

Steven S. Segal - Malpighi Award 2013.

Steve's interest in the microcirculation was sparked as an undergraduate majoring in physical education at the University of California, Berkeley in the mid-1970s. Continuing as a graduate student in Exercise Physiology, he developed a fascination with cardiovascular physiology while studying the metabolic demands of skeletal muscle in exercising humans. Viewing exercise as the interaction between muscular performance and blood flow, Steve pursued doctoral studies at the University of Michigan (PhD, 1984) where his research explored the dynamics of contractile performance and biochemical adaptations underlying reinnervation, revascularization and regeneration of transplanted skeletal muscle. Focusing his postdoctoral training on the microcirculation at the University of Virginia, Steve's work identified cell-to-cell coupling through gap junctions as a basis for coordinating vasomotor responses in microvascular resistance networks. Since establishing his own laboratory in 1987, Steve's research efforts have endeavored to resolve mechanisms by which blood flow control is governed in the microcirculation, particularly in response to the contractile activity of skeletal muscle fibres and its regulation by sympathetic innervation. During exercise, motor unit recruitment generates electrical and chemical signals in endothelial cells and smooth muscle cells of microvessels that control the distribution and magnitude of muscle blood flow. The Segal laboratory focuses on elucidating the cellular and molecular events that initiate these signals, how such signals are transmitted from cell to cell to orchestrate vasodilation and vasoconstriction in microvascular networks, and how these integrative processes are governed by the nervous system. Intravital microscopy enables direct observation of blood flow control in the microcirculation. Complementary studies of isolated microvessels and their constitutive cells enable even greater resolution of specific regulatory processes. Pharmacological, biochemical, optical and genetic analyses are applied towards resolving the functional expression of proteins that mediate cell-to-cell coupling through gap junctions and electrical signalling through ion channels. Studies of transgenic mice afford unique insight into how particular signalling pathways affect control processes within the microcirculation. In turn, these basic relationships are being explored in light of how aging affects microvascular structure and function.

Web: <http://medicine.missouri.edu/mpp/faculty-segal-s.html>

<http://dalton.missouri.edu/investigators/segalss.php>