BDR SEMINAR in Kobe

Christer Betsholtz

Uppsala University, Karolinska Institute

Thursday, July 25, 2019

11:00-12:00, 1F Auditorium, DB Building C

A single cell perspective on vascular biology

Summary

While all blood microvessels in our bodies are made from the same principal cell types – endothelial and mural cells – they differ fundamentally in their functions between organs. A chief example of microvascular organotypicity is the blood-brain barrier (BBB), which is conceived as central nervous system-specific endothelial specialization. Dysfunction of the BBB may contribute to the pathogenesis of brain diseases, including both common (stroke, Alzheimer's), and rare (e.g. CADASIL, cerebral cavernous malformation, primary familial brain calcification and others) diseases through leakage of neurotoxic substances from the blood to the brain. Conversely, intact BBB functions contribute to the resistance of brain tumors to pharmacological therapy. Cancer drugs are generally blocked from entering the brain through the presence of efflux transporters in the brain endothelium; these recognize xenobiotic compounds, including most low molecular weight drugs. However, the molecular and cellular nature of the BBB is still incompletely understood. For example, it remains unclear if the brain endothelial junctions have unique molecular composition, and to what extent cells other than endothelial cells, including pericytes and other perivascular cell types, contribute to the BBB. To shed light on these and other questions, we have begun constructing a molecular atlas of the BBB and other organotypic vasculatures using single cell RNA sequencing (scRNASeq) and proteomic analysis. I will discuss how this data provides fundamental and specific information about microvascular organotypicity. I will also exemplify how scRNASeq information provides insights into arterio-venous specialization and identifies hitherto unrecognized vascular cell types and subtypes.

Host: Li-Kun Phng
Laboratory for Vascular Morphogenesis, BDR
likun.phng@riken.jp
Tel:078-306-3196 (ext:95-3196)