IN BRIEF

CYTOSKELETON

Tubulin polyglutamylation stimulates spastin-mediated microtubule severing

Lacroix, B. *et al. J. Cell Biol.* 7 Jun 2010 (doi:10.1083/jcb.201001024)

Microtubule polyglutamylation is thought to contribute to cytoskeletal organization, but little is known about its functional relevance. Lacroix *et al.* overexpressed tubulin Tyr ligase-like proteins (TTLLs), which catalyse the addition of glutamylated chains of different lengths, in interphase HeLa cells (which normally have low levels of glutamylation). Long Glu side chains induced microtubule loss more efficiently than short ones. Microtubule disassembly requires the activity of spastin (a microtubule-severing protein), which is directly activated by polyglutamylation. The authors confirmed spastin-mediated severing of differentially modified microtubules *in vitro* and showed that TTLLs which generate long Glu chains also activate the microtubule-severing protein katanin p60 *in vivo*. So, polyglutamylation might control microtubule dynamics, but how it is spatiotemporally regulated remains to be determined.

AUTOPHAGY

Termination of autophagy and reformation of lysosomes regulated by mTOR

Yu, L. *et al. Nature* 6 Jun 2010 (doi:10.1038/nature09076)

During autophagy, double-membrane autophagosomes sequester cellular components and fuse with lysosomes to form autolysosomes, which degrade their contents and regenerate nutrients. Autophagy is induced by starvation, but its regulation and the autolysosome fate are unclear. Yu *et al.* observed that shortly after starvation initiation, lysosomes disappear by forming autolysosomes, but reform and reach their initial numbers after 12 hours of starvation. Microscopy analysis revealed that the regenerated lysosomes originate from tubules and vesicles deriving from autolysosomes. Which signals control this process? Mammalian target of rapamycin (mTOR) is a nutrient-responsive kinase, the inactivation of which on starvation induces autophagy. Nutrients generated by autophagy were shown to stimulate mTOR signalling, which downregulates autophagy and triggers lysosome formation. Thus, mTOR signals to stop autophagy and restore lysosome homeostasis.

DNA REPAIR

Ku70 corrupts DNA repair in the absence of the Fanconi anemia pathway

Pace, P. *et al. Science* 10 Jun 2010 (doi:10.1126/science.1192277)

The Fanconi anaemia pathway regulates the removal of interstrand DNA cross links. It uses a nuclear protein complex that ubiquitylates the downstream effector FANCD2, among others, leading to the formation of DNA repair structures. Fanconi anaemia proteins resolve DNA double-strand breaks (DSBs) created at cross links, but how this occurs was unclear. FANCC-deficient cells are sensitive to DNA cross links, and Pace *et al.* now find that the concomitant disruption of *Ku70* (also known as *XRCC6*) increases resistance to cross-linkers; this indicates a genetic interaction between *FANCC* and *Ku70*. Ku70 is known to bind DSB ends, thereby committing them to abortive non-homologous end joining repair, which interferes with homologous recombination. The authors show that the Fanconi anaemia pathway antagonizes Ku70 activity and diverts repair towards homologous recombination, possibly through the 3′–5′ exonuclease activity of FANCD2.