TITLE: Clock and the Regulation of Vascular Smooth Muscle Function

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Research Project Description: Most biological process exhibit diurnal variation and are regulated by the biological clock. Our collaborator and colleague, Dr. Michelle Gumz, has shown the clock protein per1 regulates ENaC activity and sodium reabsorption within the kidney. However ENaC is also present in vascular smooth muscle cells and has important function in regulation of vascular stiffness. The role of per1 in regulation of vascular ENaC is not known. Our hypothesis is that per1 regulates ENaC activity and function in vascular smooth muscle cells

Methods: We will examine time dependent expression of per1 and ENaC mRNA and protein in vascular smooth muscle cells. We will see if modulating per1 affect ENaC expression or activity. This will include standard molecular biology techniques such as polymerase chain reaction, western blot and cell culture.

Role of medical student: The student will design and perform all of the experiments. Graduate students in the laboratory, technicians and the mentor will help guide the student.

Funding: Divisional Gatorade Funds to Nephrology

Relevant Publications: Drummond, H.A. (2015). Nontubular epithelial Na+ channel proteins in cardiovascular regulation. Physiological reports 3.

Gumz, M.L., et al (2009). The circadian clock protein Period 1 regulates expression of the renal epithelial sodium channel in mice. J Clin Invest 119, 2423-2434.