NATHAN SHOCK CENTERS OF EXCELLENCE IN THE BASIC BIOLOGY OF AGING

# PILOT AWARDEE SPOTLIGHT

## Matthew Yousefzadeh, PhD

Assistant Professor
Columbia University Medical Center

**2023 Oklahoma NSC Pilot Awardee**

***Investigation of transcriptional changes in immune cell populations of mice treated with rapamycin***

**How did you become interested in aging?**
Originally, I was working in the field of cancer biology but became interested in aging after my mother began suffering from multiple age-related chronic diseases and passed away at an early age while I was in graduate school. So during my postdoctoral training I decided to focus on aging and study the role of senescence in health and disease. It was an incredibly exciting time to join the field of geroscience because senolytics were starting to take off.

**Briefly describe your project in non-scientific terms. What questions are you trying to answer?**
As we age, so do our immune systems which can make us more susceptible to disease and infections. Rapamycin has been shown to extend lifespan and reduce age-related pathologies. It has also been shown to improve immune function in older animals and humans. However it is not fully understood which immune cells specifically benefit from rapamycin treat. To study this, we performed single nuclei RNAsequencing on splenic samples from young and old mice that were fed control chow or chow supplemented with rapamycin. Our analysis seeks to address multiple questions: 1) how gene expression profiles of different immune cells fluctuate with age; 2) which immune cell types in older mice are conferred a more “youthful” expression profile upon rapamycin treatment; 3) if these transcriptional changes in immune cell populations change based upon the sex of the animals as well.

**What previous research or experience informed the development of this proposal?**
The robust work around the benefits of rapamycin by many labs showing that it extended lifespan in animal models and work done in humans and mice showing that it could stimulate an aged immune system were major inspirations for this project.

**What’s exciting about your project’s potential impact?**
We are starting to gain insight into the effects of rapamycin on different immune cell populations whether that be restoring immune cell populations that are lost with age or blunting the accumulation of detrimental immune cell populations that amass with age.

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

The next step is to perform functional validation studies on individual immune cell populations that are treated with rapamycin to see if functional deficits due to age are restored and to what degree.

**How has support from and collaboration with the Nathan Shock Centers helped further this project and/or your research overall?**

The bioinformatics support provided by the Oklahoma NSC has been invaluable. Their expertise solved a major impediment to advancing the project as I have limited access to bioinformatics support and if able to access it would have to wait a significant amount of time to receive that support. The Oklahoma NSC helped to advance this project in a timely manner and shorten the time to getting vital preliminary data for a future grant application, which is incredibly important for me as junior faculty.