



## ICGEB International SEMINAR PROGRAMME 2018

Friday, 18 May 2018 | 3:00 pm | ICGEB Seminar Room, W building | Padriciano, 99, Trieste, ITALY



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The establishment of a functional patterned vascular network is crucial for development, tissue growth and homeostasis. The mis-patterning or dysfunction of this network is associated with cardiovascular diseases. The formation of a functional vascular network requires two distinct processes – formation of primitive vascular plexuses through sprouting angiogenesis; and vascular remodelling, which reorganizes the primitive plexuses into a hierarchical network of arteries, capillaries and veins. Both morphogenic processes are driven by extensive cell migration and cell rearrangements.

Here, we show that blood flow-induced wall shear stress and VEGF-induced junctional tension are two mechanical forces that direct collective endothelial cell polarity. We demonstrate that blood flow and VEGF compete to orchestrate patterns of endothelial cell polarity at the network-level. We establish that the competitive nature of this interaction defines the transition between two distinct morphogenic events, vascular sprouting and vascular remodeling. Accordingly, manipulation of VEGF gradients or blood flow in vivo compromises normal polarity patterns, resulting in delayed or premature remodeling of blood vessels. At the molecular level, we show that mechanotransduction at adherens junctions is key for VEGF-induced polarization and negatively regulates flow-dependent collective polarization.

Our results highlight how the information relayed by two key organizers of cell polarity is integrated to coordinate collective cell behavior in blood vessels, providing a novel concept for the etiology of cardiovascular diseases.

## “Competing interests in vascular morphogenesis”

Host: S. Zacchigna

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