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**"Systems biology of angiogenesis"**

**ABSTRACT:** Multiscale computational models of angiogenesis will be presented that include molecular-detailed models of hypoxia-inducible factor (HIF), vascular endothelial growth factors (VEGF), and matrix metalloproteinases (MMPs), as well as agent-based models of capillary sprouting and neovascular network formation. The model of VEGF is extended from molecular to whole body level and is applied to investigate therapeutic pro-angiogenic interventions in peripheral arterial disease and anti-angiogenic interventions in cancer. We also developed a proteome-wide bioinformatics analysis leading to identification of novel anti-angiogenic peptides; we validated the candidates in vitro and in vivo in mouse models of cancer and ocular diseases.