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Physiologically realistic and adaptable models of microvascular networks for exploring disease effects on blood flow distribution in tissue

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Experiments to collect data at multiple vessel levels in a vascular network is challenging and time-consuming task. Thus, microvascular network models that can be used to test hypotheses on the implications of known pathologies is critically important. While models have been proposed over the past 50 years, there is yet to be an adaptable model that is capable of supporting investigations across species, tissues, and disease processes. My research objective is to develop a simulation code that generates statistically realistic vascular network models based on 1) current techniques in biosimulation, and 2) established hemodynamic and physiological MV behaviours. The code should yield adaptable microvascular models where key parameters can be modified to suit specific tissues/organs in which health/disease conditions and experimental challenges can be simulated. Once completed, these models will allow experimenters across various fields to confirm results and test/refine novel hypotheses.