NATHAN SHOCK CENTERS OF EXCELLENCE IN THE BASIC BIOLOGY OF AGING

PILOT AWARDEE SPOTLIGHT

Timothy Allerton, PhD

Assistant Professor
Pennington Biomedical Research Center

2023 Oklahoma NSC Pilot Awardee

Skeletal Muscle Proteomic Alterations in Heart Failure with Preserved Ejection Fraction: Impact of Exercise Training

---

How did you become interested in aging?
I have always been interested in the mechanisms of chronic disease. My interest in aging is tied to its overwhelming impact on the progression and complications of heart failure, diabetes, and obesity.

Briefly describe your project in non-scientific terms. What questions are you trying to answer?
My project is centered around an emerging form of heart failure called heart failure with preserved ejection fraction (HFpEF). This form of heart failure is described by the inability of the heart to relax properly. HFpEF is very severe and is primarily driven by aging and obesity. The cardinal symptom of HFpEF, exercise intolerance, is thought to be driven largely by non-cardiac factors such as skeletal muscle dysfunction.

In my project, I used a mouse model of HFpEF to identify proteins in the skeletal muscle that were differentially regulated between healthy mice and mice with HFpEF. We then sought to determine how those proteins were modified after exercise training.

What previous research or experience informed the development of this proposal?
My early experience as a clinical exercise physiologist working with patients with heart failure, obesity, and diabetes has informed much of what I do in my research today. As I progressed through my Ph.D. and postdoctoral fellowship I was trained in metabolism, molecular biology, and the development animal models of chronic disease. I see this project as a culmination of my clinical experience and scientific training.

What's exciting about your project's potential impact?
My project has the potential to advance therapies that can target dysfunctional pathways in skeletal muscle to improve exercise intolerance in HFpEF. My project also underscores the importance of exercise training as a therapy for HFpEF.

NATHAN SHOCK CENTERS OF EXCELLENCE IN THE BASIC BIOLOGY OF AGING

PILOT AWARDEE SPOTLIGHT

Timothy Allerton, PhD

Assistant Professor

Pennington Biomedical Research Center

2023 Oklahoma NSC Pilot Awardee

Skeletal Muscle Proteomic Alterations in Heart Failure with Preserved Ejection Fraction: Impact of Exercise Training

---

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

I think the project has already been a major success. We recently published the primary results in the Journal of the American College of Cardiology: Basic to Translational Science (https://www.jacc.org/doi/10.1016/j.jacbts.2024.07.009). The next step is to interrogate the pathways that we have identified as being major players in skeletal muscle dysfunction in this model of HFpEF.

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

The support from the Oklahoma Nathan Shock Center has been essential to discover proteins and pathways that are dysfunctional in HFpEF. The quality of data we obtained through our collaboration with the Shock Center and Dr. Mike Kinter was critical to our success and resulted in a high impact publication that will help the field move forward.