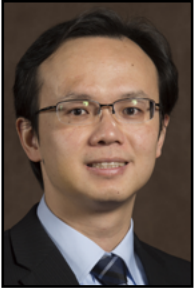




NATHAN SHOCK CENTERS
OF EXCELLENCE IN THE
BASIC BIOLOGY OF AGING

PILOT AWARDEE SPOTLIGHT



Hang Lin, PhD

Assistant Professor
University of Pittsburgh

2021 Einstein NSC Pilot Award
Autophagy and the Aging of Chondrocyte

How did you become interested in aging?

During my Ph.D. study and postdoc training, I focused on regenerative medicine, such as engineering cartilage tissues from stem cells to treat chondral injuries. At that time, I knew osteoarthritis (OA) is primarily characterized as cartilage degradation, which, however, can not be treated by the engineered cartilage unless the fundamental reasons causing the disease are resolved. Therefore, I started to pay attention to the pathogenesis of osteoarthritis. In particular, aging is one of the major risk factors for OA, and the relevant studies attracted me. However, at that time, I did not have the experience or resources to study aging and associated OA pathogenesis.

In 2018, I was selected to participate in the NIA Butler-Williams Scholars Program, which was one of the most important opportunities in my career development. I was educated on aging-relevant knowledge and introduced to the community. In particular, Dr. Ana Maria Cuervo from the Albert Einstein College of Medicine gave a fascinating talk, which inspired me so much. Specifically, Dr. Cuervo presented the critical role of autophagy in aging. After her talk, I had the chance to meet her and express my research interests to her. Dr. Cuervo kindly agreed to help me start by sharing the resources and methods. Since then, we have been working together on studying the influence of aging on OA pathogenesis.

Briefly describe your project in non-scientific terms. What questions are you trying to answer?

Osteoarthritis (OA) is a painful and disabling disease that affects millions of people worldwide. Symptom-alleviating treatments exist, although none with long-term efficacy. Furthermore, there are no drugs that can prevent or cure OA. As part of our attempts to gain a better understanding of the biology behind OA and the influence of aging on this disease, we have become interested in the study of autophagy, which is a process in cells to remove unnecessary or dysfunctional components. Autophagy decreases with age in most tissues, and disruption of different autophagic pathways accelerates aging and aggravates the progression of multiple age-related disorders. We are thus looking into different types of autophagy and their possible role in chondrocyte biology and OA development and progression.

What previous research or experience informed the development of this proposal?

As mentioned above, aging represents one of the most important risk factors for OA. I had years of experience studying chondrocytes and osteoarthritis. Dr. Cuervo and her team had done excellent work demonstrating the role of autophagy in aging. It is thus a logical step for us to work together on this exciting project.

What's exciting about your project's potential impact?

The most exciting part of this project, if successful, is to provide a method to prevent the onset of OA. When OA is diagnosed, it is often at a late stage. It is very challenging to reverse the structural changes,

such as cartilage degradation and bone remodeling. Prevention thus represents the most efficient and efficacious way to treat OA.

If your project is successful, what is the next step?

If the project is successful, we will submit proposals to the NIA or NIAMS to further explore the role of autophagy on aging and OA pathogenesis, in particular identifying the druggable target(s). In addition, we will work with companies to explore the commercialization potential of several autophagy-targeting chemicals in treating OA in humans.

How has support from and collaboration with the NSCs helped further this project and/or your research overall?

I would say this project is impossible without the support from the Nathan Shock Center and Dr. Cuervo's team at the Albert Einstein College of Medicine. In particular, the methods and materials for studying autophagy were provided by Cuervo lab, which was critical to initiating this project.