Center for Soft Matter and Biological Physics

Discussion Meeting

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"The Functional Basis of Phafin2 in Autophagy"

Friday, June 7, 2019

1:30pm - 2:30pm

304 Robeson Hall

Autophagy is a highly conserved cellular pathway in the eukaryotic cells. A portion of the cytosol, which contains invading pathogens and long-lived proteins, is taken up by an autophagosome. This double-membrane organelle fuses with lysosomes, where the contents were digested by the lysosomal enzymes. Previous data showed that Phafin2 was involved in autophagy. After the induction of autophagy, Phafin2 and Akt accumulate on the lysosomal membranes through the interactions between Phafin2 and phosphatidylinositol 3-phosphate (PtdIns(3)P). Phafin2 has two domains, one N-terminal PH (Pleckstrin Homology) domain and one C-terminal FYVE (Fab 1, YOTB, Vac 1, and EEA 1) domain. In this study, the binding affinity between PtdIns(3)P and Phafin2 was studied by surface plasmon resonance. Results showed that Phafin2 binds PtdIns(3)P with high affinity, triggering minor conformational changes in the protein. We also demonstrated that Phafin2 FYVE domain is responsible for the binding of PtdIns(3)P. Another interesting finding is that Phafin2 can cause membrane curvature, which may be required for tethering of lysosomes to autophagosomes, and consequently initiating autophagy.