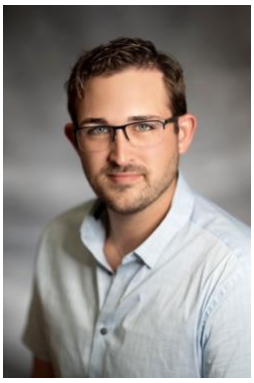
TEXAS A&M UNIVERSITY
Huffines Institute

Huffines Institute Graduate Student Travel Award

Congratulations to **Trevor Self**, a PhD student in Veterinary Physiology & Pharmacology at TAMU, who is advised by **Dr. Christine Heaps** on receiving a Huffines Institute Graduate Student Travel Award.



Trevor will present his project, "*Hypoxia impairs Kv7 channel function in porcine coronary arterioles,"* at the **2024 Vascular Biology Conference** in Monterey, California.

His project is focused on the area of ischemic heart disease, which affects more than 80 million people in the United States. Understanding the progression of this disease and the underlying regulatory mechanisms is essential for developing novel therapeutic strategies. Trevor employs a clinically relevant swine model as an in vitro approach to isolate a reduction in oxygen tension as a single characteristic of this otherwise complicated disease.

Abstract

Hypoxia impairs Kv7 channel function in porcine coronary arterioles

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Ischemic heart disease is a multifaceted pathological manifestation that affects more than 80 million people in the United States, with an annual economic cost of more than $300 billion in healthcare expenses and lost productivity. Understanding the progression of this disease and the underlying regulatory mechanisms is essential for developing novel therapeutic strategies. Using a clinically relevant swine model, we designed an in vitro approach to isolate a reduction in oxygen tension as a single characteristic of this otherwise complicated disease. We tested the hypothesis that hypoxia would attenuate coronary arteriolar relaxation, mediated through a loss of Kv7 channel contribution. Continuous bubbling of N2 gas, supplemented with 5% CO2 and 1% O2, through the tissue buffers was used to establish the hypoxic environment, and hypoxic insult was confirmed by HIF1α immunofluorescent staining. Isometric tension wire myography and electrophysiology experiments were used to investigate Kv7 channel contribution to H2O2-mediated relaxation and Kv channel currents, respectively, in response to a 1-hour hypoxic treatment. Our data reveal that hypoxia impairs H2O2-mediated vasodilation and is attributable to a loss of Kv7 channel activity. Further, protein kinases are known to associate with and activate Kv7 channels in other tissue types. Using our model of hypoxia, the inhibition of PKA yielded a similar inhibitory response as the direct blockade of Kv7 channels. Taken together, our data reveal that hypoxic insult reduces the H2O2-stimulated contribution of Kv7 channels in vascular reactivity studies, resulting in attenuated relaxation of coronary arterioles that may be mediated through PKA.

Funding: NIH RO1 HL139903 (CLH), AHA Predoctoral Fellowship (TSS), Huffines Institute Graduate Student Research Grant (TSS), TAMU CVMBS Graduate Student Research Trainee Grant (TSS)