NATHAN SHOCK CENTERS OF EXCELLENCE IN THE BASIC BIOLOGY OF AGING

PILOT AWARDEE SPOTLIGHT

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2022 UT Health San Antonio NSC Pilot Award
Investigating lipidomic changes in liver aging

How did you become interested in aging?
Aging is a major risk factor of a vast number of diseases and disorders, including cancer, neurodegeneration, autoimmune disorders, and cardiovascular disease.

Briefly describe your project in non-scientific terms. What questions are you trying to answer?
Aged livers are more susceptible to damage than young livers. In fact, lipid accumulation in the liver (steatosis) can occur with normal aging. We are using a multi-omic approach (including epigenomics, transcriptomics, metabolomics, and lipidomics) to investigate age-associated changes in the liver that may predispose the aged liver to disease.

What previous research or experience informed the development of this proposal?
Bulk RNA-seq of young versus old liver cells (hepatocytes) shows a significant decrease in essential lipid metabolic and “liver-specific” genes, indicating a loss of liver function and identity with age.

What’s exciting about your project’s potential impact?
Using several mulit-omic techniques including cutting-edge single cell and spatial transcriptomics to investigate the cellular and molecular basis of loss of cell identity with age, a phenomenon only recently tractable with the advent of single cell transcriptomics and epigenomics.

If your project is successful, what is the next step?
a. Establishing loss of identity as a new “hallmark of aging”
b. Therapeutic transcriptional reprogramming of hepatocytes to restore hepatocyte identity and protect against age-associated liver dysfunction.

How has support from and collaboration with the Nathan Shock Centers helped further this project and/or your research overall?
The Functional Lipidomics core at UTHSA has provided exceptional data on the lipidomic changes in the liver with age and has revealed exciting potential avenues for future investigations and/or therapeutic intervention.