# TEMS

Temasek External Monthly Seminar

TEMASEK LIFESCIENCES LABORATORY

**ALL ARE WELCOME**

**2 August 2018 (Thursday), 3.00pm**
**The Auditorium (Level 1)**

**Hosted by: Dr Motegi Fumio**

# Autophagy: lessons from *C. elegans*

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Dr. Hong Zhang is an Investigator in the Institute of Biophysics, CAS. The research in his lab currently focuses on the molecular mechanisms of the autophagic machinery, the regulation of autophagy activity during development and the physiological function of autophagy. Dr. Hong Zhang is an Associate Editor for *Autophagy* and is also on the editorial Board for *eLife, The Journal of Cell Biology, EMBO reports, JCS* and *Cell Death & Differentiation.*

Autophagy involves the enclosure of cytoplasmic material in the autophagosome and its subsequent delivery to the lysosome for degradation. Studies of autophagy in yeast have laid the groundwork for a molecular understanding of the autophagy pathway, but have failed to consider unique multicellular animal-specific mechanisms for the regulation and function of autophagy. My lab established *C. elegans* as one of the premier genetic models to study autophagy (Cell, 2009). Using this model, we carried out the first systematic genetic screens in multicellular organisms and identified a set of metazoan specific autophagy genes, known as *epg* genes (Cell, 2010). Among the identified *epg* genes, we found that EPG-5 acts a tethering factor that determines the fusion specificity of autophagosomes with late endosomes/lysosomes (Mol. Cell, 2016), while EPG-3 controls the ER contacts with autophagosomal structures (Mol. Cell, 2017). We showed that disruption of autophagy at different stages causes distinct pathologic defects in mice (JCB, 2013; Autophagy, 2015). Our study provides insights into how autophagy dysfunction leads to the development of neurodegeneration.

**Recent Publications:**

1. Zhao, G.Y., Liu, N., Miao, G.Y., Chen, Y., Zhao, H.Y, and **Zhang, H**. (2018) The ER contact proteins VAPA/B interact with multiple autophagy proteins to modulate autophagosome biogenesis. *Current Biology* 28, 1234-1245.
2. Zhao, G.Y., Chen, Y., Miao, G.Y., Zhao, H.Y., Qu, W.Y., Li, D.F., Wang, Z., Liu, N., Li, L., Chen, S., Liu, P.S., Feng, D., and **Zhang, H**. (2017) The ER-localized transmembrane protein VMP1 regulates SERCA activity to control ER-isolation membrane contacts for autophagosome formation. *Molecular Cell* 67, 974-989. (Cover story)
3. Wang, Z., Miao, G.Y., Xue, X., Guo, X.Y., Yuan, C.Z., Wang, Z.Y., Zhang, G.M., Feng, D., Hu, J.J., and **Zhang, H.** (2016) The Vici syndrome protein EPG5 is a Rab7 effector that determines the fusion specificity of autophagosomes with late endosomes/lysosomes. *Molecular Cell* 63, 781-795.