Pharmacology

Prof. Masanori Hirashima, M.D., Ph.D.

The vascular system comprises blood vessels and lymphatic vessels. It is a lifeline in our body, which play distinct but cooperative role in fluid homeostasis. Defective vascular development is associated with pathological conditions. The aim of our research is to clarify how these vessels are developmentally formed and how pathological conditions can be regulated. We are particularly interested in lymphatic vascular development and pathological conditions caused by developmental defect or aging.

Research interests

1. Lymphatic vascular development and regulation of fluid homeostasis in the mouse.
2. Blood vessel-derived factors regulating lymphatic vascular patterning.
3. Transcription factors in endothelial cells during blood and lymphatic vascular formation and maintenance.
4. Angiocrine factors secreted through endothelial-to-mesenchymal transition during inflammation and cancer progression.

Materials and methods for collaborations

1. Genetically-modified mouse strains causing developmental vascular defects or embryonic phenotypes such as edema.
2. Novel screening system of gene mutant mice causing embryonic phenotypes.
3. Confocal laser scanning microscopy of whole-mount mouse embryos to visualize the vascular system, by using fluorescent reporter strains or immunostaining.
4. Primary endothelial cell culture to investigate the molecular and cellular mechanisms of endothelial cell regulation.

Links to additional info

1. Liu X, et al. Semaphorin 3G provides a repulsive guidance cue to lymphatic endothelial cells via Neuropilin-2/PlexinD1. Cell Rep. 17(9): 2299-2311, 2016. https://doi.org/10.1016/j.celrep.2016.11.008
2. Otowa Y, et al. Flt1/VEGFR1 heterozygosity causes transient embryonic edema. Sci Rep. 6: 27186, 2016. https://www.doi.org/10.1038/srep27186
3. Lab HP (Japanese). https://www.med.niigata-u.ac.jp/pha/