Unravelling the microtubule network to reveal novel aspects of vascular control in hypertension

Background

Arterial tone is what determines the total peripheral resistance of our circulatory system. According to Darcy's Law, mean blood pressure is the product of cardiac output and total peripheral resistance; therefore, changes in arterial tone regulate mean arterial blood pressure. Importantly, clinical hypertension is due to increased total peripheral resistance.

According to the World Health Organisation, in 2015 approximately 970 million people had raised blood pressure (hypertension), which is major risk factor for cardiovascular diseases costing healthcare services billions of Kroner each year. The research outlined in this proposal aims to reveal a crucial aspect of vascular physiology that has the potential to uncover future therapeutic strategies, which will relieve the burden of cardiovascular disease on healthcare systems and improve the quality of life for the patient.

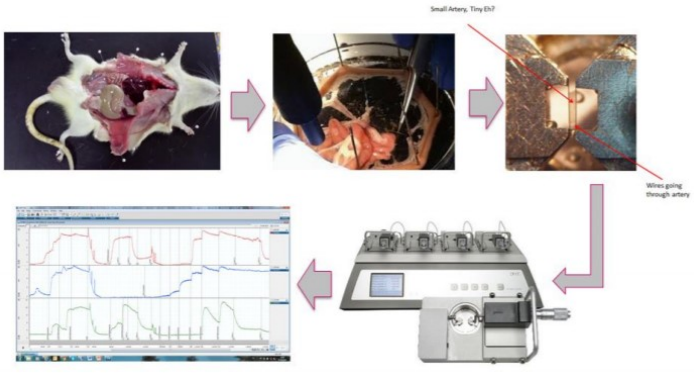
The proposed work in this project will fundamentally change our understanding of vascular biology and disease by investigating the role of microtubules, the importance of which in vascular function was previously overlooked. Very little is known about how microtubules affect vascular smooth muscle cell contractility and nothing is known about the state of microtubules in vascular diseases.

The Project

This work is at the cutting-edge of vascular physiology using state-of-the-art techniques to reveal a novel mechanism controlling vascular tone. Our aim is to unravel the complexities of the microtubule network in regulating vascular tone, for the very first time. To do this we will use rat blood vessels and manipulate the microtubule network using a selection of pharmacological modulators. Ultimately, these experiments will elucidate whether microtubules could provide a novel therapeutic target in different vascular diseases, such as ischemia and hypertension.

The Student

You should be enthusiastic about research! We will teach you our state-of-the-art techniques and, to begin with, direct the research. We hope your enthusiasm will enable you to learn fast and to become more independent, thereby allowing you to take the research in a direction that interests you.



Contact

Please contact Thomas Jepps (tjepps@sund.ku.dk) if you are interested or would like more information.

Work flow for myography experiments that investigate how blood vessels work.