<table>
<thead>
<tr>
<th>Grant Funding Date(s)</th>
<th>NIH Award Number</th>
<th>Project End Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>not specified</td>
<td>R01AG085617</td>
<td>not specified</td>
</tr>
<tr>
<td>not specified</td>
<td>SU01DD023050</td>
<td>not specified</td>
</tr>
</tbody>
</table>

The broad, long-term goal of this proposal is to characterize soma-germline interactions during adult spermatogenesis. The proposal will utilize biochemical, site-directed mutagenesis in cultured cells and immunofluorescence, genetics, RNA interference, targeted protein degradation and rescue, immunofluorescence, biochemistry, tissue- and cell culture techniques, and genetic and molecular approaches to determine how soma-germline interactions occur during normal spermatogenesis, specifically in regards to spermatogonial stem cells and spermatid formation. The specific aims of this proposal are to: 1) determine how soma-germline interactions occur during spermatogonial stem cell proliferation and differentiation; 2) determine how soma-germline interactions occur during spermatid formation; 3) determine how soma-germline interactions occur during spermatid differentiation; 4) determine how soma-germline interactions occur during spermatid elongation; and 5) determine how soma-germline interactions occur during spermatid elongation and the formation of mature spermatozoa.

To achieve these specific aims, the investigator will utilize a combination of techniques, including biochemical approaches such as proteomic analysis and mass spectrometry, genetics approaches such as CRISPR/Cas9 genome editing and transgenic mouse models, and cellular and molecular approaches such as immunofluorescence and confocal microscopy. The investigator will also utilize in vivo assays such as transgenic mouse models and in vivo assays such as in vivo assays to test whether these interactions occur in vivo. The investigator will further test the significance of these interactions by using in vivo assays and assessing the impact of these interactions on spermatogonial stem cell proliferation and spermatid formation and differentiation.

The project will examine the impact of tax on sugar-sweetened beverages (SSB) on retail sales data from one of the largest fast-food retailers in the U.S. Taxes on SSBs are one of the most promising solutions to reduce population consumption of sugary beverages. SSB taxes have been associated with reduced purchasing and consumption of SSBs in settings such as supermarkets and other fast-food restaurants across the seven U.S. cities that have implemented them. However, fast-food restaurants also have a key advantage in that they are located in low-income neighborhoods and have a larger share of the adult population. The broad, long-term goal of this proposal is to characterize the impact of SSB taxes on retail sales data from one of the largest fast-food retailers in the U.S. and to assess the impact of SSB taxes on adult health outcomes.

This project will examine the impact of SSB taxes on retail sales data from one of the largest fast-food retailers in the U.S. The project will examine the impact of SSB taxes on retail sales data from one of the largest fast-food retailers in the U.S. and to assess the impact of SSB taxes on adult health outcomes.

The project will examine the impact of SSB taxes on retail sales data from one of the largest fast-food retailers in the U.S. The project will examine the impact of SSB taxes on retail sales data from one of the largest fast-food retailers in the U.S. and to assess the impact of SSB taxes on adult health outcomes.

The project will examine the impact of SSB taxes on retail sales data from one of the largest fast-food retailers in the U.S. The project will examine the impact of SSB taxes on retail sales data from one of the largest fast-food retailers in the U.S. and to assess the impact of SSB taxes on adult health outcomes.
In the United States, more than 200,000 patients are estimated to suffer from enteric hyperoxaluria (EH). EH affects patients with malabsorptive gastrointestinal diseases and is well-known to cause renal oxalate nephropathy. Therapies for EH are limited and only partially mitigate hyperoxaluria. Several gut bacteria can degrade oxalate and likely play an essential role in protecting against hyperoxaluria. The role that these outsider-degrading bacteria, called “autobacs,” play in the pathophysiology of EH has not been elucidated. We developed a novel computational method to the first time identify the abundance of bacteria that produce oxalate-degrading enzymes in the gut microbiota of patients. Our preliminary data indicate that the gut microbiota significantly contribute to oxalate degradation and that species differences exist among patients. Our long-term goal is to identify the gut microbiota and the metabolic pathways that contribute to oxalate degradation in patients with enteric hyperoxaluria. We will gain insights into the role of the gut microbiota in the regulation of oxalate metabolism and the potential therapeutic targets for EH.

In the United States, more than 200,000 patients are estimated to suffer from enteric hyperoxaluria (EH). EH affects patients with malabsorptive gastrointestinal diseases and is well-known to cause renal oxalate nephropathy. Therapies for EH are limited and only partially mitigate hyperoxaluria. Several gut bacteria can degrade oxalate and likely play an essential role in protecting against hyperoxaluria. The role that these outsider-degrading bacteria, called “autobacs,” play in the pathophysiology of EH has not been elucidated. We developed a novel computational method to the first time identify the abundance of bacteria that produce oxalate-degrading enzymes in the gut microbiota of patients. Our preliminary data indicate that the gut microbiota significantly contribute to oxalate degradation and that species differences exist among patients. Our long-term goal is to identify the gut microbiota and the metabolic pathways that contribute to oxalate degradation in patients with enteric hyperoxaluria. We will gain insights into the role of the gut microbiota in the regulation of oxalate metabolism and the potential therapeutic targets for EH.

In the United States, more than 200,000 patients are estimated to suffer from enteric hyperoxaluria (EH). EH affects patients with malabsorptive gastrointestinal diseases and is well-known to cause renal oxalate nephropathy. Therapies for EH are limited and only partially mitigate hyperoxaluria. Several gut bacteria can degrade oxalate and likely play an essential role in protecting against hyperoxaluria. The role that these outsider-degrading bacteria, called “autobacs,” play in the pathophysiology of EH has not been elucidated. We developed a novel computational method to the first time identify the abundance of bacteria that produce oxalate-degrading enzymes in the gut microbiota of patients. Our preliminary data indicate that the gut microbiota significantly contribute to oxalate degradation and that species differences exist among patients. Our long-term goal is to identify the gut microbiota and the metabolic pathways that contribute to oxalate degradation in patients with enteric hyperoxaluria. We will gain insights into the role of the gut microbiota in the regulation of oxalate metabolism and the potential therapeutic targets for EH.
The neuromodulator dopamine is critical for motivating behaviors and maintaining goal-directed behaviors, and deficits in dopamine signaling can underlie neuropsychiatric disorders like depression, schizophrenia, and addiction. To understand the role of dopamine in these disorders, it is important to study how dopamine interacts with other systems, such as the immune system. To address this question, the study proposes to use unbiased single-cell (sc) analyses to study the immune composition of atherosclerotic cardiovascular disease (ACVD) lesions and the role of Zeb2, a key regulator in the development of atherosclerosis.

Zeb2 is a transcriptional repressor that is upregulated in atherosclerotic plaques and has been shown to contribute to plaque instability. The study aims to understand the role of Zeb2 in plaque vulnerability and cardiovascular (CV) events.

In Aim 1, the study will dissect the Zeb2-mediated activation of plaque TRM CD8+ T cells and determine how this affects plaque instability. In Aim 2, the study will assess the efficacy of this integrated HR intervention (by providing legal, housing and mental health treatment support, along with linkage to MAT) on participant retention and engagement of HR services. This information will help guide the design of future programs and policies to better respond to the overlapping crises of homelessness and substance use disorder. This research is especially important as the pandemic is expected to bring with it serious public health. The focus on health disparities in addiction is of high priority to NIDA and may prove a useful model for decreasing harm and broadening MAT access for Black and Latinx PWUD, who are more likely to be interested in HR services.

The study proposes to develop a Robust Strategy for Living Donor Follow-up and Engagement for Tissue Banks. This strategy will be evaluated by providing legal, housing and mental health treatment support, along with linkage to MAT, to evaluate the efficacy of this integrated HR intervention on participant retention and engagement of HR services. This information will help guide the design of future programs and policies to better respond to the overlapping crises of homelessness and substance use disorder.
Clinical studies have shown that exposure to stressors such as inflammation, oxidative stress, and viral infection can lead to disease or exacerbate existing disorders. However, the mechanisms underlying these effects are not fully understood. This project aims to investigate the role of the mitochondrial metabolism in the regulation of TMS responses in phenotypes of TRD.

Specifically, we plan to:

1. Use computational algorithm and statistical modeling to analyze the role of mitochondrial genes in the regulation of TMS responses in phenotypes of TRD.

2. Use advanced data analysis methods to identify genetic and environmental factors that influence the course of TMS in patients with TRD.

3. Develop new therapeutic strategies based on the findings of our research.

Our studies are highly relevant to the goals of the NEI in understanding the complex genetic architecture of KC. Our findings will lead to potential anti-oxidant biomarkers, development of NRF2- activators for KC treatments, and insights into the complex genetic architecture of KC. Our studies are highly relevant to the goals of the NEI in understanding the complex genetic architecture of KC. Our findings will lead to potential anti-oxidant biomarkers, development of NRF2- activators for KC treatments, and insights into the complex genetic architecture of KC. Our studies are highly relevant to the goals of the NEI in understanding the complex genetic architecture of KC. Our findings will lead to potential anti-oxidant biomarkers, development of NRF2- activators for KC treatments, and insights into the complex genetic architecture of KC. Our studies are highly relevant to the goals of the NEI in understanding the complex genetic architecture of KC. Our findings will lead to potential anti-oxidant biomarkers, development of NRF2- activators for KC treatments, and insights into the complex genetic architecture of KC.
Mycobacterium tuberculosis (Mtb), the causative agent of tuberculosis (TB), is one of the deadliest pathogens on the planet. Mtb is transmitted through air droplets from an infected person into another person's lungs. Once the bacteria enter the lung tissues, they spread through the body to form abscesses and spread throughout the body. These abscesses are called cavities, which can lead to death.

Current antibiotics fail to kill all of the bacteria, as well as only partially reduce the bacterial load. Therefore, we sought to find better ways to kill Mtb. We explored different strategies, such as combining antibiotics with other treatments, targeting specific enzymes, and using non-antibiotic therapies.

In our studies, we found that Mtb can survive in the body by using different mechanisms. For example, Mtb can use the MCE transport system to enter the cells and replicate. We also found that Mtb can use the MCE transport system to evade the immune system.

Our studies have led to new insights into the pathogenesis of TB and have potential implications for developing new treatments. We believe that our findings will help to improve the treatment of TB and other infectious diseases.
PEDIATRICS

Migalor Advence

Effectiveness

Migration from Python and R

to transformations experience;

Statistical analysis and machine learning;

High dimensional data visualization

Tarea Spruiel

Post Doctoral Trainee

INTERNAL MEDICINE

UNIVERSITY OF MASSACHUSETTS

Do no digital twin? A multi-level evaluation of technology-facilitated care among the patient-provider relationship in health disparity populations

Do no digital twin? A multi-level evaluation of technology-facilitated care among the patient-provider relationship in health disparity populations

Antoinette Chinheche

Post Baccalaureate Graduate Student

INTERNAL MEDICINE

UNIVERSITY OF MASSACHUSETTS

Do no digital twin? A multi-level evaluation of technology-facilitated care among the patient-provider relationship in health disparity populations

Do no digital twin? A multi-level evaluation of technology-facilitated care among the patient-provider relationship in health disparity populations

Tanya Spruiel

Post Doctoral Trainee

INTERNAL MEDICINE

UNIVERSITY OF MASSACHUSETTS
Do no digital memory and executive function deficits associated with OSA. However, there is scarcity of data regarding the impact of OSA treatment among blacks on neuropsychological outcomes, despite having a disproportionately burden of sleep apnea than whites, as well as a traditionally low treatment adherence. In this innovative hypothesis-driven study, we will address inadequate adherence to OSA treatment in African Americans. Personalized multi-modal OSA treatment (i.e., reduction in event severity, increase in sleep duration), will be evaluated through the use of sleep and memory biomarkers in blacks with OSA.

Cloud MI: an open-source software framework to democratize MR training and research. The project is a computational companion of our project entitled Novel Software Tools for Rational Design and Assessment of MR Coils, which yielded seminal advances in understanding radiofrequency coil performance at high and ultra-high field. It also delivered novel computational tools for rapid coil simulation within an interconnected simulation environment that enabled us to optimize coil performance jointly or individually. We will introduce the first web-based tool for Cloud MI: an open-source software framework to democratize MR training and research. This project is a competing continuation of our project entitled Novel Software Tools for Rational Design and Assessment of MR Coils, which yielded seminal advances in understanding radiofrequency coil performance at high and ultra-high field. It also delivered novel computational tools for rapid coil simulation within an interconnected simulation environment that enabled us to optimize coil performance jointly or individually. We will introduce the first web-based tool for Cloud MI: an open-source software framework to democratize MR training and research.

MHI: Training visits for OSA is a major public health problem with 12 million adults in the United States, driven by structural and behavioral differences in access to healthcare. We will leverage our experience in implementing national registries and developing online educational modules to improve the delivery of care to underserved populations. We will use a combination of behavioral and motivational strategies to increase the adoption of OSA treatment among minorities. Our aim is to develop and evaluate a web-based intervention to improve OSA treatment adherence among blacks with OSA through the use of mobile health technology. This project is a competing continuation of our project entitled Novel Software Tools for Rational Design and Assessment of MR Coils, which yielded seminal advances in understanding radiofrequency coil performance at high and ultra-high field. It also delivered novel computational tools for rapid coil simulation within an interconnected simulation environment that enabled us to optimize coil performance jointly or individually. We will introduce the first web-based tool for Cloud MI: an open-source software framework to democratize MR training and research.

MHI: Training visits for OSA is a major public health problem with 12 million adults in the United States, driven by structural and behavioral differences in access to healthcare. We will leverage our experience in implementing national registries and developing online educational modules to improve the delivery of care to underserved populations. We will use a combination of behavioral and motivational strategies to increase the adoption of OSA treatment among minorities. Our aim is to develop and evaluate a web-based intervention to improve OSA treatment adherence among blacks with OSA through the use of mobile health technology.
Over 24 million Americans are ≥65 years and have prediabetes. Prediabetes can be addressed using a public health approach: among the 20% of participants in the Diabetes Prevention Program (DPP) who were ages 60 and over, the diet and physical activity intervention conferred a 71% risk reduction of diabetes after an average follow-up of 3 years. The population of older adults is projected to more than double by 2050. Our proposed project focuses on developing an effective, efficient, and scalable intervention to improve guideline-concordant care for CVD risk management. It is innovative in its use of insights from behavioral economics into CDSS design to improve the clinical impact of CDSSs designed to improve guideline-concordant statin prescribing by minimizing provider time and cognitive load burden. The project’s objectives will advance the science of CDSS design and development.

For more information on cardiovascular disease (CVD) and its other disease endpoints, visit the American Heart Association’s website. Our proposed project focuses on developing an effective, efficient, and scalable intervention to improve guideline-concordant care for CVD risk management. It is innovative in its use of insights from behavioral economics into CDSS design to improve the clinical impact of CDSSs designed to improve guideline-concordant statin prescribing by minimizing provider time and cognitive load burden. The project’s objectives will advance the science of CDSS design and development.