Cellular and molecular mechanisms that regulate angiogenesis and tissue vascularization

Background/research project

Formation of new blood vessels through angiogenesis is an integrated part in a number of physiological as well as pathological processes. Examples include growth of the embryo, wound healing, cancer, rheumatoid arthritis, and psoriasis. The focus for the research group is to understand molecular and cellular mechanisms that regulate neovascularization. We have recently discovered a novel mechanism of angiogenesis using wound-healing models that has been termed looping angiogenesis (Kilarski et al. Nature Medicine 2009). This model suggests that rapid formation of new vessels in healing wound tissue does not depend on endothelial cell proliferation and sprouting, which typically have been presumed to be needed for the growth of new blood vessels. Instead, tissue tension generated by activated fibroblasts or myofibroblasts during wound contraction mediated and directed translocation of the vasculature. These mechanical forces pull vessels from the preexisting vascular bed as vascular loops with functional circulation that expand as an integral part of the growing granulation tissue through vessel enlargement and elongation. We are now further exploring this novel mechanism.

Methods

We use in vitro models to characterize regulators of angiogenesis that includes molecular biology techniques and experiments on cultured cells. In vivo animal models (mice and chicken eggs) are are used to verify these in vitro findings.

Requirements

The group is well funded and is now searching for a highly motivated new member that could be a PhD student or a post doc. The focus for the applicant will be to establish and develop an in vivo angiogenesis assay based on neovascularization of the mouse cornea. The goal is define mechanisms of looping angiogenesis in detail. The cornea model as such is not new and has been used by the group in collaboration with other researchers. The work will be in collaboration and initially guided by these collaborators. A successful candidate should therefore be interested in animal experiments but also in more cell and molecular biology oriented approaches.

If you are interested please send your CV, references and a short description of yourself preferably before June 15th.

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