IN BRIEF

ENDOCYTOSIS

A gene network regulating lysosomal biogenesis and function

Sardiello, M. *et al. Science* **325**, 473–477 (2009)

It has been unclear whether lysosomal activity is coordinated to respond to cellular needs. A new study now provides insight by uncovering a network of lysosomal genes, the transcription of which is regulated by transcription factor EB (TFEB). Microarray analysis revealed that nearly 300 genes are upregulated in response to TFEB overexpression, including many lysosomal genes and genes related to lysosomal biogenesis. TFEB overexpression causes an expansion of the lysosomal compartment. The lysosomal network is also activated in response to the storage of undegraded molecules in the lysosome, and its activation enhances the cellular clearance of glycosaminoglycans and polyglutamine-expanded huntingtin protein. This genetic programme could provide a potential therapeutic target to enhance cellular clearing in lysosomal storage disorders and neurodegenerative diseases.

ENDOCYTOSIS

Differential requirements for actin during yeast and mammalian endocytosis

Aghamohammadzadeh, S. & Ayscough, K. R. *Nature Cell Biol.* **11**, 1039–1042 (2009)

One notable difference between yeast and mammalian cells is that actin is absolutely required for endocytosis in yeast, whereas it is less crucial for endocytosis in mammalian cells. The authors now provide an explanation for this difference by showing that the endocytosis defects in mutant yeast strains that lack actin-bundling proteins can be rescued by reducing the cellular turgor pressure; even the absence of actin itself could be partially rescued. Conversely, yeast mutant strains that have increased cell turgor pressure showed reduced plasma membrane invagination. The authors conclude that, in yeast, an actin network is needed in the early stages of endocytosis to support the force generation that is required to pull the plasma membrane into the cell against the internal turgor pressure.

ENDOCYTOSIS

The retromer coat complex coordinates endosomal sorting and dynein-mediated transport, with carrier recognition by the *trans*-Golgi network

Wassmer, T. *et al. Dev. Cell* **17**, 110–122 (2009)

The retromer complex coordinates cargo sorting from early endosomes back to the *trans*-Golgi network (TGN) with membrane deformation and carrier formation. However, how retromer complexes coordinate these activities has been unclear. Wassmer *et al.* describe four mammalian retromers, which contain specific combinations of the sorting nexins SNX1, SNX2, SNX5 and SNX6. SNX5 and SNX6 associate with p150glued, a subunit of the minus-end-directed microtubule motor complex dynein–dynactin, whereas SNX1 associates with RAB6IP1, a binding partner of the TGN-localized GTPase RAB6. By coupling to molecular motors, SNX proteins (which each contain a membrane-bending BAR domain) coordinate membrane deformation with long-range transport between donor and recipient compartments. The association of SNX1 with RAB6IP1 enables retromer-labelled transport carriers to recognize their recipient TGN membrane. These interactions establish a spatially organized retromer network.