

# **"A Hypoxia Controlled Model of Hemodynamic Remodeling and Angiogenesis"**

**by**

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Angiogenesis and hemodynamic remodeling of blood vessels occur in response to biochemical and physical stimuli. There are a vast number of biochemical signals implicated in angiogenesis. Simplifying, the vascular network, the concentrations of oxygen, and vascular endothelial growth factor (VEGF) are included in a model of angiogenesis. The model incorporates hypoxia induced responses and oxygen dispersion in tissue. Hemodynamic remodeling is partially controlled by physical stimuli. This includes the nonlinear dependence of blood vessel diameter (BVD) and cross sectional luminal area (LA) on flow, pressure, wall shear stress and circumferential wall strain. An ODE model of BVD and LA is presented. Methods to incorporate the two models to better describe oxygen delivery of a vascular network to the surrounding tissue are discussed.