceted role of PGRMC1, its interaction with progesterone, and its impact on glucose metabolism—a non-classical pathway—in TNBC. PGRMC1 overexpression in breast cancer is associated with unfavorable outcomes, making it a significant target. Recent studies suggest that PGRMC1 mediates progesterone's effects, introducing non-classical pathways. This interaction could offer a novel therapeutic avenue in TNBC. We investigated the effect of progesterone on glucose metabolism in TNBC using the RT2 Profiler PCR Array for glucose metabolism. Our investigation reveals potential links between PGRMC1, progesterone, and glucose metabolism. PGRMC1, in collaboration with progesterone, may drive TNBC cells towards glycolysis, promoting rapid tumor growth. Targeting this non-classical pathway might disrupt TNBC's metabolic advantage, rendering it more susceptible to therapies. Additionally, our study highlights overexpressed genes (PHKG1, CS, and HPRT1) in TNBC cell lines, possibly contributing to metabolic reprogramming. Understanding their roles in TNBC's aggressive growth phenotype requires further exploration. Overall, targeting PGRMC1 in TNBC, particularly its interaction with progesterone and gene overexpression, offers promising therapeutic potential. Future studies should validate these findings to translate them into effective interventions for TNBC patients.

The use of mesenchymal stem cells in adolescent physeal growth arrest injuries

Student: Sankar, Rowan
Mentor: Hagag Ahmed-Thabet
Group: 2 Date: 10/12/2023 Time: 10:30 a.m.

Abstract:
The physeal growth plate is a common site of involvement in pediatric and adolescent fractures with growth plate insults being found in 18-30% of pediatric fractures. In many growth plate injuries, growth plate arrest occurs with the growth of a bony bar over the growth plate. Inadequate treatment of growth arrest in children can cause long-term complications such as limb length or angular deformities. Stem cell transplantation has been successful in treating growth arrest and preventing BB formation in physeal injuries in many different animal models.
A systematic review of the literature was performed on animal, biochemical, and human studies of stem cells being used to treat growth arrest. The keywords “growth plate arrest” were searched in MEDLINE over the last 10 years. Studies were excluded if they were off topic, editorials, or from predatory journals. The data was extracted and qualitatively analyzed by three reviewers.
From a literature search which initially identified 582 potential sources, 163 were left after filtering in PubMed. Based on preliminary analysis, a decrease in bone deformities after open physeal plate injuries when treated with mesenchymal stem cells or chondrocytes compared to no treatment or standard of care such as simple cartilage or fat pad use is present. However, there are no consistencies in the literature when it comes to the method of implanting the stem cells and what combination of cells provides the biggest benefit.
Given the high likelihood of limb deformity following childhood or adolescent growth arrest injuries, utilizing mesenchymal stem cells to prevent growth arrest and bony bar formation would significantly impact the field of pediatric orthopedics. Stem cells have the potential to drastically improve outcomes from growth plate injuries, however, more research needs to be conducted to determine the ideal methods and biochemical environment required for implanting stem cells.

Titanium dioxide nanoparticles modulate the production of immune mediators associated with lepromatous leprosy by human dendritic cells upon infection with Mycobacterium leprae

Student: Warren, Sam
Mentor: Jorge Cervantes
Group: 2 Date: 10/12/2023 Time: 11:00 a.m.

Abstract: The two polar clinical forms of leprosy, termed tuberculoid and lepromatous, have polarized cellular immune responses with complex immunological distinctions. The predominance of DCs in tuberculoid leprosy has been reported, while the lepromatous pattern of illness is associated with weak activation of local populations of DCs. TiO2 nanoparticles have previously been shown to induce maturation of these cells, leading to an inflammatory response similar to adjuvant usage in vaccine administration. We aimed to evaluate the effect of potassium-incorporated Ti oxide nanostructures, namely KTiOxs, in the response of human monocyte-derived DCs to live M. leprae. Human monocytic cell line dual THP-1, which harbors two inducible reporter plasmid systems for transcription factor activation of NF-κB and interferon regulating factor (IRF), was treated with titanium control or with 1 mol/L KOH-treated Ti or 10 mol/L KOH for 24 h. Subsequently, cells were infected with M. leprae. KTiOx nanoparticles increase DC phagocytic activity without inflammation. KTiOx exposure of DCs led to an increase in IRF activation with modulation of the inflammatory response to live M. leprae. It also led to differential secretion of the critical components of innate immune response and the development of cell-mediated immunity against intracellular pathogens. This study demonstrates the effect of nanostructures of KTiOxs and the usefulness of nanoparticle technology in the in vitro activation of human DCs against an infectious disease with a puzzling immune spectrum. Our findings may prompt future therapeutic strategies, such as DC immunotherapy for disseminated and progressive lepromatous lesions

Vertebral artery variations in the US-Mexico border

Student: Mendez, Fernando
Mentor: Heather Balsiger
Group: 3 Date: 10/12/2023 Time: 09:00 a.m.

Abstract: Different variations of vertebral artery origins have been described in current literature. Aberrant vertebral artery origins can cause problems with arterial flow in clinical situations such as in cardiothoracic surgery or vascular procedures. Studies in anatomy cadaver laboratories have shown that there has been nearly a 14.8% prevalence rate of vertebral arteries branching from the aorta rather than the subclavian artery.
The purpose of this project was to determine the prevalence of variations of the vertebral artery in the TTUHSC-EP cadaver anatomy laboratory based on the 10 cadavers of the 2022 cohort

Maternal and Neonatal Outcomes in Pregnancies with Antenatal and Intrapartum COVID-19 Infection: A Retrospective Review of Medical Records

Student: Kennard, Nicole
Mentor: Dr. Sadhana Chheda
Group: 3 Date: 10/12/2023 Time: 09:30 a.m.

Abstract:
COVID-19 is responsible for over one million deaths to date and has affected many more. More research is needed to examine the effects of COVID-19 in pregnancy on maternal and neonatal outcomes. In this study, we compared outcomes of pregnancies with antenatal and intrapartum COVID-19 infection.
We examined maternal and neonatal outcomes in 662 age-matched women who delivered between July 2020 to December 2021: 122 COVID+, 89 COVID-recovered, and 451 controls. Outcomes included delivery method, prematurity, birthweight, breastfeeding, physical exam, vitals, and lab findings, respiratory support, length of stay, APGAR scores, fetal anomalies, ICU/NICU admission, and maternal deaths.

Metabolic syndrome and hemorrhagic stroke among symptomatic CCMs in the Mexican Hispanic Population

Student: Aickareth, Justin
Mentor: Dr. Jun Zhang
Group: 3 Date: 10/12/2023 Time: 10:00 a.m.

Abstract
Cerebral cavernous malformations (CCMs) increase a person's risk of hemorrhagic stroke. The prevalence of both CCMs and the metabolic syndrome (MetS), both of which are linked to hemorrhagic stroke, is higher in the Mexican Hispanic population. 184 Mexican Hispanic CCM participants who were age- and sex-matched Hispanic and non-Hispanic white controls were identified. The CCM cohort showed a reduced percentage of MetS but a higher percentage of hemorrhagic stroke and epilepsy. The CCM cohort had higher blood pressure and fasting glucose levels. Elderly CCM patients with MetS and epilepsy had an elevated risk of hemorrhagic stroke, and the CCM group had a significantly higher risk of hemorrhagic stroke with higher systolic blood pressure. Thus, in CCM patients, especially those over 50, with blood pressure issues and comorbidities including MetS and epilepsy must be managed to reduce the risk of hemorrhagic stroke

New Discernment of Gastroparesis, Clinical Symptoms, and Gastric Emptying Scintigraphy after 4 hours of Isotope Retention

Student: Garikiparthy, Veeravenkata
Mentor: Jesus Diaz
Group: 3 Date: 10/12/2023 Time: 10:30 a.m.

Abstact: This research paper explores the relationship between gastric emptying cut-off values, the etiology of gastroparesis, and their correlation with clinical symptoms. Gastric emptying scintigraphy (GES) is the current diagnostic gold standard for gastric motility disorders, with a commonly accepted cut-off value of ≥10% retention at 4 hours. However, existing literature suggests a lack of correlation between GES results and symptom scores in patients with gastroparesis, prompting a reevaluation of these cut-off values.

In this study, we conducted a retrospective review of 386 GES cases from 2013 to 2021, focusing on patients with delayed or normal GES and available gastroparesis symptom scores. Patients were categorized based on their GES results at 4 hours (≥25% or <10% retention) and the etiology of gastroparesis (diabetic or idiopathic). Symptom scores were assessed using the Gastroparesis Cardinal Symptom Index (GCSI) scales.

Our findings reveal that diabetic gastroparesis patients with ≥25% retention at 4 hours exhibited significantly higher overall symptom scores compared to idiopathic gastroparesis patients with similar GES results ($p < 0.05$). Interestingly, in diabetic patients, GES results (whether normal or delayed) did not align with symptom severity, while idiopathic patients showed worsening symptoms with delayed GES.

Furthermore, an analysis of patients with no symptom scores referred from primary care and private practice revealed a similar prevalence of gastroparesis etiology and GES retention cut-offs.

These findings emphasize the importance of distinguishing between diabetic and idiopathic gastroparesis when interpreting GES data and exploring correlations with symptom scores

Implementing a mailed stool sample screening program in clinics providing care for an underserved Hispanic population

Student: Venishetty, Nikit
Mentor: Jennifer Molokwu
Group: 3 Date: 10/11/2023 Time: 11:00 a.m.

Abstract:
Colorectal cancer (CRC) is a leading cause of cancer-related deaths in Hispanics in the US. Despite this, Hispanics are being screened for CRC at a much lower rate than their non-Hispanic white counterparts. Implementing mailed fecal immunochemical tests (FITs) is a cost-effective intervention for increasing CRC screening rates in vulnerable populations, such as Hispanic populations in border metroplexes. We aimed to describe the effect of introductory calls coupled with mailed in-home FIT kits on CRC screening completion in two federally qualified health centers (FQHCs) in a US–Mexico border county. This was a prospective, pragmatic, two-arm intervention study with participants allocated to receive a FIT kit with a reminder call (usual care) or usual care preceded by an introductory call. The primary outcome was the percentage of patients who returned the FIT kits. Participants who returned to the FIT were primarily unemployed (54.4%), had less than a high school education (60.2%), lived in the US for at least 20 years (74.4%), and had poor self-reported health (54.4%). In addition, we observed a statistically significant increase in the absolute rate (4.5%, P = 0.003) of FITs returned when a mailed FIT kit was preceded by an introductory call compared with no initial call. This study demonstrated that adding an introductory phone call significantly improved the screening completion rate in a mailed-out CRC screening intervention in the US–Mexico border population.

New Discernment of Gastroparesis, Clinical Symptoms, and Gastric Emptying Scintigraphy between the 1 and 3 hour marks of Isotope Retention

Student: Hock, Rivers
Mentor: Dr. Jesus Diaz
Group: 4 Date: 10/12/2023 Time: 09:00 a.m.

Abstract:
Gastroparesis (GP) is clinically defined as a delayed gastric emptying without evidence of physical obstruction. This condition is associated with collection of clinical symptoms including nausea, vomiting, early satiety, bloating, and abdominal pain. The current gold standard for diagnosis of GP is a gastric emptying scintigraphy scan (GES). Current literature suggests that GES symptoms and symptom scores do not correlate. This has generated interest in reassessing cut-off values. Here, we follow a cohort of diabetic patients and idiopathic patients who have undergone a GES. We then classified patients as having delayed gastric emptying (≥10% retention at 4 hours) or normal gastric emptying (<10% retention at 4 hours) and compared these results to symptom scores. Findings show that GES results do not correlate to symptom scores in diabetic patients but they do correlate to symptom scores in idiopathic patients

Obesity and its association with epilepsy among Mexican Hispanic CCM cohort in El Paso

Student: Jang, David
Mentor: Jun Zhang
Group: 4 Date: 10/12/2023 Time: 09:30 a.m.

Abstract:
Cerebral cavernous malformations (CCMs) are neurological disorders characterized by dilation of capillaries in the brain leading to an increase the risk of hemorrhagic stroke. The Mexican-Hispanic population in El Paso has higher prevalence of CCMs with more severe clinical presentation. Our previous study revealed a higher prevalence of epilepsy among the Mexican-Hispanic CCMs cohort in El Paso. Recent studies have implicated obesity as a potential causal factor for epilepsy. However, there is no study on the relationship between obesity and epilepsy among the Mexican-Hispanic CCMs cohort in El Paso

Pesticide Use and Its Health Effects on Migrant Farmworkers and Their Families along the U.S. – Mexico Border

Student: Provencher, Sarah
Mentor: Stormy Monks
Group: 4 Date: 10/12/2023 Time: 10:00 a.m.

Abstract:
Pesticides are a necessary asset to modern agriculture as the demand for food rises to meet the needs of a growing population. However, the safety and ethics behind pesticide use are strongly debated due to public health and environmental concerns. In more recent years, pesticides have been shown to affect migrant farmworkers along the U.S.-Mexico border disproportionately. This project aims to provide education on pesticide use and its potential health impacts to migrant farmworkers and their families along the U.S.-Mexico border in EPA Region 6. Training sessions on pesticide use and its health effects on migrant farmworkers and their families will be provided to community health workers with the goal that they educate migrant farmworkers and others on this critical topic.
Each community health worker training session will include three work products: an educational flipbook, corresponding flipbook educational presentations, and the trainer-the-trainer workshop presentation that teaches the learner how to use the flipbook to teach others. At the end of the training session, the community health worker will be equipped with the knowledge and educational materials needed to teach others about pesticide use and its health effects on migrant farmworkers and their families along the U.S.-Mexico border. Upon completion of the train-the-trainer workshop, participants showed a better understanding of pesticides and pesticide safety.

Posterior Nasal Nerve Ablation for the Management of Postnasal Drip: A Single Center Case Series

Student: Bishara, Patrick
Mentor: Omar Ahmed
Group: 4 Date: 10/12/2023 Time: 10:30 a.m.

Abstract:
Chronic rhinitis (CR) is one of the most common medical conditions worldwide, affecting tens of millions of Americans. One symptom among several associated with CR is post-nasal drip (PND), characterized by the sensation of mucous in the back of one's throat, often leading to increased throat clearing. When conventional medication does not prove to be effective, an in-office procedure, ablation of the posterior nasal nerve (PNN), may prove to be effective in CR patients whose primary reported symptom is PND. While previous studies have proven this relatively novel treatment to be effective in patients with varying CR symptoms, this study is the first to analyze the effectiveness of PNN ablation in patients who consider PND to be their primary symptom.
Patients from a single institution, Houston Methodist Research Institute, were given a survey called the Sino-Nasal Outcome Test (SNOT-22) questionnaire containing 22 items asking patients to rate various symptoms and social consequences listed in the questionnaire on a scale from 0 to 5. One of these questions asks about post-nasal drip, and this specific SNOT-22 PND finding was used for statistical analysis. The SNOT-22 questionnaires were collected before and after patients underwent PNN ablation, and PND scores were compared utilizing the Wilcoxon signed-rank test to assess whether there was a significant difference between pre- and post-procedure scores. The results indicate that the pre- and post-procedure values were indeed significantly different, which indicates that PNN ablation may be a viable option for CR patients when PND is their primary symptom refractory to traditional medication. Future larger studies are needed to confirm these preliminary findings

Anti-Cancer Effects of Nimbolide Against Hepatocellular Carcinoma Progression and Metastasis

Student: JESSICA LYNN HOFFMAN
Mentor: Ramadevi Subramani Reddy
Group: 4 Date: 10/12/2023 Time: 11:00 a.m.

Abstract:
Incidence and mortality rates of Hepatocellular Carcinoma (HCC) continue to rise due to its aggressive and metastatic nature. HCC is often diagnosed at late stages, and common treatments such as liver transplantation are often limited or contraindicated in these patients. Ineffective and limited treatment options highlight the necessity of the development of new, safe, and effective treatment options. Several agents found in medicinal plants demonstrate therapeutic benefits in various cancer types. Nimbolide, an active molecule isolated from Azadirachta indica, has already shown to have anticancer benefits in several cancer types including HCC. This study examined the mechanism behind nimbolide's anticancer effects in HCC. Here, RT-qPCR results reveal that nimbolide treatment alters expression of several genes involved in the PI3K/Akt pathway which plays a key role in cell proliferation. Kaplan-Meyer survival plots highlight how altered expression of these genes affects patient median survival. Several other in-silico assays were used to connect differentially expressed genes to pathways involved in tumor progression and metastasis. Overall, these data suggest that nimbolide has the potential to act as a chemo-therapeutic agent for HCC through its regulation of genes involved in the PI3K/Akt pathway

Prevalence of Anxiety and Depression in Women with Overactive Bladder in an Underserved Community

Student: Lazuka, Kaylyn
Mentor: Pedro Maldonado
Group: 5 Date: 10/12/2023 Time: 09:00 a.m.

Abstract:

Overactive bladder (OAB) symptoms in women can significantly lower quality of life and increase the risk of associated anxiety and/or depression. Most treatment methods may fail to address this emotional burden directly due to a lack of early screening among OAB patients. Health disparities research indicates these challenges may be augmented in minority populations and medically underserved communities. This study aims to estimate the prevalence of anxiety and/or depression in a cohort of predominately Hispanic patients with OAB in an underserved area. This retrospective cross-sectional study included patients from a single institutional Urogynecology clinic in a medically underserved area. Charts were reviewed for patients presenting with symptoms of OAB. Six hundred seventy-one charts for patients with ICD-10 codes with OAB symptoms were included in the final analysis. Most patients were Hispanic (89.3%) with an average age of 63.3 years (standard deviation 13.65). A total of 217 (32.3%) had a history of anxiety and/or depression (21.2% anxiety only, 42.9% depression only, and 35.9% both symptoms). This was reported via associated ICD-10 codes (73.3%), physician documentation (94.5%), current care with psychiatry (11.5%), or current relevant medication usage (52.5%). Of the patients with anxiety and/or depression, 54.1% had OAB as the main presenting complaint. Of those who had a record of depression and/or anxiety, only three patients (1.4%) were referred to psychiatry for anxiety and/or depression by the Department of Urogynecology. Anxiety and depression were prevalent in OAB patients in this medically underserved, predominately Hispanic population. Referral to psychiatry for these symptoms was low, which may indicate under-screening in these patients. This study highlights the importance of developing a multidisciplinary, collaborative approach to treating patients with combined OAB and anxiety/depression

Prognostic Fasting Insulin Cut Points for Hidden Diabetes Risk among Apparently Healthy Young Adults: CARDIA 30-year Follow Up

Student: Garza, Joshua C
Mentor: David Cistola
Group: 5 Date: 10/12/2023 Time: 09:30 a.m.

Abstract:
Previously, we reported that young adults without prediabetes or metabolic syndrome, but fasting insulin above the top tertile, are at increased risk for diabetes later in life. Rather than tertiles, it would be better to use cut points specifically calibrated for the prognostic assessment of diabetes risk in this population. Hypothesis: Early compensatory hyperinsulinemia is associated with incident diabetes, as determined using time-dependent receiver operator characteristic curve (timeROC) analyses of 30-year data from CARDIA: Coronary Artery Risk Development in Young Adults. Methods: In this retrospective cohort analysis, the inclusion criterion was all 5,114 participants, ages 18-30 at baseline, from the parent CARDIA study; exclusion criteria: baseline hyperglycemia, hypertriglyceridemia, low HDL, diabetes, cardiovascular disease, pregnancy, fasting <8 hours; n=3,292. Analyses utilized the 'timeROC' package in R v4.2.1, where the cut point optimum was the minimum distance to [0,1]. Results: The overall cut point optimum for fasting insulin was 8.8 mIU/L (58th percentile), with area-under-the-curve (AUC)=0.659, sensitivity/specificity=61.2%/62.6%. When stratified by BMI due to effect modification, the <25 group had an optimum cut point of 7.5 mIU/L (52nd percentile), AUC=0.586, sensitivity/specificity=58.8%/55.3%. By contrast, the BMI ≥25 group had an optimum cut point of 11.8 mIU/L (59th percentile), AUC=0.647, sensitivity/specificity=61.9%/66.3%. Conclusion: Fasting serum insulin has prognostic value for assessing hidden diabetes risk in apparently healthy subjects without prediabetes or metabolic syndrome. The insulin cut point varies by BMI group and falls between the median and top tertile of each group. While useful, fasting insulin suffers from modest sensitivity; thus, better markers are needed.

Retinoblastoma: A TCR-based Epidemiologic Study

Student: Gnanasekaran, Revathi
Mentor: Dr. Fatma Dihowm
Group: 5 Date: 10/12/2023 Time: 10:00 a.m.

Abstract:
Retinoblastoma is a childhood cancer with an incidence rate of 2-5 children per 106 in the developed world and double that in developing countries and is 3% of all childhood malignancies. If diagnosed and treated early, vision can be preserved and nearly 100% can survive. Diagnosis and treatment is done at much higher rates in developed countries and high SES. There are 3000 to 4000 deaths each year in children of low SES due to Retinoblastoma that can be reduced through early diagnosis and proper treatment Delay in treatment causes the malignancy to spread quickly and metastasize in other organs like brain, leading to high death rates

Socioeconomic gradient among patient outcomes in acute angle-closure glaucoma

Student: Laswell, Stephen
Mentor: Dr. Fatma Dihowm
Group: 5 Date: 10/12/2023 Time: 10:30 a.m.

Abstract:
Acute angle-closure glaucoma (AACG) is an ophthalmic emergency caused by buildup of intraocular pressure. AACG requires prompt treatment to prevent permanent optic nerve damage. We retrospectively analyzed the incidence of AACG in Texas to determine whether cost and treatment choice varied across, race, ethnicity, or region.
Anonymous records from the Texas outpatient public use data file (PUDF) were searched for all incidence of AACG between January 1, 2016 and December 31, 2018. Data collected included age, race, ethnicity, sex, medical insurance status, procedures implemented, treatment cost, region, and source of admission. Data were analyzed to determine whether either a) cost of treatment, or b) rate of surgical intervention for AACG (including iridotomy, iridectomy, trabeculoplasty, shunt placement, corneal incision) varied based on demographically or by region

Identifying the role of IGF-1R and PGRMC1 in hepatocellular carcinoma

Student: Usman Hussain
Mentor: Ramadevi Subramani Reddy
Group: 5 Date: 10/12/2023 Time: 11

Abstract:
Hepatocellular carcinoma (HCC), a challenging global health concern, necessitates a deeper understanding of its molecular underpinnings. This study explores the roles of insulin-like growth factor 1 receptor (IGF-1R) and progesterone receptor membrane component 1 (PGRMC1) in HCC pathogenesis. PGRMC1, a multifaceted protein, impacts liver homeostasis by influencing bile acid metabolism, detoxification, insulin sensitivity, and cell growth. Dysregulation of PGRMC1 contributes to various cancers, including breast cancer.IGF-1R, a key player in the IGF system, plays pivotal roles in insulin signaling, glucose metabolism, cell proliferation, and liver regeneration. Dysregulated IGF-1R is associated with liver diseases, including HCC.
This study characterizes the expression of PGRMC1, IGF-1R, and EGFR in HCC cell lines and evaluates the effects of their inhibitors. Findings suggest that high PGRMC1 and EGFR expression correlates with improved HCC patient survivability, while high IGF-1R expression is linked to lower survivability. In summary, this study underscores the relevance of PGRMC1, IGF-1R, and EGFR in HCC and highlights potential therapeutic avenues. Further research will delve into precise mechanisms and therapeutic strategies, including the investigation of the phytochemical Nimbolide in HCC treatment.