November 2022

A split in the road: Developing blood vessel models that mimic real life

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Title: “A split in the road: Developing blood vessel models that mimic real life”

Blood vessels are like roads which facilitate transport of oxygen and nutrients to and waste away from tissue. Disruption of this process can cause death of surrounding tissue including vessels which can be regenerated in a process called angiogenesis via either sprouting or splitting. Sprouting angiogenesis has been well-characterized using both in vivo and in vitro methods. However, little is known about biochemical and molecular processes underlying splitting angiogenesis, largely due to the lack of in vitro models. To address this, I am developing a blood-vessel-on-a-chip that recapitulates the 3D geometry and biomechanics of a blood vessel using microfluidics to study splitting angiogenesis in vitro for the first time. This model provides an important platform for studying and modulating this critical but poorly understood form of angiogenesis, one that is emerging as an increasingly clinically relevant mode of blood vessel formation associated with development, tumors, and COVID-19 lungs.