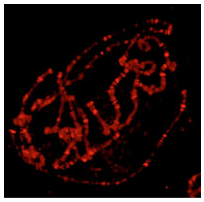
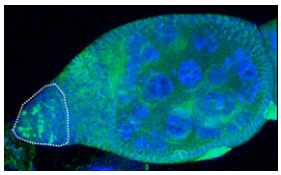


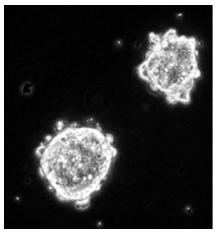
Novel larval PcG complex revealed

Drosophila Polycomb-group (PcG) proteins are transcriptional repressors that regulate gene expression throughout fly development. In larval wing imaginal discs, the hierarchical recruitment of three PcG complexes (PhoRC, which contains the DNA-binding proteins Pho and/or Pho1, followed by PRC2, which contains the E(z) chromatin-modifying subunit, and finally PRC1) to the *bxd* Polycomb Response Element (PRE) of *Ultrabithorax* (*Ubx*) represses the expression of this Hox gene. Now, on p. 813, Richard Jones and colleagues identify a new larval PcG complex, PCLC, which contains Polycomblike (Pcl), and reveal its place in this recruitment hierarchy. In embryos, Pcl associates mainly with PRC2, but in larvae, the researchers report, it is present in a larger complex that does not contain E(z). Other experiments place PCLC downstream of the binding of PhoRC to the *bxd* PRE, and upstream of PRC2 and PRC1 binding. The inclusion of Pcl in different PcG complexes at distinct developmental stages might indicate that different molecular activities are needed for gene silencing in fly embryos and larvae, suggest the researchers.



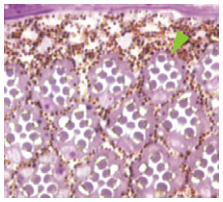
Cyclooxygenase: vital role in follicle maturation

Prostaglandins are local transient hormones that mediate many biological activities, including pain and several aspects of female reproduction. Little is known about prostaglandin signalling during reproduction but on p. 839, Tina Tootle and Allan Spradling report for the first time that *Drosophila* egg maturation requires a cyclooxygenase (COX)-like activity. COX is the rate-limiting enzyme in vertebrate prostaglandin synthesis and COX inhibitors are widely used as painkillers. Using an in vitro egg maturation assay, the researchers show that the COX inhibitor aspirin halts follicle maturation. They also identify the *Drosophila* peroxidase Pxt as a candidate COX enzyme and show that maturing follicles in *pxt* mutant females (which are sterile) have defects in actin filament formation. The maturation of *pxt* follicles in vitro is stimulated by prostaglandin treatment, they report, and the expression of mammalian Cox1 restores the fertility of *pxt* mutants. Thus, the researchers conclude, prostaglandins promote *Drosophila* follicle maturation, making fly oogenesis a useful model for genetic studies on these important biological regulators.



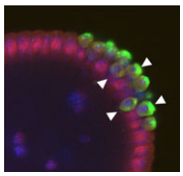
ES cells: a pluripotent mix

Pluripotent embryonic stem (ES) cells are derived from the inner cell mass (ICM) and epiblast of mammalian embryos. Given their origin, do ES cell cultures contain cells at a single developmental stage or mixtures of cells at slightly different stages? On p. 909, Toyooka and colleagues report that these cultures actually contain subpopulations of cells that correspond to ICM, epiblast and primitive ectoderm (PrE). The ICM expresses Oct3/4 (a transcription factor that maintains pluripotency) and Rex1 (a marker of pluripotency); the PrE expresses only Oct3/4. By using ES cell lines in which genes for fluorescent proteins have been inserted into the *Rex1* and *Oct3/4* gene loci, the researchers identified subpopulations of $Rex1^{+}/Oct3/4^{+}$ (ICM-like) cells and $Rex1^{-}/Oct3/4^{+}$ (PrE-like) cells in undifferentiated ES cell cultures. These subpopulations can interconvert in vitro, they report, but have different differentiation potencies in vitro and in vivo. Given these results, the researchers suggest that their gene knock-in approach could help to identify the factor(s) that turn ICM into PrE.



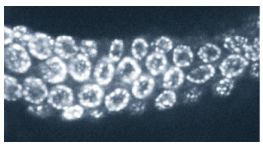
Axin' APC levels in Wg signalling

During *Drosophila* development, the Wingless (Wg) morphogen modulates the activity of the transcriptional activator Armadillo (Arm/β-catenin) by inactivating a destruction complex that targets it for proteolysis. In the prevailing model of Wg signal transduction, Axin levels limit the activity of this destruction complex (consisting of Axin, Apc and the GSK3 homolog Zeste-white 3), whereas Apc is present in vast excess. Now, on p. 963, Benchabane and co-workers propose that Apc activity is also present in limiting amounts in the developing *Drosophila* retina, to ensure accurate concentration-dependent responses to Wg. When the researchers tested the prevailing model in developing retinas, they unexpectedly discovered that the loss of *Apc2* (which reduces total Apc activity by less than twofold) caused ectopic Wg signalling and aberrant cell fate specification in regions of low Wg concentration. The researchers conclude that within the retinal Wg gradient, both Axin and Apc are present near the threshold levels required for Arm destruction, and together ensure accurately graded responses to Wg.



Nanos localization: tails with Rumpelstiltskin

Anterior-posterior (AP) axis patterning in *Drosophila* embryos requires the posterior localization of the translational regulator Nanos, which is brought about by the prior posterior localization of *nanos* mRNA. This localization process is mediated by a signal in the 3′ untranslated region of *nanos*, which, because of its complexity, has hindered the identification of the trans-acting factors that drive *nanos* mRNA localization. Now, Roshan Jain and Elizabeth Gavis have discovered that Rumpelstiltskin (Rump), a *Drosophila* heterogeneous nuclear ribonucleoprotein (hnRNP) M homolog, regulates *nanos* mRNA localization (see p. 973). The researchers identified Rump as a protein that binds to the *nanos* +2′ localization element by RNA-affinity purification. They show that Rump recognizes two CGUU motifs in this element in vitro that are needed for posterior localization by this element in vivo. Finally, analysis of a *rump*-null mutant shows that Rump regulates AP patterning by playing a direct role in localizing *nanos* RNA, thus providing the first example of an hnRNP M homolog regulating mRNA localization.



New DEPS to P granule assembly and RNAi

Germ granules (P granules in *C. elegans*) are germ-cell-specific cytoplasmic organelles that contain RNAs and proteins. Their molecular functions, which are required for germ cell specification, probably include the regulation of mRNA expression. On p. 983, Spike and colleagues provide new insights into this possible function by characterizing a new gene, *deps-1*, that promotes P-granule assembly and RNAi in *C. elegans* germ cells. They show that DEPS-1, a P-granule-associated protein, is required for several cellular events, including the expression of the granule-associated RNA helicase GLH-1, the constitutive association of PGL-1 (an RNA-binding protein) with P-granules and germ cell proliferation at elevated temperatures. In addition, DEPS-1 promotes the expression of RDE-4, an RNA-binding protein required for RNAi, and represses the expression of genes that are also regulated by the RNAi factor RDE-3. The researchers propose, therefore, that DEPS-1 is involved in some of the RNA regulatory functions of P granules, possibly by helping to generate small interfering RNAs.

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