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Evaluating DNA-Induced Autophagy in Macrophages during a *Mycobacterium tuberculosis* Infection

ABSTRACT: The increase in antibiotic resistance in *Mycobacterium tuberculosis* poses a significant threat to contemporary medicine's advances in disease treatment. *M. tuberculosis* is known to be a successful pathogen in modulating host immune systems to subvert effective immune system signaling and curtailing autophagic clearance of bacteria in the intracellular environment of phagocytic immune cells. Some key players in the selective autophagy pathway targeting *M. tuberculosis* have been previously identified, such as those implicated in the utilization of the STING/TBK1/IRF3 or TLR-9/MyD88/NF-kB signaling axis in the presence of bacterial cytosolic DNA. However, the host autophagy response against *M. tuberculosis* is only partially dependent on these pathways, and it is unknown whether additional signaling complexes activate and recruit autophagy in a STING-independent fashion. Here we report the identification and characterization of genes that are significantly implicated in modulating autophagic targeting of cytosolic DNA. Interestingly, we identified genes with known roles in host nuclear DNA damage response (DDR). By using a siRNA knockdown screen targeting ~900 ubiquitin-related genes, we show that silencing of 59 genes significantly modulate colocalization of either ubiquitin or autophagy adaptor p62 to cytosolic DNA. From their published roles in existing literature, the identification of genes involved in the host DDR, which is targeted by many pathogens to inhibit host apoptosis, suggests a potential regulatory function of the DDR on autophagy during *M. tuberculosis* infection. Taken together, these findings shed light on potential mechanisms underlying autophagy activation and targeting during *M. tuberculosis* infection and activation of the DNA damage response.

Ariana Ada Calvin

University of Arizona; Physiology

Mentor: Dr. Celina Valencia – Cancer Center Division,

Graduate College

Gene Therapy: The effects of exercise on
Sickle Cell Trait carriers vs. Alpha Thalassemia carriers

ABSTRACT: Mainly seen in the military, Sickle Cell Trait (SCT) carriers, a variant of Sickle Cell Disease (SCD), suffer from microcirculatory disturbances and undergo either mortality or morbidity related to hypoxic conditions at rest or after intense exercise. Given the current factors about how exercise affects Sickle Cell Trait carriers and Alpha Thalassemia carriers differently, gene therapy, such as LentiGlobin BB305 vector, seems to be a viable answer and cure for Sickle Cell Disease. Since Sickle Cell Trait individuals have some of the same genes, the treatment should be able to be transferable to SCT carriers without issue. To further this study, extensive research and trials will be conducted with 20 African American active military participants between the ages of 20 and 30, who are Sickle Cell Trait carriers. The participants will be transfused with LentiGlobin BB305 vector on a one-year trial period, followed by an intense exercise, and lastly conducting a blood sampling biopsy and general comparison. Though this study could not be completed at this time due to COVID-19 complications and trouble in securing lab access, it is clear that using gene therapy, LentiGlobin BB305 vector for future research is a viable answer. LentiGlobin BB305 vector has been the only option to works, it is evident that more research pertaining to SCT carriers needs to be conducted with the use and practice of gene therapy.

Cesily Cirerol

University of Arizona; Microbiology

Mentor: Dr. Gerardo Lopez – Animal and Comparative

Biomedical Sciences

Detection of *Cyclospora cayetanensis* using
Envirochek filters from Environmental Water Samples

ABSTRACT: *Cyclospora cayetanensis* is a coccidian protozoan parasite causing cyclosporiasis a diarrheal disease worldwide, associated with the consumption of fresh produce or water contaminated with the oocysts from the parasite. Detection methods for *C. cayetanensis* in environmental samples, such as agricultural water, are essential to effectively address scientific data gaps to help solve outbreak investigations in a timely manner to prevent further illnesses. A seeded study was conducted using purified *C. cayetanensis* oocysts provided by the Center for Disease Control and Prevention to determine the recovery efficiency of oocysts from Envirochek HV filters. Irrigation water were collected in four 20-L carboys and were seeded with 0, 5, 10, and 100 oocysts. Irrigation water samples were pumped through the Envirochek HV filters, eluted using parasite buffer, centrifuged twice at 4,000g for 45 minutes followed by DNA extraction using the FastPrep-24 Instrument and FastDNA SPIN kit for Soil. A multiplex qPCR targeting the 18s rDNA gene and an Internal application control (IAC) was used. The results were negative. Previous work has also presented challenges using purified oocysts without a carrier and this DNA extraction method. Further investigations are underway to trouble shoot this issue and complete the study.

Daniela Cruz Castorena

University of Arizona; Family Studies and Human

Development

Mentor: Dr. Katherine Zeiders – Family Studies and Human

Development

The Role of Family and Friendship Support on
Emerging Adults' Mental Health and Self-Compassion

ABSTRACT: Previous empirical research has shown that social support from friends and family is a significant determinant of mental health outcomes among emerging adults. Less work, however, has examined the link between social support systems and emerging adults' self-compassion. The current study examined two forms of social support, family and friends, and their relation to mental health (i.e. depression and anxiety symptoms) and self-compassion among college students (N = 286, M_{age} = 19.83, SD = 1.42).Regression analyses revealed that high levels of social support from both family and friends were associated with lower depressive symptoms higher self-compassion. High levels of friend support were also associated with lower anxiety symptoms. These findings have important implications for the adjustment period in emerging adulthood as they suggest that strong support systems may be central in developing self-compassion to facilitate this major life transition.

Nizhonabah Rene Davis

University of Arizona; Chemical Engineering

Mentor: Dr. Cindy Miranti – Cellular and Molecular

Medicine

Novel G-Quadruplex Drugs Suppresses AR Transcription in Prostate Cancer Cells

ABSTRACT: It has been found that the androgen receptor (AR) has a major role in prostate cancer proliferation. Androgen-deprivation therapies (ADT) offer patients with advanced prostate cancer long term control, but the disease can become resistant after a few years of treatment resulting in castration-resistant prostate cancer (CRPC). CRPC is independent on its ligand activation. ADT involves androgen inhibitors and AR antagonists. The focus of this study is to find a more effective way to block AR to gain a better control of CRPC. The findings show that the nucleolin-based drug, 1503, suppresses AR for the C42 cell line treated for 12-hours. 1503 binds to the G-quadruplex (G4) structure which suppresses AR expression. The next step in this study is to complete the experiments with the 0903 and 1502 drugs as well as completing each experiment for a 24-hour period for all three drugs tested. The experiments completed thus far contribute to a deeper understanding of the mechanisms that can control the expression of AR which could potentially provide a therapy to control CRPC. It is expected that the experiments that will be completed will also contribute to understanding AR.

Phoenix Eskridge-Aldama

University of Arizona; Environmental Studies

Mentor: Dr. Margaret Wilder – Geography,

Development, and the Environment

Evaluating Quality of Life for Residents of Manufactured Housing in Tucson, Arizona: Effects of Urban Green Space

ABSTRACT: Urban green space is a factor of sustainable design which can aid in alleviating the current and projected effects of climate change through cooling and flood control. Marginalized populations are particularly vulnerable to the effects of climate change, and this can be observed in many manufactured housing (MH) units where heating and cooling the home are often an issue due to insulation problems and other factors. This study compares in-person observations of urban green space and park layouts in Tucson mobile home parks with scores given to the parks based on quality of life (QOL) indicators. Interview data and in-person observation are used to determine the presence of these indicators. Potential correlation between the presence of significant urban green space and QOL for MH residents is assessed, which could have significant implications for understanding the ways in which uneven distribution of green space can affect residents. The purpose of this research is to explore the effectiveness of one potential method of small-scale climate change adaptation within the context of mobile home, trailer, and RV parks. This study finds that parks scoring higher in terms of QOL do not necessarily have more urban green space than parks scoring lower. Though the three parks evaluated for this study do not show any significant correlation between the presence of urban green space and the presence of other QOL indicators, research on the subject should continue. Future studies should use a larger sample size, interview residents about climate vulnerability directly, and potentially utilize indoor temperature measurements to gain a better understanding of the effects of urban green space for MH residents.

Gerardo Figueroa

University of Arizona; Biomedical Engineering

Mentor: Dr. David Margolis – Orthopedic Surgery

Comparison of Polymer Sensate Scaffolds for Detecting Bone Bonding

ABSTRACT: Critical size bone defects will not heal without surgery, and no current interventions consistently heal large critical size defects. Previous studies in our lab have shown that 3D printed polybutylene terephthalate (PBT) scaffolds with a tricalcium phosphate coating and adipose derived stem cells can regrow large segments of bone while incorporating sensors to monitor healing. The primary issue with PBT is that it is not resorbable. Our lab would like to develop resorbable scaffolds that can support bone formation and will also allow us to incorporate sensors. We are using resorbable polylactic acid (PLA) and tricalcium phosphate (TCP) to produce scaffolds. Scaffolds produced from four types of materials (PBT with TCP coating, PLA, 75:25 PLA:TCP, and 50:50 PLA:TCP) were implanted on the surface of rat femora for three months. After 3 months the femora were explanted for mechanical testing. A cantilever bending test is ongoing to evaluate bone ingrowth and strain transfer in each type of scaffold. Results for the cantilever bending test are expected to be completed by Fall 2020. Following the conclusion of the mechanical testing, femurs will be embedded in plastic, sectioned, attached to glass slides and stained. They will be examined in white and ultraviolet light so they can be analyzed using histology and histomorphometry. These tests will provide a complete picture of the relative response of these 4 scaffold materials *in vivo*.

Jessica Gallegos

University of Arizona; Sociology, Law

Mentor: Dr. Jennifer Carlson – Sociology

Bullets Piercing Community Members at Multiple Angles

ABSTRACT: This research seeks to understand the trauma of surviving gun violence across cultural and legal divides regarding guns. How do gun violence incidents shape an individual's life after being exposed to such a traumatic event in terms of the expected short- and long-term health effects or commonly demonstrated behaviors? To investigate this question, the research team will create case studies of gun violence incidents that fall into the categories of justifiable homicide, felonious homicide, and active shootings. The team will focus on California and Florida given their divergent gun cultures. To reach theoretical saturation to support theory development, the team will conduct 240 targeted interviews with survivors. The projected breakdown of interviews is 100 felonious homicide, 90 active shootings, and 50 justifiable homicide, with half coming from each state. These interviews will be transcribed and analyzed using Atlas.ti software. This research aims to address the gap in scholarship regarding the impact of victimization on the psychological, social, and political lives of survivors after a shooting incident (Lee, 2012). The analysis of gun violence victimization is one of the most prominent aspects to better equip society to develop consensus-based steps for improving outcomes. Understanding the aftermath of gun violence, including mass shootings, on the victims and others in the community is vital to enabling all, including policymakers, to create real solutions to this societal problem, as it has a great deal of negative consequences for all.

Frankie Garcia

University of Arizona; Neuroscience

Mentor: Dr. Kristian Doyle – Immunobiology

Investigating the use of a small molecule p75 neurotrophin ligand as a treatment for post-stroke dementia

ABSTRACT: People over the age of 55 have a 1 in 6 lifetime risk of experiencing a stroke, and currently there are more than 6.5 million stroke survivors in the US. Approximately one third of stroke survivors develop post-stroke dementia within 3-6 months of their stroke, and there are no disease modifying therapies. To address this need, we have been testing if LM11A-31, which is a small molecule p75 neurotrophin receptor (p75NTR) ligand currently in Phase II clinical trials for Alzheimer's Disease, can prevent the development of post-stroke dementia in a mouse model. To that end, we have found that following stroke, 13-14 month-old mice treated with LM11A-31 have improved recovery on a ladder rung test of motor function, and score significantly higher in nest construction ability, which is an established indicator of mouse health and well-being. Although data related to memory function are still being analyzed, mice treated with LM11A-31 had less brain atrophy compared to vehicle treated mice, and levels of the neurotransmitters glutamate, acetylcholine, and serotonin, which are critical for learning and memory, were increased. Furthermore, changes in brain metabolism caused by stroke were normalized in the LM11A-31 treated mice. Specifically, stroke induced changes in glycolysis, the tricarboxylic acid (TCA) cycle, arginine metabolism, lipid metabolism, beta-oxidation, and redox homeostasis were reversed. These findings indicate that P75NTR is an effective therapeutic target for post-stroke dementia and suggest that LM11A-31 has utility for treating not only Alzheimer's disease patients, but also people suffering from stroke.

Diana Garcia-Rojas

University of Arizona; Psychology, Spanish

Mentor: Dr. Heidi Hamann – Psychology

Cost-Effectiveness of Community-Focused Patient Navigation Within the Cancer Care Continuum

ABSTRACT: Cancer patients encounter barriers (e.g., logistical, financial, psychosocial, etc.) to their care that often impact treatment decisions and outcomes. Patient navigation programs are evidence-based interventions shown to effectively reduce cancer patients' barriers to care. Researchers have identified a particular type of patient navigation, community-focused patient navigation, that may be particularly well-suited at reducing barriers for underserved cancer patients. In order to create sustainable patient navigation programs at cancer centers, it is important to not only demonstrate intervention effectiveness (i.e., barrier reduction) but also the cost-effectiveness of the program itself. Researchers from the University of Arizona implemented a community-focused patient navigation intervention at the University of Arizona Cancer Center (UACC) on June 18, 2018. This intervention included a community-focused patient navigator who worked individually with cancer patients over a 3-month period to reduce patient-reported barriers. As part of the intervention, the navigator's efforts at barrier reduction were recorded as written comments on a secure data capturing platform. To capture the cost-effectiveness of this intervention, the current study examined the feasibility of extracting the economic activities/ contributions (i.e., the written comments within the data capturing platform) conducted by the navigator in order to preliminarily assess the cost-effectiveness of the intervention. Preliminary results suggest that it is feasible to extract written comments regarding the economic activities of the community-focused patient navigator and code comments as 'benefit to patient', 'benefit to system', or both. Although data analysis is ongoing, initial results suggest that the current methodology for capturing intervention cost-effectiveness is feasible.

Yeritza Guadalupe Gil Valencia

University of Arizona; Psychology

Mentor: Dr. Rebecca Gomez – Psychology

How Monolingual and Bilingual Children Utilize Their Context to Infer Language

ABSTRACT: Children infer language differently than adults, children infer through the syntagmatic association while adults infer more maturely through the paradigmatic association. While children tend to experience the syntagmatic-paradigmatic shift through the ages of 5-8, a hypothesis has proposed that bilingual children may experience the shift at an earlier age in contrast to monolingual children. An ongoing debate has discussed the supposed potential advantages in bilingualism, with previous research finding contradicting results in regards to bilingualism and the syntagmatic-paradigmatic shift. This study explores how 4.5-year-old monolingual and bilingual children utilize their context to infer language, investigating how words are related in children's vocabularies. The methods used in this study are a replication of a study previously conducted by Sloutsky, Yim, Yao & Dennis (2017) where children heard a list of either taxonomic or associative words that included a novel word (fep/dax) through a Zoom meeting and were then tested through the novel label extension task and the free association task. The purpose of this study was to test the hypothesis regarding the supposed sped up syntagmatic-paradigmatic shift in bilingual children and to effectively contribute to the ongoing debate with significant empirical research to address the uncertainty concerning bilingualism and the supposed advantages in word learning. Due to COVID-19, results are not expected until Spring 2021 as the study is still recruiting participants and collecting data. We predict that this study will show advantages in bilingual children and the syntagmatic-paradigmatic shift, finding potential benefits in bilingualism regarding word learning in children.

Angel Gladney

University of Arizona; Chemistry

Mentor: Dr. Armin Sorooshian – Chemical and

Environmental Engineering

Evaluation of Heavy Metals Associated with Mental Illness in Aerosols

ABSTRACT: Heavy metals in aerosols can have a negative impact on physical and mental health. Heavy metals like arsenic, lead, chromium, and manganese have been linked to psychological disorders such as schizophrenia and ADHD. The goal of this study is to evaluate heavy metals linked to mental illness near large cities that have a higher risk of mental illness. Using IMPROVE data, the overall, yearly, monthly, and seasonal averages of aluminum, arsenic, calcium, chromium, lead, manganese, nickel, and selenium are calculated along with the weekly trends at eight different sites across the United States between 2002 and 2018. By 2018, the concentrations for most of the metals went down significantly for each site, but the concentrations are still enough to possibly influence mental health.

Sarah Graham

University of Arizona; Nutritional Sciences

Mentor: Dr. Richard Simpson – Nutritional Sciences

Preferential Mobilization of Specific Natural Killer Cell and T Cell Subsets in Response to ISO Infusion and Exercise

ABSTRACT: Metastasis involves the spread of malignant tumor cells which often contributes to cancer-related deaths. Previous research focused on how exercise modulates tumorigenesis via activation of circulating cells of the innate and adaptive immune systems. This study focused on specific mobilization of immune cells and their associated activatory and inhibitory receptors. Specifically, NKG2D/NKG2A and PD-1 receptor expression on natural killer (NK) cells and T cells respectively, in response to isoproterenol (ISO) infusion and exercise. The purpose of this research was to better understand preferred immune cell mobilization in order to improve cancer immunotherapies. Seven (n=7, 1 female) participants completed the ISO and exercise trials. The ISO trial involved a 20-min ISO infusion at 50 ng/kg/min. The exercise trial involved a 30-min cycling session at 15% higher wattage than the participant's ventilatory threshold which was determined at an initial visit. Results showed a significant difference between ISO infusion and exercise of the following cell types: CD4 PD-1+ total cells/µl whole blood (WB), naïve cells, and effector memory cells; CD4 PD-1- total cells per/WB, terminally differentiated effector memory cells, and effector memory cells; CD8 PD-1- total cells/µl WB and naïve cells; and CD4-8- PD-1- total cells/µl WB. We hypothesize these differences are due to the fact that highly differentiated T cells tend to be more responsive to exercise than ISO infusion. Although these findings suggest the effects of ISO infusion and exercise differ for certain cell subsets, there appears to be a promising parallel between ISO infusion and exercise that needs further investigation.

Liza Granger

University of Arizona; Psychology

Mentor: Dr. John Ruiz – Psychology

Dollars, Degrees, and Death:

A Review of Socioeconomic Status & Mortality Outcomes in the Health Literature

ABSTRACT: The purpose of this systematic review is to examine the frequencies and overall patterns in the health literature of socioeconomic status in terms of income and education along with the outcome variable of mortality. To put the systematic review into context, a vignette component was included to frame the background information with a narrative. An explanation of the history of socioeconomic status research and the role of the health psychologist in addressing health disparities was also included. The literature review describes three models of examining socioeconomic status. The methodology of the review is a multi-step filtration process which eliminates and sorts articles depending on if the studies do or do not satisfy the research design or variables. The articles from the initial search that matched both the longitudinal study design, predictor variables of income and education, and mortality outcomes is 33 (13.1% of total articles). Further research to examine different operationalizations of SES and the implementation or social change to address health disparities is discussed as well as the possibility of variable and design related search functions.

Emily Lorraine Jarkowski

University of Arizona; Molecular and Cellular Biology

Mentor: Dr. Andrew Capaldi – Molecular and

Cellular Biology

PKA Dependent Regulation of Cell Growth

ABSTRACT: To function correctly, cells must modify their growth rate in response to the level of stress, nutrient, and hormone signals. Errors in this process cause a wide range of diseases and disorders including cancer, epilepsy, and depression. In eukaryotic cells, the cAMP dependent protein (PKA) kinases are required to control growth. As a kinase, PKA phosphorylates serine and threonine residues. However, it is currently unclear which proteins PKA modifies to regulate growth. To fill this gap in our knowledge, we are working to identify the PKA targets in the model organism budding yeast. Using phosphoproteomics, more than 100 PKA dependent phosphorylation sites have been identified. I am currently working to determine which of these sites are direct targets of the PKA kinases, using bioinformatics to examine the amino acid sequence around each phosphorylation site and analyzing the evolutionary conservation of the site across yeast species. Conservation through evolution indicates the importance of a phosphorylation site, and the potential that experiments using baker's yeast will lead to information in humans. Once this analysis is complete, several of the newly identified phosphorylation sites will be mutated to study their role in controlling cellular growth.

Anna Malkin

University of Arizona; Psychology

Mentor: Dr. Rebecca Gomez – Psychology

Fast Mapping Semantic Categories with a 24-hour Sleep Delay

ABSTRACT: Researchers have discovered that sleep is extremely important for the development of language acquisition in infants and toddlers. Infants can retain new vocabulary through two learning processes: Fast Mapping and Explicit Encoding. In recent research, children have shown evidence of semantic categorical knowledge by 15-months of age. Past studies have shown that after a 5-minute-delay, children with larger vocabularies are able to retain more information in a higher knowledge category than in a lower knowledge category. Infants tend to add more to their vocabulary if novel words are related to or found in the same semantic category, but scientists are unsure of how long children can retain new categorical information. This study explores whether infants can retain new vocabulary 24-hours after being exposed to novel words through a fast mapping learning process within their semantic categories. This study will be done virtually over Zoom due to COVID-19. Using a replication of another study we will first, identify 24-month-year-old's high and low categorical domains. Next, we will expose infants to novel words in their high and low vocabulary domains using a learning process known as Fast Mapping. Then we will test them 24-hours later to see if children retained the new information by encoding their eye movements using eye-tracking. We predict that children will better encode novel words from higher knowledge categories then lower knowledge categories.

Rachel Matsuo Saindon

University of Arizona; Film and Television, Gender and Women's Studies

Mentor: Dr. Adam Geary – Gender and Women's Studies

Queerness and Female Sexuality in Japanese Films Directed by Women

ABSTRACT: This paper will examine three feature-length queer films centered on women's lives as directed by Japanese women filmmakers: *Kakera – A Piece of Our Life* (2009) directed by Momoko Ando, *Gekijouban Zero* (2014) directed by Mari Asato, and *Love/Juice* (2000) directed by Kaze Shindo. Using formal and narrative analysis, I show that across multiple film genres, these women directors critique patriarchal sexual and gender relations through their depictions of queer women. By having mostly female casts, love stories centered around women, and graphic depictions of male sexual violence in their films, these women directors interrogate how femaleness is violently perceived and distorted by men in Japanese culture.

Estefanía Mendivil

University of Arizona; Psychology, Latin American Studies

Mentor: Dr. Antonio Estrada – Mexican American Studies

Porn and the Developing Sexualities in Post-Colonial Latin American Communities

ABSTRACT: Different cultural factors may be affecting developing sexualities in Latiné, LGBTQIA+ communities. Colonization, acculturation, family values, healthcare, media representations, a lack of inclusive sex education and pornography are discussed in this literature review as interacting with developing sexualities. The purpose of this research is to find the effects pornography consumption has on developing sexualities in the Latiné, LGBTQIA+ community. Previous studies found that young adults do report turning to pornography for education purposes and for exploring their sexuality because sex education lacks in various ways, so that is where the interest in pornography arises. There was no data collected for this literature review, but research methods were created, so the study could be conducted in the future by using various measures and a retrospective interview conducted on participants who identify as Latiné, LGBTQIA+ and aged 18-25.

Deanna Mireles

University of Arizona; Geosciences

Mentor: Dr. Kaustubh Thirumalai – Geosciences

Reconstructing glacial-to-interglacial monsoon variability in the Bay of Bengal

ABSTRACT: Foraminifera are commonly used as paleoenvironmental proxies as their calcium carbonate shells hold chemical and biological records of the environmental conditions they develop in. The stable oxygen isotope ($\delta^{18}O$) signature of these shells are used for reconstructing past sea-surface temperatures and salinity. This study proposes the use of *Neogloboquadrina dutertrei* shells, a planktic foraminiferal species, to gain insight on the mean climate and variability of runoff related to the Indian Summer monsoon phenomenon over the last deglaciation. The research question that was explored was whether the *N. dutertrei* data set will show different patterns in values when compared to that of another planktic foraminiferal species (*Globigerinoides ruber*) previously generated by the lab. Given *N. dutertrei*'s affinity for low salinity waters, it is expected that the selected tests will demonstrate drastic variations in amplitude that correlate with monsoon water runoff into the basin. The samples used in the study were collected from site U1446 in the Bay of Bengal in the northern Indian Ocean as a part of the International Ocean Discovery program. Thirty shells within the sizes between 212-200 microns will be chosen from at least 24 selected samples, measured, weighed and analyzed for their $\delta^{18}O$ composition. We will also generate a suite of morphometric measurements on *N. dutertrei* and investigate whether the species' coiling direction, number of chambers, and shell thickness display correspondences with changes in the Indian monsoon. The data for these samples will be acquired over the 2020-2021 academic year if future circumstances allow.

Enrique Alan Olivares-Pelayo

University of Arizona; English, Creative Writing

Mentor: Dr. Stefano Bloch – Geography and Development

Incarceration and Segregation:

Reification of Race and Structures of Securitization on an Arizona Prison Yard

ABSTRACT: This article provides autoethnographic data on experiences of racial segregation in Arizona prison yards, particularly the correlation to increased securitization. Studies that describe the nature of inmate societies, including prison gangs, account for the tendency of these organizations to form around racial lines (Pyrooz, 2011). Using critical reflexivity and emotional recall this article confirms that tendency for prisoners incarcerated in Maximum and Close Custody in Arizona adhering to strict racial segregation (Gariglio, 2018). At the same time, this article also illustrates the complicity of existing prison structures in reifying race, such as racially segregated housing policies, intake questionnaires conducted by prison officials that categorize inmates by race, and a qualitative observation of inmate self-segregation on lower custody prison yards. Offered as a critically reflexive narrative, this article concludes with a discussion focusing on the implications of racial segregation in prisons.

Paloma Orozco

University of Arizona; Veterinary Science

Mentor: Dr. Zelieann Craig – Animal and Comparative

Biomedical Sciences

RiboTag Immunoprecipitation to Determine
Cell-Specific Effects of Phthalates in the Mouse Ovary

ABSTRACT: Phthalates are a group of chemicals that are added to products we use in our everyday lives. They have been linked to the overall decrease (44%) of fertility amongst women of reproductive age. Phthalates are considered endocrine disrupting chemicals (EDCs) which have shown to disrupt the normal function of hormones within the female reproductive system which has an effect on fertility. The following study focuses on using the Ribotag immunoprecipitation technique to extract mRNA from specific cells from within the ovary in order to analyze the effect of di-n-butyl phthalate (DBP) on fertility. Female mice were genotyped to make sure they were carriers of both the human influenza hemagglutinin (HA) tag under the ribosomal protein 122 (Rp122),and forCyp17iCreor Cyp19iCre. Although the following study is not complete, the next steps to completion are dosing female mice with DBP for 10 days followed by ovary dissection and mRNA extraction to analyze the effects of DBP on transcription in theca and granulosa cells within the ovary.

Dianara V. Ramirez Ibarra

University of Arizona; Physiology, Latin American Studies

Mentor: Dr. Javier Duran - Latin American Studies

Patriarchy and Silence: The Bridge between Life and Death

ABSTRACT: Femicide and gendered violence has become an international problem, yet it is especially prominent in Mexico where disconcerting rates of gendered crimes accompanied with high rates of impunity are presently being orchestrated and recorded. This study uses data from *the "Reporte Sobre la Situación de Violencia de Género en Contexto de Aislamiento Social Sonora"* published by the Observatorio Sonora por la Seguridad to illustrate the rise of gendered violence and femicide during the first trimester of isolation as a result of the COVID-19 pandemic in the state of Sonora, Mexico. The purpose of this research is to inform and bring awareness to the rising problem by providing the reasoning behind the normalization of these crimes and underlining the devastating realization that a woman's home can become her burial ground at the hand of a spouse, family member, or friend. The report manifested an overall rise in gendered violence differentiated by distinct categories including sexual abuse, harassment, marital or partnered violence, and familial violence.

Shyann Roberts

University of Arizona; Psychology

Mentor: Dr. Celina Valencia – Cancer Center Division,

Graduate College

Understanding the Financial Deficit
in South Tucson, Arizona through Geospatial Records

ABSTRACT: South Tucson is a 1.2 square mile city located in the middle of Tucson, Arizona east of Interstate 10. The initial founding of South Tucson was in response to local business fears of higher taxes, over time turning into a sanctuary of Hispanic culture. Despite the town's size, it has a population of around 5,600 people, with over 80% of the race demographic identifying as Hispanic. It also has an alarmingly high poverty level, almost four times the 2018 average of 11.8% (U.S. Census Bureau, 2019). Using Geospatial data records from the United States Census Bureau's American Community 5 year estimates of 2014-2018, this report will compare income and housing characteristics between South Tucson, Arizona and Tucson, Arizona in an attempt to identify potential trends relating to the displacement of minorities, or gentrification, in Pima County, Arizona. The intent of this research is to diagnose and address systemic denial in relation to race, specifically the Hispanic population, and ascertain statistical trends through the comparison of these two cities. The sub sequential data is then used in conjunction with related literature reviews to determine if South Tucson's poverty level is related to their high Hispanic population. The findings of this study will contribute further information on income disproportion to establish a significant correlation between gentrification and racialized housing displacement.

Rebecca Emma Rodrigues

University of Arizona; Speech, Language,

and Hearing Sciences

Mentor: Dr. Meghan Darling-White – Speech, Language,
and Hearing Sciences

Breath Pause Patterns Relative to Punctuation in Children with Cerebral Palsy

ABSTRACT: Breath Pause Patterns Relative to Punctuation in Children with Cerebral Palsy Breath pause patterns are meaningful in producing successful communication. Listeners use breath pauses in order to determine the syntactic units in speech. The purpose of this study was to examine the impact of cerebral palsy (CP) on breath pause patterns. Eight children, four children with CP and four age-and sex-matched typically developing children participated in this study. Participants read "The Caterpillar" passage aloud. The breath pauses that each participant took were recorded and analyzed according to the punctuation of the passage (e.g., sentence boundary, comma, or no punctuation). TD children produced a greater percentage of breath pauses at sentence boundaries, and a smaller percentage of breath pauses where there was no punctuation, than did children with CP. Breath pauses taken at commas were at a similar percentage for both groups of children. There were fundamental differences between where TD children and children with CP took a breath. It is probable that the differences in breath-pausing location in children with CP would give a naïve listener difficulty in parsing syntactic units.

Laura Sanudo

University of Arizona; Speech, Language,

and Hearing Sciences

Mentor: Dr. Mary Alt – Speech, Language,

and Hearing Sciences

English Grammatical Norms in Typically Developing Spanish-English Bilingual Children

ABSTRACT: Developments in language form in many ways such as, dialects, pronunciation, and bilingualism. There is a growing awareness of bilingualism and the needs of children with developmental disabilities who are exposed to more than one language. This paper examines how developmental language disorders presents in the grammatical forms of bilingual Spanish-English children to help analyze difference vs. disorder amongst bilinguals. Participants included Spanish–English bilingual children ages 4–7 (years). Grammatical morpheme accuracy was evaluated using typical development of language. Mean length utterance of words (MLUw) data were calculated from children's narrative samples. Production accuracy of plural nouns, singular and plural articles, past tense, prepositions, and conjunctions was calculated and analyzed as a function of MLUw in English. Level of accuracy on these forms was compared for Spanish-dominant and English-dominant groups. Trends show that there are levels of difficulty when developing grammar. By better understanding the norms of grammatical form production in a typically developed Spanish-English bilingual child, we can better address the needs of Spanish-English speaking children with developmental language disorders.

Adria Isabel Vasquez

University of Arizona; Public Health, Interpretive Spanish Translation

Mentor: Dr. Celina Valencia – Cancer Center Division,

Graduate College

Continuous Mobile Health Support of Smoking Cessation using SMS E-Cigarette Cessation Protocol

ABSTRACT: The prevalence of pulmonary illnesses such as "Popcorn Lung" have increased in the emerging adulthood age group (18-24) with e-cigarette usage as one of the main risk factors (Chun, 2017). As this is a Public Health concern, there is a need for effective e-cigarette cessation programs that are tailored to this age group. This SMS Cessation Protocol aims to decrease the percentage of self-reported e-cigarette use among college aged students and prevent potential pulmonary illness that result from consistent e-cigarette use. Through the use of M-Health as a delivery system that is both convenient and cost-effective, an SMS program may prove effective at increasing quit rates and lowering morbidity. SMS messages will map the benefits of following recommendations on health, stress-coping, and anticipated benefits that can positively impact the quality of life through supportive texts twice a week. Layered with in-person meetings and Craving Management support participants will be able to further develop the social supporting relationships in their lives such as parents, friends, and family members in their quit process. While the Social Ecological Model as the framework will encourage community level action through the determination to create a safer, healthier environment as a whole for college aged young adults (Parker, 2016).

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Filament Formation: Plant Root Adaptation to Environmental Stress

ABSTRACT: Nitrogen is a nutrient that is essential to plant root growth. Although, because it is usually distributed unevenly in the soil, plant roots can experience nutrient deficiency that results in the activation of signaling pathways in plant cells in response to this environmental stress; this is known as the Environmental Stress Response (ESR). When plant roots are only able to detect low levels of nitrogen, they activate the C-terminally Encoded Protein Receptors (CEPRs) in cells, which are known to interact with certain enzymes that are also present in other organisms where they promote the growth of filamentous structures. This project investigates if plant cells use localization of filament-forming enzymes to alter their root growth in response to changes in the environment, specifically varying levels of nitrogen concentration, and how phosphorylation of cell receptors could potentially contribute to regulating this localization. Understanding this process will contribute to investigations on maximizing nutrient absorption for plant roots, while decreasing the possibility of excess nitrogen contributing to nitrogen contamination of areas surrounding the soil. For this study, plant DNA is extracted from roots of Arabidopsis thaliana plant to address whether enzymes used in response to environmental changes help promote filament growth in plant cells. The effect of these changes on plant root growth is analyzed for their genetic interaction to determine the role that certain receptors carry out in lateral root growth. Therefore, the objective is to show promoting filamentous structures allows the plant roots to adapt in conditions affecting growth.