1139-92-560 **Jared O Barber*** (jarobarb@iupui.edu), Department of Mathematical Sciences, 402 N Blackford St, LD 270E, Indianapolis, IN 46202, and **Julia C Arciero** and **Erin Zhao**.

Mathematical model of vascular adaptations to a major arterial occlusion in the rat hind limb. Preliminary report.

Blood vessel adaptation to different situations, such as exercise, is critical for maintaining healthy tissue. Understanding adaptation better can help lead to earlier and less invasive treatments for victims of major events like heart attacks and strokes and major vascular diseases like peripheral arterial disease where lower leg circulation is severely limited. A compartmental model of the vessel network in the rat hindlimb is used to study the roles of different sized vessels (e.g. arteries vs capillaries) in providing blood flow to the hindlimb before and after a major arterial conclusion. The model includes vascular response mechanisms for changes in pressure (myogenic response), vessel wall shear stress (shear response), and oxygen levels (metabolic response). Simulations include varying levels of activity both before and after a major arterial occlusion and at varying time scales. Results suggest that vessel mechanisms cannot fully restore normal oxygen levels immediately following a major occlusion and that long term flow restoration depends on the strength and type of long term vascular adaptation (arteriogenesis vs angiogenesis). Results also suggest that to obtain realistic vessel dynamics, there must be some level of heterogeneity in the metabolic response. (Received February 19, 2018)