SEMINAR

ALL ARE WELCOME

TEMASEK LIFESCIENCES LABORATORY

6 April 2021 (Tuesday), 3.30pm

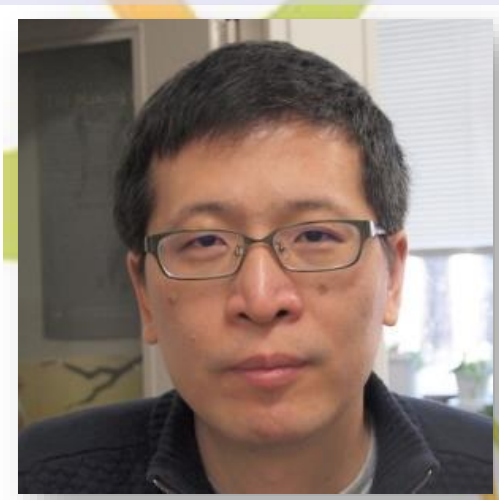
Hosted by: Dr Yu Fengwei

Join Zoom Meeting: https://us02web.zoom.us/j/85027220761

Meeting ID: 850 2722 0761 | Passcode: 840475

Development of avian chorioallantoic membrane

Dr Guojun SHENG
International Research Center for Medical Sciences, Kumamoto University, Japan



In birds and reptiles, chorioallantoic membrane (CAM) forms via fusion of the chorion and allantois, two of the four extraembryonic tissues that are conserved among amniotic vertebrates (the other two being the amnion and yolk sac). The CAM mediates oxygen and calcium uptake during avian and reptilian embryonic development and is the evolutionary precursor of mammalian placenta (which is also known as the chorioallantoic placenta). Failure of CAM formation in mice is embryonic lethal. Cellular and molecular mechanisms mediating CAM fusion are poorly understood. Using the chick model, we have carried out a systematic analysis of CAM fusion. We show that the fusion is mediated by epithelial mesenchymal transition (EMT) of two mesothelial layers, one lining the allantois and the other lining the chorionic ectoderm. Our molecular and morphogenetic data suggest that allantoic mesothelium undergoes an active EMT, whereas chorionic mesothelial EMT is passive. CAM fusion is initiated via salt-and-pepper EMT events of stochastically selected allantoic mesothelial cells and is propagated via a zipper-like action of EMT at the border of chorioallantoic contact. Finally, we will discuss our findings in the context of mammalian placentation and mesothelial pathology.

Dr. Guojun Sheng is a professor at the International Research Center for Medical Sciences and the Graduate School of Medical Sciences in Kumamoto University (Japan). He obtained his Ph.D. in developmental genetics from the Rockefeller University (U.S.A.) in 1997 and received his postdoctoral training in molecular embryology at Columbia University (U.S.A.) and University College London (U.K.). Before joining Kumamoto University in late 2015, Dr. Sheng had directed the Laboratory for Early Embryogenesis at RIKEN Center for Developmental Biology (Japan), first as a Team Leader (2004-2014) and then as a Senior Investigator (2014-2015). Dr. Sheng currently serves as the president of “the Epithelial Mesenchymal Transition International Association” (TEMTIA) (2019-2021) and editor-in-chief of the journal “Cells Tissues Organs” (Karger Publishers) (2018-). He is also actively involved in undergraduate- and graduate-level science education and in promoting cross-cultural and cross-disciplinary collaboration in scientific research. Dr. Sheng’s laboratory uses the avian model to study cellular and molecular mechanisms regulating cell fate changes during early embryonic development. His research focuses on the epithelial-to-mesenchymal transition (EMT) process during mesoderm differentiation and the hematopoietic, vascular and smooth muscle cell lineage specification during early cardiovascular and hematopoietic system formation.

Recent Publications:

1. (2020) Yang et al, Guidelines and definitions for research on epithelial–mesenchymal transition. *Nat Rev Mol Cell Biol* 21, 341–352 https://doi.org/10.1038/s41580-020-0237-9
2. (2020) Hamidi et al, Mesenchymal-epithelial transition regulates initiation of pluripotency exit before gastrulation. *Development* 147(3), dev184960. https://doi.org/10.1242/dev.184960
3. (2020) Weng et al, NPAS4L is involved in avian hemangioblast specification. *Haematologica* 105(11):239434. https://doi.org/10.3324/haematol.2019.239434