

## **Evaluation of Elastin Composition and Organization in Murine Abdominal Aortic Aneurysms**

**Annabelle Frazier<sup>1</sup>**, Cortland Johns<sup>2</sup>, Abigail Cox<sup>2</sup>, Craig J. Goergen<sup>2</sup>

<sup>1</sup>Indiana University School of Medicine; <sup>2</sup>Purdue University Weldon School of Biomedical Engineering

### **Background and Hypothesis:**

The prevalence of aortic aneurysms has increased dramatically over the past 20 years, with over 35 million cases of abdominal aortic aneurysms (AAAs) in 2019 alone. However, AAAs with intraluminal thrombus (ILT) development remain understudied. Elastin is a key component of the aorta that gives it distensibility. Here, we evaluated the organization of aortic elastin with and without ILT.

### **Methods:**

AAAs were induced in mice by topically applying elastase to the aorta.  $\beta$ -aminopropionitrile was added to drinking water to promote AAA expansion. After 8 weeks aortas were extracted and stained with Movat's Pentachrome. Images at the largest aortic diameter were collected at 100  $\mu$ m zoom and separated into 4 quadrants around the lumen. Manual counting was used to determine the number of elastin fibers in the aortic wall. ImageJ's color segmentation was used to find extracellular matrix component composition of each aortic layer.

### **Results:**

We found samples without ILT on average had 2.7 more distinct elastin sheets compared to ILT samples. Color segmentation findings showed 7% less elastin in the tunica media in samples with ILT. Further, color segmentation showed there was a statistically significant increase in the amount of proteoglycans in the tunica media in samples with ILT.

### **Conclusion:**

We found ILT forming aneurysms had fewer intact elastin fibers and greater proteoglycan deposition, indicating more detrimental breakdown of the tunica media compared to samples without ILT.

### **Clinical Implications:**

Our findings suggest AAA patients with ILT are at higher risk for more severe cases of aortic wall degradation, suggesting special monitoring following identification of ILT.

### **Further Considerations:**

A larger sample size is needed to identify a statistically significant difference in elastin between groups. Future work should compare changes in aortic wall composition in male and female mice to improve our understanding of pathophysiological differences observed between genders.