MLL5 limits PLK1 aggregation

Zhao et al. reveal that the prospective tumor suppressor MLL5 helps mitotic cells maintain a bipolar spindle by preventing the kinase PLK1 from aggregating in the cytosol. MLL5, whose gene is often deleted in patients with acute myeloid leukemia, localizes to nuclear speckles and regulates chromatin organization and the cell cycle. During mitosis, cells lacking MLL5 form multipolar spindles with misaligned chromosomes, resulting in genomic instability. MLL5 promotes chromosome alignment by stabilizing the Aurora B kinase-containing chromosomal passenger complex, but how MLL5 limits the formation of multipolar spindles remains unknown.

Zhao, W., et al. 2016. J. Cell Biol. http://dx.doi.org/10.1083/jcb.201501021

A switch for stress granule assembly

Kedersha et al. describe how phosphorylation and the competition between mutually exclusive binding partners regulate G3BP’s ability to mediate stress granule assembly. When translation initiation is inhibited, mammalian polysomes disassemble into ribonucleoprotein particles that form microscopically visible stress granules (SGs). The RNA-binding protein G3BP can nucleate SG assembly—its overexpression induces SG formation even in translation competent cells—but how the protein does this, and how its activity is regulated, remains unknown.

Kedersha, N., et al. 2016. J. Cell Biol. http://dx.doi.org/10.1083/jcb.201508028

How Gpr161 exits from cilia

Pal et al. describe how a G protein–coupled receptor (GPCR) that inhibits sonic hedgehog (Shh) signaling is removed from the primary cilium in response to activation of the pathway. Shh signaling is associated with trafficking of proteins into and out of the primary cilium. For example, upon activation of the pathway, the signal transducer Smoothened accumulates in the cilium, while the constitutively active orphan GPCR Gpr161, which suppresses Shh signaling, is quickly expelled. How Gpr161 is removed from the cilium is unknown; GPCRs are generally removed from the plasma membrane by clathrin-mediated endocytosis, but clathrin only localizes to the base of the cilium—at the ciliary pocket—rather than in the cilium itself.

Pal, K., et al. 2016. J. Cell Biol. http://dx.doi.org/10.1083/jcb.201506132