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TEMASEK LIFESCIENCES LABORATORY

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The Auditorium (Level 1)

The Making of New Blood Vessels Through Sprouting Angiogenesis

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Dr. Li-Kun Phng is a vascular biologist who has made notable contributions to the understanding of Notch signaling in regulating endothelial tip/stalk cell specification and blood vessel patterning during angiogenesis. In recent years, she has focused her research on investigating endothelial membrane and actin dynamics during sprouting angiogenesis, and uncovered differential roles of specific F-actin structures in regulating vessel morphogenesis.

The vascularization of tissues and organs is crucial during embryonic development and in maintaining tissue homeostasis in adults. In many tissues, blood vessels form through sprouting angiogenesis. In my seminar, I will present the role of Dll4/Notch1 signaling in regulating endothelial tip/stalk cell specification and the function of the Notch target gene, Nrarp, in controlling vessel density during developmental angiogenesis. I will also present more recent work on how the actin cytoskeleton drives changes in endothelial membrane dynamics and cell shape and consequently, regulate vessel morphogenesis. For example, F-actin-rich filopodia promote efficient vessel migration and anastomosis but do not have a role in the guidance of blood vessel patterning. In addition, F-actin cables assemble at endothelial cell-cell junctions during vessel formation in a formin-dependent manner. The failure of junctional F-actin cable assembly results in defects in lumen formation as well as the destabilization of patent vessels, highlighting the importance of actin cytoskeleton at endothelial cell-cell junctions in blood vessel function.

Recent Publications:

1. Franco CA, Jones ML, Bernabeu MO, Geudens I, Mathivet T, Rosa A, Lopes FM, Lima AP, Ragab A, Collins RT, **Phng LK,** Coveney PV and Gerhardt G. Dynamic endothelial cell rearrangements drive developmental vessel regression. PLOS BIOLOGY (2015).
2. **Phng LK**, Gebala V, Bentley K, Philippides A, Wacker A, Mathivet T, Sauteur L, Stanchi S, HG Belting, Affolter M, Gerhardt H. Formin-mediated actin polymerization at endothelial junctions is required for vessel lumen formation and stabilization. DEVELOPMENTAL CELL (2015).
3. **Phng LK,** Stanchi F and Gerhardt H. Filopodia are dispensable for endothelial tip cell guidance. DEVELOPMENT 140, 4031-4040 (2013).