

**“Abnormal blood flow in epilepsy”**

**Dr. Stephen Macknik  
Barrow Neurological Institute**

**Friday, October 18th, 2013  
LECTURE: 9:00 AM - 10:00 AM**

**ENGINEERING CENTER  
ROOM EC 2300  
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**Abstract:**

Progressive neurodegeneration often occurs due to prolonged and/or repetitive seizure activity. Ictal neurodegeneration has traditionally been viewed as a consequence of glutamate-induced excitotoxicity, resulting from calcium overload that activates pro-apoptotic molecular cascades. Ischemia, however, activates the same pro-apoptotic pathways as excitotoxicity. Abnormal capillary vasospasms during ictal periods, therefore, could contribute to apoptotic ictal neurodegeneration. Here we test the role of ictal pericytic-capillary vasospasms—sudden vascular constrictions that reduce blood flow—as a contributor to hippocampal neurodegeneration. We use a novel imaging technique to visualize spontaneous cerebral capillary vasospasms *in vivo*. In fact, the contribution of capillary vasospasm-driven hypoxia versus excitotoxicity has never before been assessed in any neurodegenerative disease model. We show normal and abnormal ictal hippocampal vasoconstrictions *in vivo*, in awake animals, driven by pericytes, with 54% of neurodegeneration in epilepsy driven by abnormal blood flow. We find that vascular ictal neurodegeneration is reversible through oral administration of blood flow regulating drugs.

**Biography:**

Stephen Macknik received his PhD at Harvard University in the laboratory of Prof Margaret Livingstone. He was then a postdoctoral fellow with the Nobel Laureate Prof. David Hubel at Harvard Medical School, and also with Prof. Zach Mainen at Cold Spring Harbor Lab. Dr. Macknik led his first laboratory at University College London, and is currently a Laboratory Director at the Barrow Neurological Institute. His research and scientific outreach activities have been featured in the *New York Times*, *The Wall Street Journal*, *The Chicago Tribune*, *The Boston Globe*, *NPR*, *Nova:scienceNow*, *The Discovery Channel*, and *Der Spiegel*, among hundreds of media stories. He is board member of *Scientific American*, where he has a monthly column in *Scientific American Mind*, as well as a daily blog (*Illusion Chasers*). His other publication credits include contributions to *Nature*, *Nature Neuroscience*, *Neuron*, *Nature Reviews Neuroscience*, and the *Proceedings of the National Academy of Science*.

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**Map:** [http://campusmaps.fiu.edu/Engineering Center](http://campusmaps.fiu.edu/Engineering%20Center)