

Molecular Interplay of Autophagy and Endocytosis in Plant Cells

Xiaohong Zhuang

Centre for Cell & Developmental Biology and State Key Laboratory of Agrobiotechnology, School of Life Sciences, The Chinese University of Hong Kong, Hong Kong SAR, P. R. China

Email: xhzhuang@cuhk.edu.hk

As a fundamental metabolic pathway, autophagy plays important roles in plant growth and development, particularly under stress conditions. During autophagy, cargoes are encapsulated into a de novo formed double-layer structure termed an autophagosome and delivered into the vacuole for degradation or recycling. Despite the evolutionarily conserved functions of two conjugation systems, the molecular actions of plant autophagic regulators remain poorly understood. Previous studies have shown that under normal condition, the plant-specific autophagic regulator SH3 domain-containing protein 2 (SH3P2) mainly participates in the clathrin-coated vesicle (CCV)-mediated endocytosis and cell plate formation. Upon autophagic induction, SH3P2 interacts with the autophagosomal marker autophagy-related (ATG) protein 8 and is recruited to the autophagosomal membrane. Our recent study showed that SH3P2 carries an atypical ATG8-interacting motif (AIM) for binding with ATG8. Intriguingly, by mass spectrometry analysis, we have identified several phosphorylation sites upstream/downstream of the SH3P2 AIM. Here we will present our recent data about SH3P2 to highlight a novel mechanism for its interplay between plant autophagy and endocytosis.

References:

1. Sun S, Feng L, Chung KP, Lee KM, Cheung HHY, Luo M, Ren K, Law KC, Jiang L, Wong KB, Zhuang, X. * Mechanistic insights into an atypical interaction between ATG8 and SH3P2 in *Arabidopsis thaliana*. (2021) *Autophagy*. 6:1350-1366
2. Ren K, Feng L, Sun S and Zhuang, X. * (2021) Plant Mitophagy in Comparison to Mammals: What Is Still Missing? *International Journal of Molecular Sciences*. 2021, 22, 1236.
3. Zhuang, X., Wang, H., Lam, S.K., Gao, C., Wang, X., Cai, Y., and Jiang, L. (2013). A BAR-domain protein SH3P2, which binds to phosphatidylinositol 3-phosphate and ATG8, regulates autophagosome formation in *Arabidopsis*. *Plant Cell* 25, 4596-4615.