Distinguished Lecture Series in Physiology

Physiology and Membrane Biology

University of California, Davis

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"Translating thought into blood flow: Capillary-to-arteriole communication in the brain"

Blood flow into the brain is dynamically regulated to satisfy the changing metabolic requirements of neurons, but how this is accomplished has remained unclear. Our data demonstrate a central role for capillary endothelial cells in sensing neural activity and communicating it to upstream arterioles in the form of an electrical vasodilatory signal. This signal is initiated by extracellular potassium (K+)—a byproduct of neural activity—which activates capillary endothelial cell inward-rectifier K+ (KIR2.1) channels to produce a rapidly propagating retrograde hyperpolarization that causes upstream arteriolar dilation, increasing blood flow into the capillary bed. These data establish brain capillaries as an active sensory web that converts changes in external K+ into rapid, 'inside-out' electrical signaling to direct blood flow to active brain regions. Emerging evidence also supports a role for capillary-to-arteriole calcium signaling in this process.

Tupper Hall 2133/2135
Tuesday, December 6, 2016
11:00 a.m.

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