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ABSTRACTS
FAITH BASED EDUCATION TO IMPROVE ALZHEIMER’S DISEASE UNDERSTANDING, ATTITUDES AND HEALTH LITERACY IN AFRICAN AMERICAN WOMEN

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Although, African Americans (AA) make up 20% of the nearly 5.7 million Americans diagnosed with Alzheimer’s disease (AD). They are 1) least likely to receive an early AD diagnosis where treatment is helpful, 2.) AA are more likely than non-Hispanic white counterparts to believe AD/ and other dementias are a normal part of aging and 3.) They are least likely to have adequate AD knowledge. The long-term goal is to improve AD literacy in AA women. Our focus is on women because 61% of AA women are caregivers for a female relative with AD and dementia. The hypothesis for this R21 application is that faith-based education interventions will improve AD literacy with churchgoers in comparison to churchgoers who receive conventional AD education. Our approach will compare if AD literacy improves when participants are provided faith-based AD education in comparison to conventional AD education. We will also evaluate if attitude about AD in both the intervention and control group improved after receiving dementia education.
Purpose: This study demonstrates refined analysis of existing data to motivate adoption of an evidence-based intervention (EBI) and considers replicability and application to other initiatives. Methods: Asthma 411 is an EBI developed between 2003-2008 in St. Louis, MO. Dissemination to North Texas began in 2008. In 2013-2015 a two-school, two-year pilot was conducted within a predominantly minority and low-income school district. Following the pilot, analysis of existing, district-wide data was conducted to refine understanding of asthma’s local impact on school attendance and academic outcomes. The analysis included demographic, attendance, and academic data collected by the district as required by the Texas Education Agency, and asthma status was recorded in student health records according to district policy. Mean absences among children with and without asthma was calculated with adjustment for the proportion of the school year each child was enrolled. A mixed-effect, logistic regression model examined the association between failure to attain math and reading grade-level standards and absenteeism, controlling for available co-variants. Results: On average, asthma status was associated with a 2.1-day increase in absences; each absence day was associated with a 3-5% increase in risk of failing grade-level standards (p < .01). Presentation of results to district administrators was followed by (1) adoption of Asthma 411, (2) development of a data sharing agreement for ongoing evaluation. Conclusions: This case study provides an example of using existing, local data to support D&I of EBIs. It may provide insights that are relevant to dissemination of asthma and other school health EBIs. Keywords: asthma, school-health, dissemination
"I WAS NOT A VEGETABLE PERSON BEFORE"; SHE TRIBE: PRELIMINARY FINDINGS

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SHE (She’s Healthy and Empowered) Tribe is a wellness program that encourages women to make healthy behavior changes by utilizing their existing social supports and goal setting. The goal of the program is to promote accountability, self-awareness and reflection, and positive growth. Over the course of five weeks, participants work on goal setting, self-care, movement, nutrition, and social support. The program is delivered through a trained peer leader by tailoring each gathering to meet the needs and goals of their respective tribe members. A total of 110 women in 20 tribes have been served by the program to date. SHE Tribe operates in partnership with the YMCA to facilitate the program and recruit peer leaders who in turn recruit participants from their own social networks. Preliminary program feedback from participants is positive. Of participants who answered the satisfaction survey (n=45), 93% responded that SHE Tribe was enjoyable to a great extent. When asked on a scale of 1 to 10 regarding the helpfulness of SHE Tribe gatherings, the mean scores were above 8.5 for all five weeks. This poster highlights our participants and our findings based on preliminary analysis.

Keywords: wellness, goal setting, behavior change
PHQ-2 SCORES AND MENTAL HEALTH DISPARITIES IN BROWARD COUNTY’S HOMELESS POPULATION

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Introduction: Florida ranks 9th in states with highest prevalence of mental illness among homeless individuals. The state also ranks 43rd of 52 states in providing adequate access for mental health concerns in homeless individuals. (National Mental Health Association, 2016) The 2018 federal budget Omnibus Spending Bill has increased funding for certain homeless programs. Unfortunately, programs administered by the federal Substance Abuse and Mental Health Services Administration and Projects for Assistance in Transition from Homelessness will have no federal funding increases, thereby diverting expenditure away from mental illness resources (Council on Homelessness, 2018). This research aims to address mental health disparities by quantifying homeless people's need for evaluation and care and by uncovering their barriers to healthcare. Methods: The Community Based Participatory Research model was employed while working with local volunteer organizations. The participants completed an 18 question survey and standardized depression screening tool at three sites, totaling 136 participants. Results: 100% of participants surveyed had an income below $12,488, thereby falling in the Affordable Care Act coverage gap. 66% stated “none” as insurance plan, 67% of this population screened positive for depression with the PHQ-2 questionnaire, while 57% acknowledged suffering from mental illness. 80% of this population had at least 1 ER visit within the year. Discussion: The results of the PHQ-2 screening suggests a majority of homeless individuals need further psychiatric assessment. Based on the utilization of the ER, health care resource awareness is inadequately approached. Free resources are under utilized due to lack of awareness, accessibility and outreach.

Keywords: Mental Health Disparities, Depression, Omnibus Bill
STI TESTING AMONG YOUNG ADULTS: OPPORTUNITIES FOR PREVENTION

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Objective: Sexually transmitted infections (STI) disproportionately affect young adults in the United States. However, STIs can be prevented through recommended screenings. The purpose of this study was to examine risky-sex cognition correlates for chlamydia, gonorrhea, and HIV testing among a national sample of young adults ages 18-20. Methods: Young adults (18-20 year old) were recruited nationally using online, in-print, and in-person recruitment strategies (N=1,144). The sample was restricted (n=871) based on inclusion/exclusion criteria for analysis. The outcome variables were gonorrhea, chlamydia, and HIV testing, respectively, in the last 12 months. Covariates included demographic variables, alcohol use, perceived vulnerability, protective behavioral strategies, and sexual behavior in the last 3-months. Adjusted logistic regression models were estimated in SAS 9.4. Results: Approximately 24% of respondents were tested for chlamydia and gonorrhea, and 21% were tested for HIV in the past year. Women were more likely than men to be tested for chlamydia (OR=1.67, 95%CI 1.13, 2.46) and gonorrhea (OR=1.55, 95%CI 1.05, 2.28). Persons who were worried about an STI after a sexual encounter and who engaged in casual sex were more than two times as likely to be tested for all three STIs. Similarly, persons who used more non-condom related protective behavioral strategies were more likely to be tested. Conclusions: The main correlates identified for STI testing were related to being female, immediate perceived vulnerability, non-condom protective behavioral strategies, and having a casual sexual partner. Future studies may consider these correlates as potential intervention points for promoting STI testing among young adults.

Keywords: sexually transmitted infections; young adults; screening
A NOVEL FAMILY-BASED E-HEALTH INTERVENTION PROCESS TO REDUCE OBESITY

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The proposed research will fill a critical gap by using participant tailored transtheoretical framework e-health text messages with connection to community resources to induce attitudinal and knowledge changes amongst a population that has been difficult to engage, socioeconomically disadvantaged families with obese children. The overall objective of this study is to measure the efficacy of text message e-health intervention to deliver culturally appropriate health education content to change knowledge and attitudes of families of obese children regarding the 6 major lifestyle behaviors contributing to obesity, eating, physical activity, sleep, social connection, tobacco cessation, and stress management. Specific Aims for this research project are: (SA1): Will tailoring an interactive e-health text message intervention improve the delivery of lifestyle information and connection of community resource to African American and Hispanic families of overweight/obese children ages 6 months to 11 years and (SA2): Can an e-health text message intervention efficaciously impact family members’ attitudes, knowledge, and confidence to achieve SMART goals as related to the 6 lifestyle modifications? This randomized control study will assign participants to either the e-health intervention group or a control group of usual care. Intervention participants will receive health education briefs at frequency intervals based upon participant request over a 6-month period. The contribution of this study will be to rigorously evaluate a novel participant tailored, community resource linked, and behavioral change framework-based e-health text message intervention to improve multiple lifestyle behaviors that will translate into improved chronic disease outcomes, known to have significant racial and socioeconomic disparities.

Keywords: obesity, lifestyle behaviors, e-health
IDENTIFICATION OF POSTPARTUM HEALTHCARE COVERAGE ACCESSIBLE TO LOW-INCOME WOMEN IN TEXAS

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Texas sparked nationwide interest after reports suggested that the maternal mortality rate had increased by almost double between the years 2010-2013. During this time, the majority of maternal deaths (during pregnancy and one year postpartum) happened to women enrolled in Medicaid at delivery and between 42 days and one year postpartum. Since Medicaid coverage ends 60 days postpartum, the lack of health care access may contribute to maternal deaths among low-income women. A web-based search was conducted of peer-reviewed journal articles and state reports, limited to Texas, to identify the leading causes of maternal deaths in the late postpartum period, as well as public health care programs available to low-income women. According to the recent Texas Maternal Mortality and Severe Morbidity Task Force Report, the leading causes of late maternal deaths include cardiac events, drug overdose, homicide, and suicide. Uninsured women have few options to overcome such problems. Public insurance programs, i.e., Medicaid for Pregnant Women and the Children’s Health Insurance Program-Perinatal, only provide health care coverage for up to two months postpartum, leaving an absence of health care during a critical period after giving birth. Access to health screenings, referrals and follow-up care for intimate partner violence, depression, substance use, and treatment can help save women’s lives. In the 86th Texas Legislative Session House Bill 411 was introduced to extend Medicaid to 12 months following the end of pregnancy. If passed, this extension could address some deficits in the system of care for low-income Texas mothers.

Keywords: postpartum, healthcare coverage, Texas
SDM IN THE ICU

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Background: Patients in the intensive care unit (ICU) are sometimes unable to make decisions for their own medical care due to disease state progression or therapeutic interventions that prevent communication, and may rely on family members or close friends to serve as surrogate decision-makers (SDMs). While health disparities have been identified related to patient outcomes in the ICU, very few literature have characterized communication disparities among SDMs in this setting. Additionally, tools for improving communication among healthcare providers (HCPs) may be adapted for use of SDMs.

Objectives: To characterize the intersections of communication experiences, challenges, and potential solutions with SDM characteristics including race, gender, language skills, and level of health literacy.

Methods: A mixed-method quantitative and qualitative study comprised of survey data and focus group discussion is currently underway. Adult SDMs who have cared for someone in the ICU in the past 5 years are recruited to participate in the study. Demographic information, ICU experiences, and SDM perceptions of feasibility of various communication tools in this setting were collected. Results: Interim results are presented with this abstract. A total of 25 eligible participants are currently enrolled and data from 12 previous SDMs are included in this analysis. The mean age of participants were 54 ± 15 years, with 8% identifying as Hispanic, and 25% scoring with inadequate levels of health literacy. Participants rated very high quality relationships with their patient family members, and lower levels of confidence related to confidence in decision-making and confidence in understanding information. Initial themes from the focus group discussion include: “caregivers feel vulnerable, anxious, and fearful” and “caregivers need open and plain language communication.” Conclusion: Preliminary results from this mixed-method analysis show SDMs face challenges while caring for someone in the ICU. Future analyses aim to identify intersections among SDM characteristics and the challenges they face along with potential solutions and tools for communication.
MATERNAL MORTALITY THROUGH A HEALTH LITERACY LENS

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Maternal Mortality is a global public health issue. Globally, approximately 830 women die every day from preventable causes related to pregnancy and childbirth (WHO, 2018). Maternal death rates range from 12-239 per 100,000 live births between developed and developing countries respectively (WHO, 2018). In the US, black mothers are dying at the highest rate while disparities also exist for low-income women, women at extremes of maternal age and women from rural areas. Many of these same disparities as well as others exist in countries across the globe (WHO, 2018). With the vast information taught on postnatal discharge, a woman's ability to understand is influenced by many factors, such as culture, sleep deprivation, physical and emotional changes, side effects of medications, and low health literacy (Roman et al., 2017). Kilfoyle et al. (2016) suggest that health literacy impacts postnatal knowledge to recognize symptoms after birth as normal, or abnormal requiring medical attention. For rates of postpartum maternal morbidity and mortality to be reduced and disparities to be addressed postpartum education must be improved (Berg et al., 2005). This pilot study identified ways to incorporate health literacy and cultural sensitivity into postnatal education. Outcomes informed sustainable health systems strategies to improve the readability, understandability and cultural sensitivity of information given to moms after birth. Educational tools developed include a plain language flier, App and provider trainings to not only improve postnatal education in underserved communities at high risk for maternal mortality but also to build health literate societies across the globe.

Keywords: Health Literacy, Maternal Mortality, Maternal Morbidity
Implementation of a patient-centered HIV care model to optimize HIV outcomes through improved communication between pharmacists and providers

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- HIV medication therapy can significantly extend the lives of persons living with HIV
- To benefit from ART, participants must be both retained in care and adherent to therapy
- Lack of coordinated HIV care and lack of use of pharmacists may contribute to poor retention and adherence
- Strategies are needed to improve the use of pharmacists in participant HIV care and to increase the capacity of HIV service integration among community pharmacists and primary medical providers

Keywords: HIV care, pharmacists, community health
DISPARITIES IN AWARENESS OF HUMAN PAPILLOMAVIRUS TESTING AS A CERVICAL CANCER SCREENING TOOL AMONG WOMEN IN THE UNITED STATES

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Purpose: Human papillomavirus (HPV) causes 99% of cervical cancers. In the US, HPV testing has recently been recommended as a standalone option for cervical cancer screening in women over 30 years of age. Yet, studies have shown a low awareness of HPV testing. This study examined potential sociodemographic disparities in HPV testing awareness among US women. Methods: Women aged 30 to 65 years, without hysterectomies, completed an online survey (N=812). Predictor variables for HPV testing awareness included: age, race, ethnicity, education level, income level, insurance status, relationship status, if currently monogamous, religious affiliation, and HPV vaccination history. Multiple logistic regression identified variables associated with HPV testing awareness using SAS 9.4. Results: 62.4% of women in the sample were aware of HPV testing as a method of cervical cancer screening. There was lower awareness in older women compared to younger women. Women with some college education had a higher awareness compared to women with high school education or less. Additionally, women without health insurance had almost 50% lower odds of being aware compared to women who had private health insurance. Lower awareness of HPV testing was also seen among women who had never received a HPV vaccination or who did not know if they had ever received the vaccine.

Conclusions: This study identified sociodemographic disparities for HPV testing awareness among women in the US. Improving awareness is necessary to help women make more informed health decisions and promote uptake of this recommended screening tool.

Keywords: HPV testing, disparities, awareness
IMPACT OF RACE AND SOCIOECONOMIC STATUS ON BREAST CANCER MORTALITY IN USA: A CROSS-SECTIONAL TIME-SERIES ANALYSIS.

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Purpose: Racial, ethnic, and socioeconomic (SES) disparities in incidence and mortality exist among all breast cancer (BC) types and stages, particularly between African American (AA), Caucasian American (CA), and Hispanic American (HA) women. The goal of our study is to investigate all three dimensions of SES to identify occupation, education, and income as predictors for BC mortality among racial groups.

Methods: A pooled cross-sectional time-series analysis is used to determine the statistical significance of the variables predicting age-adjusted BC mortality in the 50 U.S. states from 1999-2015. The variables used were collected from publicly available databases (CDC Wonder and American Community Survey).

Results: This study used beta coefficients, B, as indicators to determine the strength of the association between the dependent variables and BC mortality. AA women showed the greatest statistical significance and strongest beta (p=0.000; B=0.061), followed by CA women (p=0.007; B=0.037). The positive beta exhibited in both AA and CA women suggests that the probability of dying from BC increases as the number of women in each racial group increases. The high beta shown in AA women illustrates a stronger relationship among this racial group, signifying the AA race alone may independently predict BC death. The negative beta observed in HA women shows increase in this ethnic group would reduce BC mortality, implying the presence of a protective factor. Also, under control were health care expenditures and lifestyle risks. Conclusion: This is the first BC study to include all 50 U.S. states longitudinally and cross-sectionally to provide a large scale, population-based analysis. Additionally, this study is one of the first to consider all three dimensions of SES as predictors for BC death. When analyzed independently, race/ethnicity alone showed significant relations to total age-adjusted BC mortality, holding constant influences of education, income and employment.

Keywords: Breast cancer, socioeconomics, race
SURFACE PROPERTIES OF ANTI-CANCER DOXIL-MIMICKING LIPOSOMES

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The use of nanoparticles (NPs) for drug delivery has gained a lot of attention from biomedical researchers in the last few decades. This is primarily because NPs are of extremely small size that enables them to accumulate preferentially inside tumors instead of healthy tissue. We do not know the reason why research that has been done on NPs has shown promising results in animal models but does not always translate successfully to the clinic. Here, we will study the effect of NPs cholesterol and hydrophilic polymer (PEG) content on their surface tension. We hypothesize that surface tension can be useful in enriching characterization of novel NPs, and help determine which NPs to move on to clinical testing. We used Doxil®, that consists of a drug (doxorubicin) encapsulated in liposomes made of HSPC, cholesterol (CHOL), and PEG. Three formulations of NPs, HSPC:CHOL:PEG (Doxil®) HSPC:PEG and HSPC:CHOL were prepared by thin film hydration followed by membrane extrusion. We tested their surface tension at six concentrations using an optical tensiometer (DataPhysics). Removal of PEG from the liposomal formulation significantly decreased the critical concentration where surface tension reduction is observed, indicating that the liposomes became significantly more surface active. Removal of cholesterol lead to an increase in surface tension, as opposed to removal of PEG that decreased surface tension. Accordingly, an optimal surface tension is likely necessary to maximize intratumoral distribution, with higher and lower values resulting in the nanoparticles inability to effectively navigate through the tumor’s extracellular matrix.

Keywords: Drug delivery, transnational research, surface properties
REDUCING HEALTH DISPARITIES IN BREAST CANCER BY TARGETING TUMOR-ASSOCIATED MACROPHAGES

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Macrophages are characterized by phenotypic plasticity. Based on the environmental stimulus, they can assume a spectrum of phenotypes ranging from pro-inflammatory and anti-tumoral M1 phenotype to immune suppressive and pro-tumoral M2 phenotype. Located in the stromal part of the tumor microenvironment, tumor-associated macrophages (TAMs) are induced by tumor secretions to progressively take on an M2 pro-tumoral role which facilitates tumor suppression immune suppression, tumor proliferation and metastasis. Successful TAM targeting has implications in breast cancer therapy where ethnic disparities have been described. For example, African American women diagnosed with triple negative breast cancer (TNBC) have unusually high mortality rates and display more aggressive forms of the disease despite early detection and efforts at prevention. Our lab has developed biocompatible nanoparticles for drug delivery (rHDL NPs) with the potential to transport and deliver macrophage polarizing agents to achieve M2 to M1 subtype reversal. In addition, these nanoparticles can be optimized to specifically target TAMs and thus enhance their potential therapeutic effect. This targeting strategy may be particularly effective against TNBC, disparate expression of cytokines have been found in the tumor microenvironment of African American women versus women of other racial groups. These cytokines have also been reported to induce an M2 phenotype in TAMs, enhancing the aggressive nature of tumors. With this health disparity in perspective, TAMs could be selectively modulated to revert to their anti-tumoral role when targeted via rHDL NPs, to achieve reduced aggressiveness of and thus lower mortality rates in African American women with TNBC.

Keywords: TNBC, nanoparticles, tumor-associated macrophages
THE EFFECT OF RACE ON SPECIFICITY PROTEIN 1 EXPRESSION, AND THE ROLE OF DOWNSTREAM TARGET BACULOVIRAL INHIBITOR OF APOPTOSIS REPEAT-CONTAINING 5 EXPRESSION IN OVARIAN ADENOCARCINOMA PATIENTS SURVIVAL

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Background: Ovarian adenocarcinoma is the most common ovarian cancer. Over expression of transcription factor, Specificity Protein 1 (Sp1) and anti-apoptotic protein, baculoviral inhibitor of apoptosis repeat-containing 5 (BIRC5) are associated with poor prognosis in multiple cancers and show therapy-resistant characteristics. Sp1 regulates key genes associated with cancer including BIRC5. This study elucidates the expression of Sp1 and BIRC5 in ovarian adenocarcinoma patients based on tumor grade using online database. Analyses were also done to compare the association of Sp1 expression with the survival rates among Caucasians, African Americans and Asians.

Methods: We used R2 genomics visualization platform to create survival curves for patients with ovarian adenocarcinoma with low and high expression of Sp1 or BIRC5. The Cancer Genome Atlas (TCGA) information was used to determine the association between the expression of selected markers (Sp1 and BIRC5) and tumor grade. TCGA samples were also used to determine survival curves for patients with ovarian adenocarcinoma of differing races to find an association with survival probability and race.

Results: Tumor grades 2 and 3 showed an increase in Sp1 and BIRC5 transcripts. The survival probability showed Caucasian patients with ovarian adenocarcinoma expressing either high or low levels of Sp1 had a significantly better prognosis compared to Asian and African American patients with either higher or lower levels of Sp1 expression. African American patients with either high or low levels of Sp1 were found to have a significant decrease in overall survival probability compared to Caucasian patients who had high or low levels of Sp1 expression. Asian patients with higher levels of Sp1 expression had the lowest survival probability out of all ethnic groups. Asian and African American patients’ survival probability declined faster than Caucasian patients when Sp1 expression levels were high.

Conclusion: Sp1 and BIRC5 both impact the prognosis of patients similarly by increasing tumor grade. Prognosis of patients with ovarian adenocarcinoma is effected by race. The survival probability of patients with high and low expression of Sp1 varies from different ethnic groups, as does the rate at which survival probability decreases. We are interested in continuing to explore the effects race has on Sp1 expression, and other factors such as age that can effect ovarian adenocarcinoma prognosis.

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INVESTIGATE SURVIVIN AS A MARKER OF BREAST CANCER DISPARITY

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Despite all the advances made, resulting in improved overall breast cancer survival, health disparity in treatment and outcomes continues to exist. The overall breast cancer incidence is higher in white women compared to black, however mortality remains significantly higher among black women. Also, black women tend to be diagnosed with breast cancer at an earlier age, have more advanced cancer such as TNBC, and have poor prognosis and survival rates compared to white women for the same type of cancer. Factors such as socioeconomic status, access to health care, and education fail to fully explain this health disparity. Understanding the role of biological factors behind the existence of this disparity may provide opportunities for novel strategies targeting these factors to improve diagnosis and prognosis that benefit this vulnerable population. In this study our aim is to correlate the expression of Survivin in breast cancer with race or ethnicity. Survivin is an anti-apoptotic protein that belongs to the inhibitor of apoptosis protein (IAP) family. It is expressed in cancer cells but not in normal cells and its expression is associated with poor prognosis and resistance to therapy. In the first part of the project, Survivin expression in breast cancer cell lines and tumor tissue from patients representing black and white women, will be analyzed. The second part involves analysis of genomic databases (e.g. TCGA) to correlate Survivin expression with race and with various clinical parameters. The long term goal of this project is to use Survivin in diagnostic and therapeutic strategies.

Keywords: Breast cancer, Disparity, Survivin
COMPARATIVE MICROBIOME ANALYSIS OF BREAST CANCER IN BLACK NON-HISPANIC AND WHITE NON-HISPANIC WOMEN

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A higher level of Breast Cancer Disparity with an especially aggressive subtype, Triple Negative Breast Cancer (TNBC) is more prevalent than Triple Positive Breast Cancer (TPBC) among black non-Hispanic women as compared to white non-Hispanic women. White non-Hispanic women exhibit disparity in TNBC subclass of breast cancer as shown by higher level of mortality, early age of onset and late diagnosis than white non-Hispanics women. Studies have shown that the breast milk and breast tissue microbiota may have a major influence respectively on breast carcinogenesis and establishment of infant gut microbiota and health status during adult life. Additional studies have also shown that taxon differences between breast tumor vs healthy tissue; gut microbiome between different racial/ethnic groups. These studies provide a strong premise for microbiome analysis in breast cancer health disparity. To achieve this goal, we performed microbiome analysis in retrospective frozen breast cancer and healthy tissues using 16S rRNA V3-V4 amplicon sequencing strategy. Two distinct breast tumor subtypes were included in the study, namely, TNBC and TPBC class. The data was analyzed for composition, abundance and microbiota diversity parameters, alpha diversity and beta diversity. Total 20 bacterial phyla and 435 genera were observed residing in the breast tissue of cancer patients. Across all the breast tissues samples, the most dominant bacterial population was Proteobacteria (60.5% ± 18.7%), followed by Actinobacteria (18.3% ± 11.8%), Firmicutes (17.3% ± 16.2%), and Bacteroidetes (2.0% ± 2.7%). The preliminary microbiome analysis revealed that the alpha diversity matrices measuring either richness (ACE or Chao1) alone or both richness and evenness (Shannon index) of microbiota of TNBC class showed difference in microbial diversity between healthy breast tissue and the matched tumor breast tissue in both BNH and WNH women. The microbiota richness in BNH women TNBC tumor tissue was lower as compared to its matched healthy breast tissue. In contrast, the microbiota richness in WNH TNBC tumor tissue is higher as compared to its matched healthy breast tissue. The multivariate analysis of beta diversity revealed a distinct clustering of BNH vs WNH in both TNBC tumor tissue and in normal tissue adjacent to tumor (NAT). Conclusion: These results have demonstrated that the black non-Hispanic and white non-Hispanic racial groups exhibit differences in the abundance of microbial supergroups, at the phylum level and distinct alpha and beta microbial diversity patterns in normal and tumor breast tissue. Keywords: Breast cancer, Racial Health Disparity, Microbiome
HEALTH DISPARITIES IN LIGHT OF SOCIAL AND SPATIAL JUSTICE: THE CASE OF THE HEART DISEASE AND STROKE EPIDEMIC IN CHINA

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The study examines disparities in heart diseases and stroke mortality in China and causes of such disparities and the rising epidemic in the framework of social and spatial justice. Data from 2002 to 2016 were from Health Statistical Yearbooks of China and China Reports on Cardiovascular Diseases. All-age heart disease and stroke mortality tend to increase in recent years, particularly among rural residents, leading to increased rural-urban disparities. In particular, rural men 20 to 24 years old were over 56% more likely to die from heart diseases and twice likely to die from stroke than their urban counterparts in 2014–2016. Rural-urban health disparities are larger for young men in China than in the US. In addition, Chinese rural men tended to be over many times more likely to die from stroke than their American counterparts. In addition, ethnic minorities and populations in less-developed regions suffered more. These disparities were caused by many factors such as behavioral risks and genetics. However, the study takes a social and spatial justice approach. It proposes a social justice model that illustrates interactions among multiple attributes. A proposed definition and spatial justice model emphasizes interactions among place/location, process, and unfair distribution of resources, opportunities, and health disparities. From this perspective, health disparities were caused by unfair distribution of resources and opportunities, which were caused by the unfair development policies that prioritize economic growth and urban development over environmental health and rural and minority well being.

Keywords: health disparities, social justice, spatial justice
Background. Only a small amount of the genetic factors for Alzheimer’s disease (AD) risk have been identified. APOE allele e4 carries the largest known genetic contribution in non-Hispanic white population; but surprisingly, APOE effects are less-pronounced in certain admixed populations even though the disease is more common and/or severe. In admixed populations, mitochondrial genetics (mtDNA) may be contributing to the heritability. Mitonuclear incompatibility, MNI, is when the ancestral state of mtDNA is discordant with the majority of the nuclear DNA. MNI is a source of significant evolutionary pressure in some animal populations, and evidence for this phenomenon in humans (Zaidi and Makova, 2019) which begs the question—is MNI relevant in human disease? Hypothesis. We hypothesize that cognitive impairment will be more prevalent in the subset of Mexican Americans who have MNI. Methods. The Texas Alzheimer’s Research and Care Consortium is a state-wide research initiative who aims to provide resources for better understanding age-related cognitive deficits, including AD, in Mexican Americans. Genome-wide SNP profiles from TARCC were analyzed in conjunction with data from the Human Genome Diversity Project (ancestral reference data.) Admixture software (Alexander et al., 2009) and HaploGrep (Weissensteiner et al., 2016) were used to ascertain nuclear and mitochondrial ancestry. MNI was identified, quantified, and tested for association with cognition. Results. We report three main findings: (1) cognitive impairment are more prevalent in MNI groups, (2) the degree of MNI is increased in subjects with cognitive impairment, and (3) MNI risk is greater in females than males.

Keywords: Alzheimer's disease, mitochondrial DNA, admixture
The purpose of this study is to examine an association between feelings of depression and marijuana use amongst high school students in the United States. Data were analyzed based on the Youth Risk Behavior Surveillance System (YRBS), 2017. SAS 9.4 was used to apply survey weighting procedures to the bivariate and logistic regression models as well as to calculate univariate and bivariate descriptive statistics, and crude and adjusted odds ratios for the outcome, exposure, and covariates (n=13,916). Outcome was measured as “During the past 12 months, did you ever feel so sad or hopeless almost every day for two weeks or more in a row that you stopped doing some usual activities” and operationalized by yes/no. Exposure was measured by “during your life, how many times have you used marijuana” and operationalized as no if zero and yes if any other number. Students who had feelings of depression were more likely to have ever used marijuana (49.1%) than those who did not have feelings of depression (29.4%). Also, females were more likely to have experienced feelings of depression when compared to males, 67.2% and 32.8% respectively. High school students who ever tried marijuana had 2.46(95% CI:2.15-2.82) times the odds of feeling depressed compared to those who had never tried marijuana. Female students had 2.73(95% CI:2.37-3.13) times the odds of feeling depressed compared to male students. Black or African American, 0.83(95% CI:0.69-0.99), and 15 year old, 0.78(95% CI:0.64-0.96), students had less odds than whites and those 17 years and older respectively. This study revealed that students who had feelings of depression were more likely to have ever used marijuana compared to students that did not. Race and age were protective factors for depression. Female students had almost three times the odds of feeling depressed than males. Results can inform future research surrounding attitudes of marijuana use among high school students with feelings of depression in order to prevent or delay marijuana use in this population.

Keywords: adolescents, substance abuse, mental health
Tuberculosis is a disease caused by Mycobacterium tuberculosis that adds significant morbidity and mortality to populations already stressed with a high burden of disease, such as prisoners, indigent, and HIV-risk communities. Prisons have a well-documented incidence of TB, and prisoners are at high risk for TB due to drug use, low SES, and greater prevalence of HIV. Correctional facilities inherently contribute to the spread of TB due to cramped quarters, overcrowding, inadequate sanitation, and poor ventilation. In this review, we examine the state’s policies for TB within prisons, along with its current scope. Within Texas, the state prison system has the highest incarceration rate in the U.S. Additionally, the general state population has a TB case rate higher than the national average. A majority of prison units at the state level lack air conditioning, in contrast to local and county jails. Facilities for isolation are either nonexistent or inadequate, requiring outpatient hospitalization. Prisons, even those with relatively high populations, lack trained healthcare professionals for early diagnosis and treatment. Risk factors specific to Texas are multifactorial: those born out-of-country (border states of Mexico, Central American nations) are at higher risk, along with those in detainment by ICE. Statewide, homelessness continues to rise, which is a risk factor for TB and future incarceration. Efforts at preventing and treating TB include execution of legislature for air conditioning and decreasing overcrowding and guard shortages. Finally, a standardized directly observed treatment program (TB-DOT) would be a novel approach to control the disease within prison walls.

Keywords: tuberculosis, prison, HIV
TRENDS IN MAGNESIUM INTAKE OF HISPANIC ADULTS, NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY (NHANES) 1999 – 2014

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Magnesium is an essential mineral that plays important roles in hundreds of physiologic activities, however, magnesium intake has been historically low in Americans. Hispanics as the rapidly growing population, it is critical to investigate the potential nutritional problem in this population. The purpose of this study is to examine trends of magnesium intake from foods and total magnesium intake among U.S. Hispanic adults. Data on 9,690 Hispanic adults aged ≥20 years from eight National Health and Nutrition Examination Surveys (NHANES) cycles (1999-2014) were included in this study. For each cycle, survey-weight, energy-adjusted average dietary and total magnesium intakes were estimated. The prevalence of dietary and total magnesium intake below the Recommended Dietary Allowance (RDA) were estimated limiting to cycles 2003-2014 using the National Cancer Institute (NCI) method. Survey linear procedure was used to test trends. We found that both dietary and total magnesium intake increased significantly among Hispanic adults between 1999-2000 and 2013-2014. Magnesium intake tended to be lower among women, other Hispanics, adults with lower education level, lower family income, or aged ≥ 65 years. Approximately 70% of Hispanic adults had magnesium intake below the RDAs, and prevalence of insufficient magnesium intake for both dietary and total intake tended to be higher among Hispanic men than among women. Our results indicate mild improvements in magnesium consumption among U.S. Hispanic adults. However, the prevalence of magnesium inadequacy remained high, suggesting the necessary to improve magnesium intake in this population through appropriate public health educations on nutrition and supplementation.

Keywords: magnesium intake, Hispanic population adults, trends, gender
INVESTIGATING OXIDATIVE DAMAGE: IMPLICATIONS IN COGNITIVE AND METABOLIC PHENOTYPES OF ALZHEIMER'S DISEASE IN THE MEXICAN AMERICAN POPULATION

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As the elderly population expands, it is predicted that many age-related diseases, such as cardiovascular disease, metabolic disorders, cancer, and neurodegenerative diseases will burden the healthcare system. The Texas Alzheimer’s Research and Care Consortium (TARCC) is a collaborative research effort to identify factors in the development and progression of Alzheimer’s Disease (AD) in the Mexican American population compared to non-Hispanic whites, and to better understand the role of these factors. In the Mexican American population diabetes, depression, stroke, and obesity are common risk factors for developing cognitive impairment. The reasons for the association between cognitive decline and comorbidities remain unclear. Some studies have shown correlation between common pathological changes that are observed in AD and those that are a result of DNA damage. The mitochondrial genome specifically is particularly vulnerable to DNA damage. Age-associated decrease in mitochondrial function results in accumulation of reactive oxygen species which are capable of damaging DNA and other vital biomolecules. Oxidative damage to DNA takes many forms, but oxidation of guanine (G) to 8-oxoG is one of the most prevalent lesions. Currently, the methods for detection of 8-oxoG are limited and lack reproducibility. We propose nanopore sequencing technology as an improved alternative to the current methods. Here we describe preliminary proof of concept results and discuss the future application of this method for analysis of mtDNA damage in the TARCC cohort. We will investigate if oxidative DNA damage may be implicated in cognitive and metabolic phenotypes observed in Mexican Americans as compared to non-Hispanic whites.

Keywords: Alzheimer’s Disease, mtDNA damage, sequencing
GENOME-WIDE STUDY HIGHLIGHTS NOVEL GENES ASSOCIATED WITH ALZHEIMER’S-HYPERTENSION COMORBIDITY SHOWING UTILITY OVER CSF BIOMARKERS

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Age-related comorbidity is common and significantly increases the burden for healthcare of the elderly. Alzheimer’s disease (AD) – a type of dementia – and hypertension are the two most prevalent age-related conditions and are highly comorbid. While hypertension is a risk factor for vascular dementia (VaD) – a distinct subtype of dementia – the presence of hypertension with AD (AD+Hyp+) is often characterized as probable vascular dementia. In the absence of imaging and other diagnostic tests, differentiating the two pathological states is difficult. Our goals are to (1) identify differences in vascular dementia profiles, if any, between individuals who have AD only (AD+Hyp-), and individuals with AD+Hyp+ using CSF levels of amyloid β, tau and p-tau, and (2) compare genome-wide DNA profiles of AD+Hyp- and AD+Hyp+ with an unaffected control population. We hypothesize that genetic variants underlying AD+Hyp+ comorbidity pattern will be different than variants associated with VaD, AD, or hypertension independently. Genotype and clinical data from the Alzheimer’s Disease Neuroimaging Initiative (ADNI) were used to conduct comorbidity analyses comparing healthy controls to AD+/Hyp- vs AD+/Hyp+. We compared the CSF biomarkers in three cohorts using one-way ANOVA. We then evaluated genome-wide profiles in three groups and mapped SNPs to genes based on position and lowest p-value. The significant genes are further examined for co-expression patterns and known disease networks. Through this exploratory study using a novel cohort stratification design, we highlight the genetic differences in clinically similar phenotypes, indicating the utility of genetic profiling in aiding differential diagnosis of AD+Hyp+ and VaD.

Keywords: Hypertension, Alzheimer, Vascular
PRIVATE SECTOR OPPORTUNITIES TO MITIGATE DISPARITIES IN TUBERCULOSIS RISK AMONG FOREIGN-BORN INDIVIDUALS IN THE US: DATA FROM THE 2011-2012 NATIONAL HEALTH AND NUTRITION EXAMINATION SURVEY.

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Background: Over two-thirds of active tuberculosis (TB) cases in the US occur among foreign-born persons, yet there are disparities in how well domestic TB elimination strategies have addressed TB risk in foreign-born versus US-born individuals. With 90% of incident active TB cases among foreign-born persons stemming from reactivation of latent TB infections (LTBI), there is a need to increase targeted LTBI testing and treatment in this population. If LTBI-positive foreign-born persons have access to and use health insurance and private sector healthcare it may be feasible to conduct LTBI-related preventive care services in that setting. Aims: (1) Estimate LTBI prevalence among foreign-born individuals by health insurance status and usual source of healthcare (USHC); and (2) examine insurance coverage and USHC among foreign-born persons with LTBI. Methods: We analyzed 2011-12 National Health and Nutrition Examination Survey (NHANES) data for civilian, noninstitutionalized, foreign-born persons ages 6 years or older with interferon gamma release assay (IGRA) results and self-reported insurance and USHC data (N=1,793). Results: Overall, 15.9% of our sample were LTBI-positive per IGRA results. Of these, almost two-thirds had some form of insurance and over three-quarters had a USHC. While LTBI prevalence was highest among Medicare beneficiaries, many had private insurance. Conclusion: Both health insurance and USHC were common within LTBI-positive foreign-born individuals residing in the US. Our results suggest that targeted LTBI-related care within the US private healthcare sector could reach the majority of foreign-born persons with LTBI and thus reduce disparities in TB risk.

Keywords: LTBI, health disparities, foreign-born
DEMOGRAPHICAL AND SEX-BASED DIFFERENCES IN MAXILLARY SINUS ANATOMY: IMPLICATIONS ON HEALTH DISPARITIES IN SINUSITIS

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Over 30 million people are diagnosed with sinusitis annually, yet potential anatomical etiologies behind sinus infections remain poorly understood. However, previous research suggests regional/ancestral differences in maxillary sinus (MS) anatomy may contribute to sinusitis susceptibility. The purpose of this study was to examine overall MS size and shape, and MS ostium positioning, among three different ancestral groups to assess potential impacts on drainage and infection risks. Employing CT scans (n=151) of crania from European, East Asian, and African ancestries, we collected 93 3D coordinate landmarks per specimen from which 34 linear measurements of MS and surrounding facial features were calculated. ANOVA and Tukey-Kramer test results indicate that individuals of Asian ancestry have significantly taller maximum MS heights compared to that of Europeans and Africans (F=14.5; p<0.0001), suggesting greater distance from the ostium. Additionally, males in all three populations had consistently deeper MS than their female counterparts, with Asians (p=0.004) and Europeans (p=0.017) attaining statistical significance. Our results suggest that compared to those of European and African ancestries, those of Asian ancestry might be at a greater risk for chronic sinusitis due to the lower MS floor leading to increased pressure on the mucociliary system to drain the sinus. For similar reasons, across all populations, males may be more predisposed to recurrent MS infections than their female counterparts. Additional research into the prevalence of MS sinusitis in these populations and potential sex-based differences are warranted to evaluate possible contributions to health disparities.

Keywords: maxillary sinus, anatomy, infection
LESSONS LEARNED: IMPLEMENTING TECHNOLOGY ENHANCED SCREENING AND SUPPORTIVE ASSISTANCE, AN INTEGRATED INTERPERSONAL VIOLENCE SCREENING INTERVENTION

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Purpose: Interpersonal violence (IPV) is a public health issue that disproportionately affects women. IPV screening improves likelihood of survivor disclosure and access to additional support. To enhance primary care IPV screening, Technology Enhanced Scr[311x431]eening and Supportive Assistance (TESSA) uses integrated technological systems to deliver bi-directional, evidence-based IPV, health, and safety interventions. This study evaluates TESSA implementation using the Consolidated Framework for Implementation Research (CFIR). Methods: CFIR is a meta-theoretical framework used for evaluating clinical intervention implementation. The research team and content experts identified pertinent constructs within CFIR’s five domains (intervention characteristics, outer setting, inner setting, characteristics of individuals, and process). Of the 36 constructs, 23 constructs were selected, and pertinent implementation details were examined. Results: Key lessons learned included intervention characteristics constructs like intervention source (e.g., selecting tablets that can screen for items integral to the program’s aims) and adaptability (e.g., ensuring tablets worked with electronic medical records for each clinic); process constructs like engaging champions (e.g., garnering buy-in from key clinic stakeholders and staff); outer setting constructs like patient needs and resources (e.g., addressing pertinent patient resource needs) and external policies and incentives (e.g., incentivizing clinics by addressing clinic needs); and inner setting constructs like leadership engagement (e.g., ensuring buy-in from organizational leaders as leadership changed frequently). Conclusions: Using a framework like CFIR to identify TESSA implementation successes and other implementation areas for improvement can improve primary care IPV screening buy-in and feasibility. Overall, TESSA’s successful and continually improving implementation enhances access to resources for this vulnerable and hard-to-reach population.

Keywords: interpersonal violence, implementation, lessons learned
IMAGING VISCOSITY OF INTRAGRANULAR MUCIN MATRIX IN CYSTIC FIBROSIS CELLS

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Objective: Cystic fibrosis (CF) is a genetic disease which causes mucus to be abnormally thick and viscous. The thick mucus harbors bacteria and particulates and is unable to be cleared by the mucociliary system resulting in respiratory disease. Understanding mucus pathology is critical to understanding and treating diseases like CF. While many factors that influence CF mucus to be unusually thick are known, the question remains if there are differences in the viscosity of the mucus before secretion. Before being secreted, mucus exists as granules in the cell known as mucin. In this work, we examine the viscosity of intracellular mucin of human bronchial epithelial cells with and without cystic fibrosis.

Methods: We use a simple fluorescent phenyl-BODIPY rotor molecule which is readily uptaken into mucin granules and exhibits dramatic changes in its fluorescent lifetime as a function of its environments viscosity. To measure the distribution of viscosities in intracellular mucin, we use time-resolved fluorescent microscopy to image the non-CF and CF cells and measure the fluorescent lifetime of the probe in intracellular mucin. We employ a machine learning algorithm to analyze the pictures and use a combination of Python and ImageJ to compute the size and viscosity distribution of intracellular mucin granules.

Results: Our results show that our molecular rotor is readily uptaken into mucin granules of human epithelial cells. The changes in fluorescent lifetime are substantial enough to determine the apparent viscosity distribution of intracellular mucin granules. The non-CF cells have a single normally distributed peak in the viscosity distribution centered at 560 cP. The CF cells have a bimodal distribution with a peak at 560 cP and an additional peak at 210 cP. The origin and implications this second low viscosity group of mucin granules in is unclear but may provide biophysical insight into CF mucus pathology.

Conclusion: Our phenyl-BODIPY molecular rotor in combination with fluorescent lifetime imaging microscopy is a promising method to study the intracellular viscosity distribution of cells. Our results suggest that there is a distinct difference in the viscosity of mucin granules in non-CF cells versus CF cells. We believe our work will provide a new tool for investigators to study intracellular mucin and examine a variety of mucus related diseases.

Keywords: Cystic fibrosis, Mucus Viscosity, FLIM
T-CELLS IMPACT ASTROCYTES FUNCTION

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Purpose: Post-ischemic stroke, T-lymphocytes infiltrate the brain and co-localize with astrocytes in the peri-infarct region. This provides rationale to investigate the impact of T-cells on astrocytes' functions. We hypothesize that T-cells interact directly with astrocytes triggering astrocytes to differentiate into a more anti-inflammatory (A2) phenotype. Materials and Methods: C8-S murine astrocyte type II clone cell line (ATCC® CRL-2535™), and T-cells extracted from the spleens of 3-month-old C57/B6 female mice were placed in co-culture at a 1:1 for 19, 48, 67, and 72 hours and compared to individual cell cultures. Anti-CTLA-4 antibodies were added to each culture condition as another experimental group. Astrocytes and T-cells were collected separately for QT-PCR analysis. Summary of Results: IL-10 gene expression was elevated in astrocytes and T-cells individually harvested from 1:1 co-cultures compared to astrocytes and T-cells alone at 48 and 72 hours respectively. IL-10 was produced primarily by T-cells stimulated by direct contact with astrocytes. Anti-CTLA-4 antibodies blocked the direct cell-to-cell interaction by reducing IL-10 gene expression in both astrocytes and T-cells. Conclusion: Our data suggests that in co-cultures, astrocytes directly interact with T-cells increasing their IL-10 gene expression by 72 h., implying a neuroprotective mechanism exists via astrocyte stimulation of T-cell IL-10 production.

Keywords: T-cells, Astrocytes, IL-10
SEX DIFFERENCES IN RESPONSE TO VARIOUS ACUTE STRESSORS IN MICE

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Studies have shown pre-menopausal females are protected against hypertensive and sympatho-excitatory effects of stress. Our goal was to identify whether sex difference exists between male and female mice in response to various acute stressors. Adult male (n=7) and female (n=7) C57BL/6J mice underwent telemetry implantation surgery and allowed 1-week recovery. Mice were exposed to 1 of 5 acute stressors and allowed 1-2 days of recovery between stressors. Briefly, acute restraint: mouse placed in conical tube (30min); hypoxia: mouse exposed to 8% O2 (20min); new cage: mouse placed in empty cage (30min); cold: mouse exposed to 1-4C (30min); forced swim: mouse placed in water-filled beaker (10 min). Mean arterial pressure (MAP), heart rate (HR), and activity were recorded and 2-way repeated measures ANOVA followed by Holm-Sidak was performed. Acute restraint: male mice responded with peak MAP of 135±4, whereas female mice responded with peak MAP of 131±2. Hypoxia: male mice responded with peak MAP of 122±4 and peak HR of 780±6, whereas female mice responded with peak MAP of 131±1 and peak HR of 784±18. Forced swim: male mice responded with peak MAP of 136±5, whereas female mice responded with peak MAP of 134±5. Certain acute stressors induced pressor response while others induced depressor response. No significant sex difference was observed in MAP response to the acute stressors, however there was a trend for sex difference in HR during hypoxia stress. This study needs to be repeated in lights-off phase when stress hormone concentration peaks before further conclusions can be made.

Keywords: sex differences, stress, hypertension
AN ESTROGENIC COMPOUND EXHIBITS ANTIDEPRESSANT-LIKE EFFECT IN MICE

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We have showed that an estrogenic test compound produced a dose-dependent antidepressant-like effect in PST, and this effect was completely reversible by the co-administration of an estrogen antagonist, implicating that the genomic effect of the estrogenic compound played a pivotal role in the observed CNS effect. At the same time, we also showed that the uterus of animals receiving the estrogenic test compound became very large due to fluid imbibition, which is a typical detrimental peripheral side-effect of estrogens exogenously administered for the purpose of neurotherapy. In the future, drug content in the brain and blood of the experimental animals will be determined and correlated with the obtained neuropharmacological effect.

Keywords: Estrogenic, Behavioral, Porsolt Swim Test
TRANSFORMING GROWTH FACTOR BETA-2 AND TOLL-LIKE RECEPTOR 4 CROSSTALK IN THE TRABECULAR MESHWORK

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Purpose: Elevated intraocular pressure (IOP) is the major risk factor for the development and progression of primary open angle glaucoma (POAG) and is due to trabecular meshwork (TM) damage leading to impaired aqueous humor outflow. Here, we explore a novel molecular mechanism involved in glaucomatous TM damage development. Recently, we identified TGFβ2 and toll-like receptor 4 (TLR4) signaling crosstalk regulates changes in the TM ECM and mutation in Tlr4 rescues TGFβ2-induced ocular hypertension in mice. Here, we investigated the role of an endogenous TLR4 ligand, FN-EDA, and TLR4 downstream signaling molecule, NFκB, in TGFβ2-induced ocular hypertension in mice.

Methods: C57BL/6J and mutated TLR4 and/or FN-EDA mice were intravitreally injected with 2.0μL Ad5.TGFβ2 (2.5x10^7pfu) in one eye and the contralateral uninjected eye was the control. Likewise, we tested mice lacking p50 subunit of NFκB (B6.Cg-NFκB1tm1Bal/J) and C57BL/6J mice. IOP was measured once per week using a TonoLab rebound tonometer on isoflurane-anesthetized mice. Significance determined by one-way ANOVA. Immunohistochemistry technique used to access total fibronectin and FN-EDA isoform expression.

Results: Ad5.TGFβ2 significantly induced ocular hypertension in C57BL/6J. Spontaneous ocular hypertension was developed and Ad5.TGF 2 further elevated IOP in B6.FN-EDA+/. Mutations in Tlr4, FN-EDA, and NFκB blocked Ad5.TGFβ-induced ocular hypertension. Total FN and FN-EDA isoform expression increased in Ad5.TGF 2 injected C57BL/6J and B6.FN-EDA+/+ mice and uninjected B6.FN-EDA+/+ mice.

Conclusions: TLR4, FN-EDA and NFκB are necessary for TGFβ2 to induce ocular hypertension and ECM deposition in mice. B6.FN-EDA+/+ mice spontaneously develop ocular hypertension. These data provide new targets to lower IOP and inhibit the glaucoma disease process.
CALORIC RESTRICTION ATTENUATES MOTOR FUNCTION DECLINE IN RATS: EVIDENCE FROM AN ADVANCED MIDDLE-AGED COHORT


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Up to 50% of the elderly may suffer from locomotor impairments similar to those in Parkinson’s disease. These impairments greatly compromise the ability to perform daily life activities, leading to loss of independent living, frailty, and mortality. Engagement of lifestyle strategies in middle or advanced middle age could prove beneficial to reduce risk of aging-related parkinsonism. We previously reported that initiation of caloric restriction (CR) in middle-aged rats can reduce aging-related parkinsonism. We therefore sought to determine if CR could still mitigate aging-related parkinsonism when initiated well into the latter half of the rat lifespan which would also answer whether there is an aging-related limit of CR efficacy. 18-month old male Brown-Norway/Fischer rats maintained on a lifelong ad libitum (AL) diet were grouped into CR and AL groups. CR was gradually introduced with a 30% restriction being achieved 3 weeks after study initiation. This was maintained for 6 months with open-field locomotor assessments conducted every 6 weeks. A significant and sustained motor function decline was observed in the AL group from 12 weeks after study initiation. CR, however, prevented this aging-related decline, with increased movement frequency in the CR group compared to the AL group at study completion. CR initiated in advanced middle-aged rats leads to a preservation of motor function suggesting that there may be no aging-related limit of CR to preserve motor performance. Identifying the molecular mechanisms can reveal targets for pharmacological or genetic approaches to mitigate motor impairment in individuals where CR would be contraindicated. Keywords: Neuroscience, caloric restriction, healthy aging, motor function

Keywords: Neuroscience, healthy aging, caloric restriction, motor function
PLASMA BIOMARKERS AS INDICATORS FOR NEUROCOGNITIVE IMPAIRMENT IN HIV+ INDIVIDUALS

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Chronic inflammation in HIV patients correlates with the severity of HIV-associated neurocognitive disorders (HAND), suggesting that inflammatory mediators could be indicators for the progression of HIV-associated neurocognitive impairment. The current clinical evaluations for HAND are designed for diagnosis after the onset of the disorder, limiting avenues for intervention. Therefore, there is a need for prognostic biomarkers to determine the likelihood for HAND development. We hypothesize that inflammatory factors from blood plasma and peripheral blood mononuclear cell (PBMC) can serve as prognostic markers of HIV-associated neurocognitive impairment and these associations may be dependent upon race and sex. Performance in seven neurocognitive domains was measured in 121 HIV+ male and female African, Caucasian and Hispanic Americans using CNS Vital Signs computerized tests. Inflammatory factors were measured in participant plasma and PBMCs and association to neurocognitive tests were identified by a multivariate multiple linear regression model. Here, we demonstrate that higher plasma levels of monocyte chemoattractant protein 2 and tissue inhibitor of metalloproteinases 1 significantly associate with lower neurocognitive scores in all domains tested except reaction time. In addition, higher plasma levels of chemokine c-c ligand 17, interleukin (IL) 10, and IL-23 significantly associate with lower neurocognitive scores in processing speed and executive functioning. Further studies to characterize these markers in PBMCs and as predictors of HAND are being conducted.

Keywords: Inflammation, CNS vital signs, HIV-associated neurocognitive disorders
Neutrophils and monocytes are phagocytic cells that have previously been shown to be important for host protection during infection with the intracellular bacteria, Listeria monocytogenes. Previous studies have shown that simultaneous depletion of neutrophils and monocytes with the Gr-1 antibody leads to susceptibility to Listeria infection. However, the literature is divided on the necessity of neutrophils for host protection during infection. The purpose of these studies is to delineate differences in function between neutrophils and monocytes during intracellular bacterial infection. The mean fluorescence intensity (MFI), obtained with a flow cytometer, of the antibody against Listeria was measured as a determinant of the total bacteria phagocytosed by the cells. It was observed that neutrophils obtained from the bone marrow, liver and spleen of C57Bl/6 mice were more effective at phagocytosis of Listeria in comparison to monocytes as they had a higher total bacteria MFI than the monocytes. To determine differences in the ability of the cells to keep bacteria contained in the phagosome, the cells were infected with a strain of Listeria that only expresses GFP when the bacteria escapes out of the phagosome into the cytosol. Comparison of the MFI of total bacteria present vs escaped bacteria showed that monocytes from the bone marrow, liver and spleen of mice phagocytosed less bacteria and allowed for more bacteria to escape in comparison to neutrophils. Therefore, monocytes are less effective at bacterial containment in comparison to neutrophils. Additionally, measurement of intracellular cytokines, TNF- and IL-1 show that a higher percentage of monocytes produce these cytokines in response to Listeria infection. To ascertain differences in killing ability, bone marrow neutrophils and monocytes were sorted for a killing assay and neutrophils were also observed to be more effective than monocytes at bacterial killing. However, there were no differences in ROS production between neutrophils and monocytes. In conclusion, although both neutrophils and monocytes are capable of performing the above measured functions, neutrophils are primarily important for phagocytosis, phagosomal containment and killing whilst monocytes are more effective at cytokine production.
DIFFERENTIAL EFFECTS OF YOUNG AND OLD SERUM EXOSOMES ON ISCHEMIC STROKE OUTCOMES IN AGED RATS

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Background: Aging is associated with striking increases in the incidences of stroke and neurodegenerative diseases, both of which are major causes of disability among aged people in the United States. Despite progress in understanding molecular mechanisms of neuronal cell death after stroke, effective treatment remains elusive. Recent studies showed that systemic factors in the blood can profoundly reverse aging-related impairments. However, the underlying mechanism remain unclear. Exosomes are extra-cellular microvesicles that play important roles in intercellular signaling and in regulating various physiological and pathological conditions. Here, we explore the role of young and old serum-derived exosomes on ischemic outcome in aged rats. Method: The exosomes were isolated from serum of young or old rats, and then were intravenously injected into aged ischemic rats via tail, respectively. Infarct volume was determined with triphenyltetrazolium chloride (TTC) staining and motor function was assessed with neurobehavioral tests including running ladder and cylinder tests. To elucidate the potential mechanism underlying the functional improvement or deterioration, neuroplasticity was examined using Golgi-Cox staining. Results: We found that ischemic rats reduced infarct volume and improved motor functional deficits after injection of young exosomes, while have opposite results for old exosomes. Moreover, neuroplasticity was significantly increased after injection of young exosomes, while decreased after injection of old exosomes. Conclusion: Our data suggest that young and old serum exosomes differentially affect functional outcome in aged ischemia rats, which potentially be translated into novel therapeutic intervention by minimizing of detrimental molecules and enhancing the beneficial contributions to repair the damaged brain.

Keywords: Ischemia stroke, exosomes, neuroplasticity
MAPPING THE BINDING SITE MEDIATING CARISOPRODOL DIRECT ACTIVATION IN GABAA RECEPTORS

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Carisoprodol (CSP) is a centrally-acting prescription muscle relaxant that can directly activate and allosterically modulate the GABAA receptor. GABAA receptors are the target of many different clinically prescribed compounds because of the role they play in regulating the central nervous system. Our previous studies have shown that CSP differentially potentiates GABAA receptor subtypes via allosteric modulation and direct activation. It has been reported that a single amino acid residue, L415, located at the top of the fourth transmembrane domain (TM4) in the 1-subunit of the GABAA receptor is critical to CSP’s direct gating effect. Whether the residue is involved in CSP binding remains unsolved. The purpose of the present study is to explore the binding site mediating CSP’s direct action with in-silico docking, site-directed mutagenesis and whole-cell electrophysiology. Initial in-silico docking of CSP at the GABAA receptor suggested that the CSP binding pocket may be formed by residues from the TM4, pre-TM1 and cys-loop regions of the 1-subunit. In whole-cell electrophysiology studies performed on HEK-293 cells either stably or transiently expressing different GABAA receptor subtypes, specific modifications of CSP’s molecular structure produced greater direct action on GABAA receptors. Furthermore, the ability of CSP and its analogs to open the channels aligned with in-silico docking at the interest region in the GABAA receptors. The role of the residues predicted as a CSP binding site in in-silico docking analysis are being verified with mutagenesis and patch clamp studies.

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BRAIN-TARGETING PRODRUG DESIGN FOR THYROTROPIN RELEASING HORMONE

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Thyrotropin releasing hormone (TRH) has many neuromodulatory effects throughout the brain, however, treatment using this peptide induces unwanted peripheral side-effects. Based on our novel prodrug design that synergistically employs lipoamino acid residues (LAAs) and a brain-enzyme sensitive linker for prolyl oligopeptidase (POP), we have developed a set of lead compounds in silico. Prodrugs with different LAAs and POP-sensitive linkers were designed in silico for docking with POP’s binding site and to calculate their logP (clogP). Computational assessments of lipophilicity and POP-binding affinity of our virtual prodrugs led to the selection of a representative prodrug, termed Prodrug (1), for synthesis and in vitro membrane affinity studies to predict brain access from circulation. Prodrug (1) was compared to TRH in membrane affinity using immobilized artificial membrane chromatography (IAMC). IAMC is an established method to predict membrane affinity, such as blood-brain barrier (BBB) permeability, using chromatographic columns comprised of immobilized synthetic lipids that mimic biological membranes. Prodrug (1), showed a significantly increased membrane affinity characterized by its IAM Chromatographic Hydrophobicity Index (CHIIAM) value, as compared to that of the highly hydrophilic parent peptide, TRH. Overall, based on the predicted excellent binding of Prodrug (1) to POP’s binding site and favorable membrane affinity, we expect that this prodrug will be able to efficiently deliver TRH into the brain, and also serve as a template for fine-tuning our prodrug constructs for efficacious brain delivery of this neuropeptide.

Keywords: Prodrug, Thyrotropin-releasing hormone (TRH), Drug-delivery
A ROBUST MODEL FOR A SUSTAINABLE DIVERSE HEALTHCARE COMMUNITY

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The Center for Diversity and International Program’s (CDIP) objectives are to broaden partnerships (local, national and international), unify institutional pipeline programs, innovate education and training, and lead diverse constituencies to opportunities in biomedical/behavioral science research and Health Professional career paths.

Keywords: Diversity, Healthcare, Community, Professional Development, Training

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