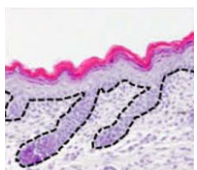


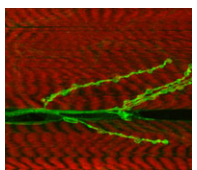
Wnt/PCP signalling, microtubules and gastrulation

During vertebrate gastrulation, convergence and extension (C&E) movements shape the germ layers to form the anteroposteriorly elongated body axis of vertebrate embryos. Non-canonical Wnt/planar cell polarity (Wnt/PCP) signalling regulates C&E by polarising the morphology and behaviour of cells, which suggests that the Wnt/PCP pathway might influence the microtubule cytoskeleton. Here, Lila Solnica-Krezel and co-workers investigate this possibility by assessing the position of the centrosome/microtubule organising centre (MTOC) relative to the cell nucleus and the body axes during zebrafish gastrulation (see p. 543). They report that MTOCs occupy a polarised position within the plane of the ectoderm and mesoderm, becoming biased to the posterior and dorsal/medial side of the cell between mid and late gastrulation. This polarisation, they report, depends on intact Wnt/PCP signalling. Conversely, microtubule disruption experiments show that microtubules are required to initiate the anterior localisation of Prickle, a core PCP signalling component. These and other results suggest that reciprocal interactions between Wnt/PCP signalling and the microtubule cytoskeleton are required during C&E gastrulation movements.



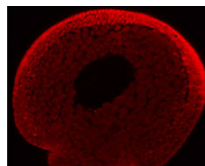
Skin deep: Adam10 regulates Notch signalling

Notch signalling plays a crucial role in the development and maintenance of the epidermis: the stratified epithelium that forms the skin's outer layer and protects organisms from dehydration, mechanical trauma and microbial invasion. Now, on p. 495, Carien Niessen, Paul Saftig and colleagues reveal that the disintegrin/metalloproteinase Adam10, a 'shedase' involved in Notch processing, is essential for epidermal integrity and Notch-mediated epidermal signalling in mice. The researchers show that epidermal-specific deletion of Adam10 in mouse embryos leads to perinatal death, impairment of the skin's barrier function and an absence of sebaceous glands. Moreover, deletion of Adam10 in adult mice causes hair loss, epidermal hyperproliferation and cyst formation. These phenotypes closely resemble those produced by epidermal inactivation of Notch signalling. Indeed, the researchers report that epidermal loss of Adam10 severely impairs Notch processing and signalling in the epidermis. Together, these data identify Adam10 as the major Notch processing enzyme in the epidermis *in vivo* and as a central regulator of skin development and maintenance.



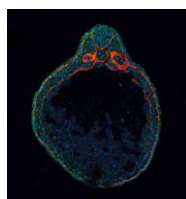
SAD (kinase) tales of neural-specific glycans

Several aspects of neural development and function rely on the regulated expression of specific glycans, but what are the mechanisms that govern neural-specific glycosylation during embryogenesis? On p. 553, Michael Tiemeyer and colleagues report that Sugar-free frosting (Sff) – the *Drosophila* homologue of SAD kinase, which regulates synaptic vesicle tethering and neuronal polarity in nematodes and vertebrates – drives neural-specific glycan expression in the *Drosophila* embryo prior to synaptogenesis. They performed a genetic screen for mutations that affect the expression of neural-specific N-linked glycans known as HRP-epitopes; neural expression of HRP-epitopes requires ectodermal expression of Tollo, a *Drosophila* Toll-like receptor. Analysis of the *sff* mutant recovered from this screen reveals that Sff modulates glycan complexity by altering Golgi dynamics in neurons that respond to Tollo transcellular signals. The researchers propose that multiple protein kinases facilitate flux through divergent Golgi processing pathways, thereby sculpting tissue-specific glycan expression patterns during development.



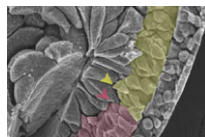
nanos1: novel structure-based translational regulation

During development, translational control of mRNAs regulates gene expression. Translational control is usually achieved through binding of trans-acting factors to mRNA untranslated regions but, on p. 589, Mary Lou King and co-workers reveal a novel, structure-based mechanism for translational repression of *Xenopus* germline *nanos1*. Nanos translational repressors maintain primordial germ cell identity during development. *nanos1* RNA is transcribed during early oogenesis and stored in germinal granules. Surprisingly, the researchers report that, unlike other mRNAs, *nanos1* RNA translates poorly after injection into *Xenopus* oocytes. Thus, sequestration within germinal granules cannot explain translational control of *nanos1* mRNA. Instead, they report, a secondary structural element immediately downstream of the mRNA start site is necessary and sufficient to repress the initiation of *nanos1* translation through steric hindrance of ribosome scanning; insertion of 15 nucleotides between the start codon and this element relieves repression. Although structure-based translational regulation is common in prokaryotes it has not been observed before in eukaryotes and represents a new, developmentally important mode of *nanos1* regulation.



Fast Nodal/Lefty movements set LR asymmetry

Nodal and its feedback inhibitor Lefty instruct left-right (LR) asymmetry in vertebrates, but what controls the spatial distribution of these ligands in the embryo? On p. 475, Lindsay Marjoram and Christopher Wright address this question by expressing functional epitope-tagged Nodal and Lefty from grafts implanted into tailbud *Xenopus* embryos. Both ligands move long distances along the extracellular matrix (ECM), they report, with Lefty moving faster than Nodal. Moreover, sulphated proteoglycans in the ECM seem to facilitate Nodal movement. Thus, the researchers propose, Nodal autoregulation aided by rapid ligand transport underlies the anteriorward shift of Nodal expression along the left lateral plate mesoderm (LPM), with higher levels of chondroitin-sulphate proteoglycan in more mature anterior regions providing directional transport cues. Finally, they report, Lefty moves from the left to the right LPM, a result that strengthens LR patterning models that involve active blocking of right-sided Nodal expression. Future molecular studies into how Nodal and Lefty interact with sulphated proteoglycan-rich ECM should provide additional insights into the establishment of LR asymmetry.



Moved to radial intercalation by PDGF-A

Radial intercalation – a common morphogenetic process in which cells from germ layers deep in developing embryos interdigitate into more superficial layers – is essential for the tissue rearrangements that occur during gastrulation. Here (p. 565), Erich Damm and Rudolf Winklbauer use scanning electron microscopy and time-lapse recordings to analyse radial intercalation in the prechordal mesoderm (PCM) during *Xenopus* gastrulation. They show that this process involves cell reorientation in response to a long-range platelet-derived growth factor A (PDGF-A) signal and directional intercellular migration towards the ectoderm, the source of this signal. The PCM, they report, fails to spread during gastrulation when endogenous PDGF-A signalling is inhibited. However, expression of a short-splicing isoform of PDGF-A, but not of a long-splicing form that binds to the extracellular matrix, rescues PCM radial intercalation. These results provide the first insights into the molecular basis of radial intercalation movements in the vertebrate gastrula and identify distinct roles for PDGF-A isoforms during gastrulation.

Jane Bradbury