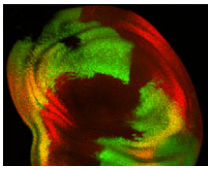
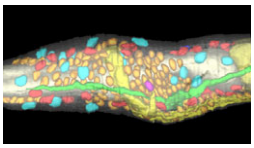


Size control: no (cell) competition

In *Drosophila* imaginal wing discs that contain cells that proliferate at different rates because they carry *Minute* mutations, fast-growing, non-minute M^+ cells contribute much more to the final disc than do slow-growing *M*/+ cells. Yet, the final disc size is unaffected. This suggests that specific interactions between cells may cause the elimination by apoptosis of slow-growing cells by fast-growing cells – so-called cell competition. However, Ginés Morata and colleagues now report that prevention of apoptosis does not affect the compartment size in developing imaginal discs, even in the presence of overgrowing M^+ clones (see p. 3747). The overgrowth of M^+ cells, they report, is solely due to their higher division rate. The researchers propose, therefore, that the contribution of each cell type to the disc compartment is exclusively determined by its division rate rather than by cell competition, and that a size control mechanism stops growth once the compartment reaches the correct size, a conclusion that is supported by their computer simulations.

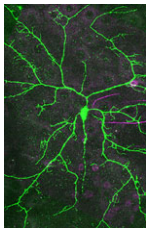
Shh BuMPed off in developing limbs

During limb development, the zone of polarizing activity (ZPA) in the limb bud controls the bud's growth and patterning by producing the signalling molecule sonic hedgehog (SHH). Any alteration in *Shh* expression affects limb development but, although the factors that activate and maintain *Shh* expression have been identified, what restricts *Shh* expression to the ZPA is unclear. Now, on p. 3779, Bastida and colleagues reveal the central role that bone morphogenetic protein (BMP) plays in restricting *Shh* expression during posterior limb development in mice and chicks. The researchers show that BMP indirectly downregulates *Shh* expression by interfering with the FGF and Wnt signalling pathways that maintain *Shh* expression. Furthermore, they report, because SHH positively regulates the expression of BMP genes, a negative-feedback loop operates between BMPs and SHH to confine *Shh* expression to the ZPA. Finally, BMP gene expression is positively regulated by FGF signalling and negatively regulated by an auto-regulatory loop. Together, these results reveal the complex crosstalk between signalling pathways that ensures accurate limb development.



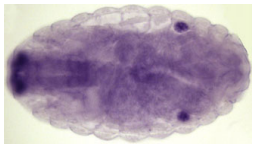
Wnt5 Rors out nematode brain development

The nerve ring – the most anterior axon bundle in *C. elegans* – is derived from over half of the animal's neurons and is regarded as the animal's brain. Now, on p. 3801, Cornelia Bargmann and co-workers report that Wnt signalling through a Ror tyrosine kinase homologue directs the development of this primitive brain. The researchers identify *cwn-2*, the *C. elegans* homologue of Wnt5, as a regulator of nerve ring placement in a genetic screen. They report that *cwn-2*, which is expressed in cells posterior to the nerve ring, acts mainly through CAM-1, the *C. elegans* Ror2 homologue, an unexpected result given that CAM-1 is a non-signalling receptor in other *C. elegans* Wnt signalling pathways. Other experiments show that the SIA and SIB neurons, which lie near the base of the nerve ring, play a crucial role in positioning the nerve ring. The researchers suggest, therefore, that *cwn-2* directly affects axon guidance of the SIA and SIB neurons, which then organize the nerve ring.



Mitochondrial Prel-ude to neurodegeneration

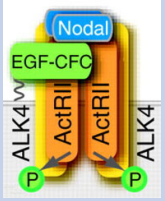
Abnormal mitochondrial morphology and dysfunction are often seen in neurodegenerative diseases, but the reason for this association is unclear. Now, Tsubouchi and colleagues report that the *Drosophila* mitochondrial protein Preli (protein of relevant evolutionary and lymphoid interest)-like (Prel), a member of the conserved PRELI/MSF1 family, is required for the development and maintenance of dendritic arbors in *Drosophila* sensory neurons (see p. 3757). The researchers identified *Prel* as a gene that affects the morphology of class IV (highly branched) dendritic arborization (da) sensory neurons in an overexpression screen. Both *prel* loss of function and overexpression, they report, abrogate mitochondrial structures and activity in *Drosophila* da neurons. Furthermore, when Prel function is impaired in vivo in class IV da neurons, the neurons simplify and downsize their dendritic arbors, and breakages appear in some of their major branches. These and other observations suggest that Prel-dependent regulation of mitochondrial activity prevents the regression of dendritic branches and that the human homologue of *Prel* may be mutated in some human neurodegenerative diseases.



Somatic cells drive sex in early gonad development

Sexual reproduction in animals requires the proper differentiation of the germline into male or female gametes, but when and how is germline sex determined? On p. 3821, Abbie Casper and Mark Van Doren report that this important event occurs early in embryonic gonad development in *Drosophila* and is controlled mainly by signals from somatic cells (the soma). The researchers identify genes that are expressed in a sex-specific manner in embryonic germ cells and show that these genes start to be expressed at the time of gonad formation. By altering the sex of the soma relative to that of the germline, they show that germ cells largely take on the sex of these surrounding cells, irrespective of their own sex chromosome constitution. By contrast, inactivating the genes thought to act autonomously in the germline to cause sex determination has little effect on the establishment of germline sexual identity. Thus, signals from the soma are, surprisingly, dominant over germline autonomous cues during the initial stage of germline sex determination in *Drosophila*.

Jane Bradbury



Minifocus: Tgfβ signalling in the spotlight

Over the past few years, studies of the complex transforming growth factor β (Tgfβ) signalling pathway have yielded many new insights into how this pathway is regulated, both extracellularly and intracellularly, and how it functions in the context of development and disease. This pace of progress is reflected in a Minifocus on Tgfβ signalling published in this issue, and particularly so in Kristi Wharton and Rik Derynck's review of a recent FASEB meeting on TGFβ signalling (see p. 3691). For an appraisal of our current understanding of how Tgfβ signal transduction is regulated, see the review by Aristidis Moustakas and Carl-Henrik Heldin (p. 3699). Also in the Minifocus, David Umulis and colleagues discuss, on p. 3715, the molecules and processes that regulate Tgfβ signalling extracellularly, often in a context-specific manner. Finally, Pascal Kahlem and Stuart Newfeld illustrate in their review how phylogenetics and mathematical modelling can be used to explore and discover the molecular mechanisms that underlie the regulation and activity of this pathway (see p. 3729).