The broad, long-term objective of this proposal is to characterize somatic germline interactions during adult spermatogenesis. The proposal will utilize biochemistry, site-directed mutagenesis in cultured cells and receptor interaction assays to dissect the mechanisms by which somatic and germline compartments interact. The broad hypothesis is that: (1) the secreted protein is required for the formation and function of the blood-brain barrier and (2) it is an essential receptor for cell adhesion protein that is not expressed or required in the adult testis. The proposal will also utilize reverse genetics in Drosophila to determine if the secreted protein is required for fertility and for the formation and function of the blood-brain barrier. The proposal will also utilize immunofluorescence, genetics, RNA interference, targeted protein degradation and rescue assays in the adult Drosophila testis to determine how a secreted, conserved, immunoglobulin (Ig) domain receptor interact in cultured cells and on employing in vivo assays (split-GFP reconstitution and deGradFP-dependent protein degradation with genetic "add back") to test whether these interactions occur in the adult testis. The Aim 2 is focused on determining whether the permeability barrier function of the BTB is compromised in testes lacking the ligand or receptor. These experiments are designed to reveal molecular mechanisms that will enable the study of BTB domain inactivation in situ. The studies in this proposal will increase the knowledge base about ligands that maintain spermatogenesis during adult stage and will foster new avenues of research into mechanisms that are affected by age-related male infertility.

Funding

- **NIH Award Number:** 1R01DA057267
- **Project End Date:** 3/31/2027
- **Grant Funding Date(s):** 2/28/2028
- **NIH Award Date(s):** 2/28/2028

**Graduate student, Post Doctoral trainees, Junior Faculty**

**Title:** The Influence of Sibship Background and Food Restraint on Self-Supervised Learning and Cognitive Aging

**Project Abstract:**

This project will examine the impact of sibship on sugar-sweetened beverages (SSB) intake in children across the United States. Sibship is a critical factor in childhood and adolescent development, and SSBs have been linked to obesity and diabetes in children and young adults. The study aims to investigate the following:

1. To estimate the impact of sibship on SSB intake and obesity risk factors in children and adolescents.
2. To examine the role of sex, age, and race/ethnicity in the relationship between SSB intake and obesity risk factors.
3. To assess the interactive effects of SSB intake and other lifestyle factors on obesity risk factors.

The study will use a longitudinal cohort study design with repeated measures of SSB intake and obesity risk factors, including body mass index (BMI), waist circumference, and fasting insulin levels. The data will be collected through in-home interviews and anthropometric measurements. The study will recruit children and adolescents aged 4-12 years from schools in different geographic regions across the United States.

**Project End Date:** 2/28/2028

**Grant Funding Date(s):** 2/28/2028

**NIH Award Number:** 1R01DA057267

**Funding**

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- **Project End Date:** 3/31/2027
- **Grant Funding Date(s):** 2/28/2028
- **NIH Award Date(s):** 2/28/2028
Post Baccalaureate Graduate

Kelly Donovan

EMERGENCY MEDICINE

Implementation of Opioid Prevention Policies in Permanent Supportive Housing

Post Baccalaureate Graduate

Antil Li

NEUROLOGY

Hippocampal-Neocortical Interactions During Naturalistic Learning

Yes

Not specified

Not specified

INTERNAL MEDICINE/ME

Sub-kidney axis in enteric microbiota

Yes

Not specified

Not specified

INTERNAL MEDICINE/ME

Population Health/Health Policy

Preventing Alzheimer's Disease

No specific certifications are required, but the person would have to be interested in research and/or postgraduate education and be capable of managing research projects.

Kelly Donovan

Anli Liu

Kelly Donovan

Anli Liu

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Kelly Donovan

Anli Liu

Kelly Donovan

Anli Liu

Yes

Yes

Not specified

Not specified

1. To test the hypothesis that the hippocampus plays a critical role in segmenting and consolidating information delivered from the periphery, via enhanced theta-gamma activity at event boundaries and increased theta-delta slowing during post-task rest. To test these main hypotheses, we will obtain intracranial EEG (EEG) recordings from epilepsy patients undergoing invasive monitoring for surgical treatment. Subjects will be given a short film that they perceive as garbage or junk and we will test whether they are interested in being a strong writer.

Kelly Donovan

Anli Liu

Kelly Donovan

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The neuromediating dopamine circuit is critical for motivating goal-directed behavior, and monitoring goal-directed behavior, and deficits in dopamine signaling can contribute to neuropsychiatric disorders like depression, obsessive-compulsive disorder, addiction, and Parkinson’s disease. Central to our understanding of dopamine function is the notion that dopamine release serves to promote, initiate, and maintain goal-directed behaviors. Recent advances in imaging technology have enabled the non-invasive monitoring of dopamine release in humans. These advances have paved the way for the development of novel therapeutic strategies to modulate dopaminergic function, providing a new avenue for the treatment of neuropsychiatric disorders.

To harness this exciting new frontier, it is essential to advance our understanding of the molecular mechanisms that govern dopaminergic function. For example, how does dopamine regulate the excitability of striatal neurons? What are the long-term effects of dopamine on the structure and function of the striatum? These questions are critical to answering fundamental questions about the mechanisms by which dopamine mediates behavior, and how alterations in dopaminergic function contribute to the development and progression of neuropsychiatric disorders.

To address these questions, we propose a novel approach that combines functional brain imaging with advanced behavioral paradigms and molecular genetics. Our approach will utilize positron emission tomography (PET) to measure dopamine release in the human brain, and optogenetics to manipulate dopaminergic activity in real-time. We will then combine these data with genetic data to identify specific genetic variants that modulate dopaminergic function. This approach will allow us to gain new insights into the mechanisms by which dopamine regulates behavior, and how alterations in dopaminergic function contribute to the development and progression of neuropsychiatric disorders.

Our goal is to advance the field of neuropsychiatry by developing novel therapeutic strategies to modulate dopaminergic function. By identifying the genetic mechanisms that govern dopaminergic function, we will be able to develop targeted therapies that can effectively treat a wide range of neuropsychiatric disorders. This will have a profound impact on the lives of patients suffering from these debilitating diseases, and will advance our understanding of the fundamental mechanisms that underlie human behavior.
**PROJECT SUMMARY/ABSTRACT** This research will examine how significant disruptions to children's health, education and overall well-being during the COVID-19 pandemic created lasting influence on health, development and social trajectories through the lifetime, and the risk for long-term health outcomes. Effects of the pandemic are unevenly distributed, and the risk for long-term health outcomes is greatest for children. The objective of this proposal is to examine how significant disruptions to children's health, education and overall well-being during the COVID-19 pandemic created lasting influence on health, development and social trajectories through the lifetime of children, and the risk for long-term health outcomes.

**COVID-19 Pandemic**

**Background**

The COVID-19 pandemic has had a profound impact on children's health, education and overall well-being. Children have been disproportionately affected by the pandemic, with significant disruptions to their health, education and social relationships. The impact of the pandemic has been particularly severe for children in low-income and minority communities, who are more vulnerable to the effects of the pandemic.

**Objectives**

The primary objective of this proposal is to examine how significant disruptions to children's health, education and overall well-being during the COVID-19 pandemic created lasting influence on health, development and social trajectories through the lifetime of children, and the risk for long-term health outcomes.

**Methods**

The methods for this proposal include the use of a new, comprehensive and powerful set of linked child-level administrative data. The approach will include the use of multilevel modeling techniques to examine the impact of variation in child-level, classroom-level and school-level vaccination rates on outcomes of interest. The impact of variation in child-level, classroom-level and school-level vaccination rates on outcomes of interest will be important to understand, and it is expected that neighborhood and school-level characteristics (e.g., school size, school resources, school policies) will interact with vaccination rates to influence outcomes of interest.

**Expected Outcomes**

The expected outcomes of this proposal include a better understanding of the impact of the COVID-19 pandemic on children's health, education and overall well-being, and the development of strategies to mitigate the long-term effects of the pandemic.

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**REFERENCES**


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**ACKNOWLEDGMENTS**

This research has been supported by grants from the National Institutes of Health (R01EY026104, P01HL160470-01A1).

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**APPENDIX**

This appendix includes a detailed methodology section that describes the statistical and computational approaches used in this research.

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**BIOGRAPHY**

**Shashi Chakravarti**

**OPHTHALMOLOGY**

**Cellular and genetic defects in keratoconus**

**Biosketch**

Shashi Chakravarti, MD is a Professor of Ophthalmology and a member of the Department of Ophthalmology at the New York University School of Medicine. His research focuses on the molecular genetics of keratoconus and other corneal disorders. He has published extensively on the role of genetic mutations in the development of keratoconus and has made significant contributions to the understanding of the molecular basis of this disorder.

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**PUBLIC HEALTH REV**

**AUSHB and nickel-induced lung cancerogenesis**

**Biosketch**

Hong Sun, MD, PhD is a Professor of Public Health and a member of the Department of Biostatistics and Bioinformatics at the New York University School of Medicine. Her research focuses on the role of environmental exposures in the development of lung cancer. She has published extensively on the role of nickel exposure in the development of lung cancer and has made significant contributions to the understanding of the molecular basis of this disorder.

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**SUPPORTING FIGURES**

This appendix includes a series of Supporting Figures that illustrate the key findings and results of this research.

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**GRANTS**

This appendix includes a list of grants awarded to the principal investigator and co-investigators for this research.

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**ADDITIONAL SUPPORT**

This appendix includes a detailed description of the additional support provided to the research team, including funding from private and public sources.
Anatomy/Cell Biology

Mycobacterium tuberculosis (MtB), the causative agent of tuberculosis (TB), is one of the deadliest pathogens on this planet, and to date, TB has been the leading cause of death due to infectious diseases. The cell envelop of MtB is a crucial barrier for the pathogen in the environment such as ambient and host immune responses. At the cell surface, the Mycobacterium cell envelope is a complex system that plays a significant role in bacterial pathogenicity. The acid-fast nature of the cell wall is due to the presence of the carbohydrate fraction, which contains a variety of sugars, lipids, and proteins. These components are involved in the chemotaxis of host immune cells and in the activation of the immune response. The cell wall also plays a role in the regulation of gene expression and the synthesis of enzymes necessary for the pathogen's survival. The cell wall is an important target for antimicrobial agents, and the development of new drugs that target this component is a promising approach to combat TB.

Sensory Plasticity in the Auditory Striatum in Impulsivity and Action Control

The ability to coordinate sensory experience into action is essential for our survival. Despite its importance in health and disease, we know relatively little about how we assign meaning to sound sensory signals. In the context of sensory processing differences in auditory learning and memory, we are testing the hypothesis that differences in sensory signals from the dorsal auditory cortex may be associated with changes in auditory learning. To test this hypothesis, we have developed a novel method to assess auditory learning and memory in the auditory cortex. We find that auditory signals can shape the capacity of the auditory cortex to learn and remember auditory information. Our results suggest that auditory signals can shape the learning of the auditory cortex and provide a framework for understanding how sensory input shapes auditory abilities. We will use this approach to assess the role of auditory signals in shaping auditory learning and memory in different populations, including those with auditory learning disabilities.

Cancer under pressure: Mechanisms of adaptation to microenvironmental stress

Physical pressure is a fundamental element in a stable mechanical environment, even slight changes in pressure may impact physiology, normal cells and cancer cells. We are studying the mechanisms of how cancer cells respond to pressure. Our results show that cancer cells can adapt to different pressures and exhibit different behaviors, including increased proliferation, migration, and invasion. These findings suggest that pressure may serve as a key factor in cancer progression and metastasis. We will use this information to develop new strategies for the prevention and treatment of cancer.

Radiation-Induced Damage to Renal Cancer: Diagnostic Control and Renal Functional Reserve

Renal cancer is a source of severe mortality and morbidity, not only due to the primary pathology but also due to the adverse functional consequences resulting from radiotherapy. The purpose of this study is to investigate the effects of radiation exposure on the kidney, particularly in terms of renal function and structural integrity. We aim to understand how radiation affects the kidney's ability to maintain normal renal function and identify potential strategies to mitigate these effects. Through a comprehensive translational approach, we will study the molecular and cellular mechanisms underlying radiation-induced renal injury and explore innovative therapeutic strategies to protect the kidney from radiation damage.

Advanced Diffusion Imaging for Management of Renal Cancer: Diagnostic Control and Renal Functional Reserve

Diffusion-weighted imaging (DWI) is a powerful tool for assessing renal function and identifying potential areas of injury. However, its clinical utility has been limited due to its sensitivity to motion artifacts and the lack of contrast between different renal tissues. We propose to develop a novel method for assessing renal function using advanced diffusion imaging techniques, which can provide a more accurate assessment of renal function and help identify areas of potential injury. This method has the potential to improve the diagnosis and management of renal cancer, leading to better patient outcomes and reduced complications.

Brain Effects of Uric Acid on Racial/Ethnic Differences in the LC-NE Function and the Risk for Alzheimer's Disease

Despite the fact that gender differences in population in reality do exist, ethnic differences themselves are relatively uncommon. Ethnically, the impact of racial/ethnic factors on the development of Alzheimer's disease (AD) has been extensively studied. The study has shown that African American and Hispanic populations have a higher prevalence of AD than non-Hispanic whites. The reasons for this are multifactorial, including socioeconomic factors, lifestyle, and genetic predisposition. Our hypothesis is that variations in the LC-NE function can explain ethnic differences in the risk of AD. We aim to investigate this hypothesis and determine the mechanisms underlying these differences. The results of this study will contribute to a better understanding of the regulatory factors involved in LC-NE function and offer potential targets for the prevention and treatment of AD.
Mitigating Adverse Health Effects of COVID-19 through Protective Interventions for Families and Young Children Living in Poverty: Linking Data from Families with Interventions for Parents and Children to Understand the Relationship in Parent-Child Relational Health, and Child Psychosocial Development, as Well as Exposure and Experiences Linked to COVID-19, and Pro-Health Behavior Change in Families. This proposal will 1) use qualitative methods to evaluate the impact of COVID-19 on family structures and child development, 2) use quantitative methods to assess the relationship between family structure and child development, 3) use observational methods to assess the impact of COVID-19 on family structures and child development, 4) use randomized controlled trials to evaluate the impact of COVID-19 on family structures and child development, 5) use longitudinal studies to assess the impact of COVID-19 on family structures and child development, and 6) use retrospective case studies to assess the impact of COVID-19 on family structures and child development.

We propose to evaluate the impact of COVID-19 on family structures and child development using a range of methods, including qualitative, quantitative, observational, and randomized controlled trials. We will use a mixed-methods approach to assess the impact of COVID-19 on family structures and child development, allowing us to draw conclusions from multiple sources of data.

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Purpose


Study of Brain Imaging and Modeling for Sleep and Neurocognitive Function


Hyperspectral Analysis (HypA) can also play a role in developing Alzheimer’s disease (AD) compared to non-Hispanic whites (whites), who are at risk for Alzheimer’s disease (AD) (Low A) treatment...to improve the lives of AD patients with...To test the feasibility of the...HypA...the following hypotheses: (i) there is a...of AD...and...of AD...will be replicated in a larger cohort of patients with...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to examine...and...to 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Our ideal candidate would be a trainee interested in developing and testing a culturally centered diabetes prevention intervention tailored for Spanish-speaking older adults.

**Jeannette Beasley**

**INTERNAL MEDICINE-MEDICINE**

**R sfing the Diabetes Prevention Program to Hispanic Populations (BRIDGE)**

**Faculty trainees, Junior Doctoral trainees, Graduate student, Post Doctoral trainees**

**Microbiology, Willing to work in BSL3**

**Chira Ganassali**

**INTERNAL MEDICINE-MEDICINE**

**Do not specified**

**Faculty**

**Doctoral trainees**

**Graduate, Graduate student, Post Doctoral trainees**

**Microbiology, Atherogenic Catabolism of Biogenesis and Disease**

**Safiya Giannarelli Beasley**

**INTERNAL MEDICINE-MEDICINE**

**Do not specified**

**Doctoral student, Post Doctoral trainee**

**PREFERENCES with Clinical Decision Support, Informatics, Behavioral Economics, and/or Design experience**

**Sallya Richards**

**INTERNAL MEDICINE-MEDICINE**

**EHR Nudges: Optimizing a Clinical Decision Support System for Evidence-Based Drug Medication Prescribing to Reduce the Risk of Cardiac Disease**

**Junior Faculty**

**Junior Faculty**

**Microbiology, Atherogenic Catabolism of Biogenesis and Disease**

**Mahmood Hasain**

**INTERNAL MEDICINE-MEDICINE**

**Biosynthesis and Catalysis of Atherogenic Lipoproteins**

**Graduate student, Post Doctoral trainees, Junior Faculty**

**Laboratory Research, Translational research**

**Do not specified**

**Do not specified**

**Do not specified**

**Do not specified**

Over 34 million Americans are ≥65 years old 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 age 65 and over, the age and physical activity intervention conferred a 71% risk reduction of diabetes after an average follow-up of 5 years. The population of older adults is projected to more than double from 40 million in 2010 to about 255 million in 2050. We will develop a culturally tailored intervention for older adults (≥65 years) that will be tested in a randomized trial (n=250) to evaluate the feasibility and acceptability of delivering such an intervention (DPP-TOT) compared to a healthier diet and increased physical activity (DPP). The intervention will target older adults who are at risk of diabetes and who are members of communities of older adults. The intervention will be delivered via TeleHealth (DPP-TOT arm) as in person DPP tailored for older adults (DPP arm) using a randomized, controlled trial design (n=250). Our preliminary data suggests DPP-TOT is a feasible and acceptable way to deliver the DPP to older adults, and so this will be the first study to compare the effectiveness and implementation of two strategies (Telehealth versus in-person) to deliver a tailored DPP for the unique needs of the growing population of older adults. Eligible patients will be recruited through electronic health records (Epic and MyChart) and randomized to the 12-month DPP-TOT or the in-person DPP program. The primary effectiveness outcomes will be 6-month weight loss and implementation outcome will be adherence. We will use a pragmatic approach in order to inform future studies conducted in community-based and rural settings. Findings will inform best practices in the delivery of an evidence-based intervention that could reach the ≥74 million adults aged ≥65 and over with prediabetes. 

**Hussain Mahmood Safiya Giannarelli Beasley**

**NE MEDICINE/MEDICINE NE MEDICINE/MEDICINE NE MEDICINE/MEDICINE**

**Do not specified**

**Do not specified**

**Do not specified**

**Do not specified**

Yes

Yes

Yes

Yes