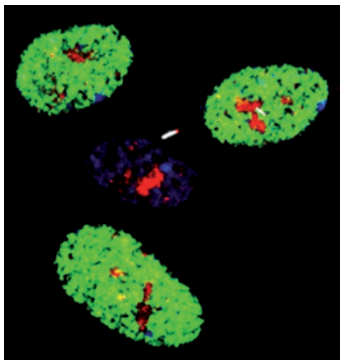
Anchoring the pole plasm

The pole plasm, a cytoplasmic region containing maternal mRNAs and proteins at the posterior of *Drosophila* oocytes, is essential for germline and abdominal development. Pole plasm assembly is initiated by the microtubule-dependent transport of *oskar* (*osk*) mRNA to the posterior, where the Osk protein stimulates endocytic and actin-remodelling events essential for germ plasm functionality. Nakamura and colleagues (*Development* **138,** 2523–2532; 2011) have found that Mon2, a protein associated with Golgi and endosomes, acts downstream of Osk to remodel cortical actin and anchor the pole plasm. *mon2* was identified in a screen for genes required for the localization of the pole plasm component Vasa. The authors found that Osk-induced formation of actin protrusions was perturbed in *mon2* mutants, as seen previously in endosomal GTPase *rab5* mutants. A *mon2* mutation rescued actin defects in *rab5* mutants, and Mon2 was found to interact with the actin nucleators Spire and Cappuccino, both linked to Vasa localization in the screen. Cappucino and Spire were also required for Osk-induced formation of actin protrusions. Consistent with a role for Mon2 in mediating actin-related events, *mon2* mutant oocytes did not exhibit posterior accumulation of the small GTPase Rho.

Understanding exactly how Mon2 couples endocytic activity with cortical actin remodelling will be next on the agenda. NLB

A kinesin in ciliogenesis



In serum-starved cells, the primary cilium is nucleated from the mother centriole. Both cilia formation and centriole elongation is restricted by the centrosomal protein CP110. Brian Dynlacht and co-workers have now identified the kinesin Kif24 as a CP110-binding protein and regulator of cilia assembly (*Cell* **145,** 914–925; 2011).

The authors identified the uncharacterized kinesin Kif24 as a protein that binds both CP110 and the CP110-interacting protein Cep97 in a proteomics screen. Kif24 localizes mainly to the mother centriole and basal body, and its RNAi-mediated depletion leads to increased ciliogenesis in cycling cells — as has been found after CP110 or Cep97 depletion in previous studies — and to loss of CP110 at the mother centriole. However, unlike CP110/Cep97, endogenous Kif24 does not restrain centriole elongation. Ectopic expression of Kif24 specifically destabilizes centriolar, but not cytoplasmic, microtubules. *In vitro* experiments confirm the ability of Kif24 to bind and depolymerize microtubules. Furthermore, Kif24 overexpression suppresses cilia formation in starved cells, but, surprisingly, also suppresses centriole elongation induced by Cep97 depletion. In both cases the microtubule depolymerizing domain of Kif24 is required.

Thus, the authors suggest that Kif24 suppresses cilia assembly from the mother centriole through two mechanisms: by stabilizing or recruiting CP110 and through microtubule remodelling. CKR

An OPTN for autophagy of *Salmonella*

Autophagy receptors promote selective clearance of substrates by linking specific cargo molecules to the LC3 autophagy machinery. However, the signals that regulate receptor function have remained elusive. Dikic and colleagues now show that phosphorylated optineurin (OPTN) interacts with ubiquitin-coated *Salmonella*, and promotes the autophagy-mediated growth inhibition of the targeted bacteria. This suggests that OPTN is an autophagy receptor for *Salmonella* (*Science* doi: 10.1126/science.1205405).

OPTN was shown to interact with both ubiquitin chains and LC3/GABARAP proteins, but through different domains. Wild-type OPTN, but not ubiquitin- or LC3-binding-deficient mutants, localized to LC3-positive vesicles following autophagy induction, suggesting that OPTN functions as an autophagy receptor. Intriguingly, OPTN phosphorylation — by TBK1 (Tank-binding kinase 1) — enhanced the interaction between OPTN and $LC3_B$. TBK1 is known to be recruited to ubiquitin-coated *Salmonella* and restrict its proliferation; therefore, the authors investigated whether TBK1-mediated phosphorylation of OPTN was important for suppression of *Salmonella* growth.

Indeed, OPTN was recruited to ubiquitin-decorated *Salmonella*, where it co-localized with TBK1 and $LC3_B$. A phosphorylation-deficient OPTN mutant could not efficiently recruit $LC3_B$ to these structures. The ubiquitin- and LC3-binding domains of OPTN were both important for its ability to repress *Salmonella* growth. Together, these data suggest that OPTN bridges ubiquitin to $LC3_B$ in a phosphorylation-dependent manner, targeting ubiquitylated *Salmonella* for autophagy. EJC

miRNA control of glucose metabolism

Insulin signalling is controlled by restricting the insulin receptor to caveolae, membrane microdomains rich in caveolin-1. Markus Stoffel and colleagues now show that microRNAs (miRNAs) 103 and 107 regulate insulin signalling through direct targeting of caveolin-1 (*Nature* doi: 10.1038/nature10112).

The authors found that miRNAs 103 and 107 were upregulated in livers of obese mice. Tail-vein injection of adenovirus expressing miR-107 increased hepatic glucose production and decreased insulin sensitivity, while global miR-103/107 silencing increased insulin sensitivity in liver and adipose tissue. miR-103/107 was found to regulate fat levels by modulating the number of small versus large adipocytes. A function for miR-103/107 in adipocyte differentiation was confirmed by analysing pre-adipocyte differentiation in culture. In agreement with a role for the miR-103/107 in glucose metabolism in fat tissue, overexpression of miR-107 in fat pads also decreased glucose tolerance and insulin sensitivity. Gene profiling identified *Cav1* as a potential target, and miR-103/107 directly targeted the *Cav1* 3′ UTR in reporter assays and in cells. Insulin signalling was enhanced after miR-103/107 depletion, and experiments on *Cav1*-null mice showed that the effects of miR-103/107 on glucose metabolism were largely dependent on caveolin-1. The authors suggest miR-103/107 could be a target for diabetes treatment. CKR

Written by Emily J. Chenette, Nathalie Le Bot and Christina Karlsson Rosenthal