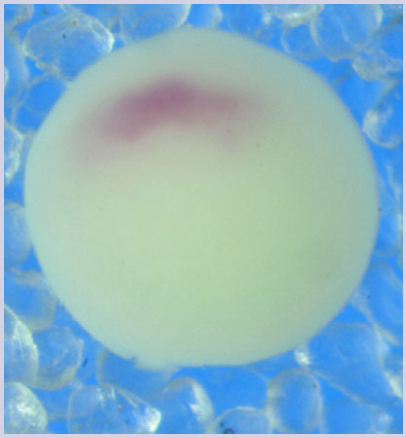

Ethanol competes for important enzymes during development

Embryonic ethanol exposure can cause fetal alcohol spectrum disorder (FASD) and, when severe, fetal alcohol syndrome (FAS). Symptoms include facial malformations, short stature and central nervous system defects. The mechanism responsible for the teratogenic effects of ethanol remains unknown, but one hypothesis proposes that ethanol competes with the enzymes that are needed to synthesize retinoic acid (RA), an important molecule in correct pattern formation during development. Using Xenopus embryos, Hadas Kot-Leibovich and Abraham Fainsod show that inhibition of one such enzyme, retinaldehyde dehydrogenase 2 (RALDH2), exaggerates ethanol-induced developmental defects, whereas increasing RALDH2 activity ameliorates the influence of ethanol exposure. This provides biochemical evidence that FASD and FAS abnormalities result from ethanol interference to normal RA synthesis during gastrulation.

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This research article is freely accessible online.

Mouse models of allergy

Simultaneous exposure to multiple allergens can enhance the allergic response through airway hyperresponsiveness (AHR). Research presented here by Franco DiGiovanni and colleagues combines mouse models of allergen challenge to simulate dual allergen exposure. Mice that are chronically and simultaneously exposed to ovalbumin and dust mite allergens have sustained AHR when compared with animals chronically treated with each allergen alone, highlighting the important combinatorial effect of allergens on the inflammatory response.

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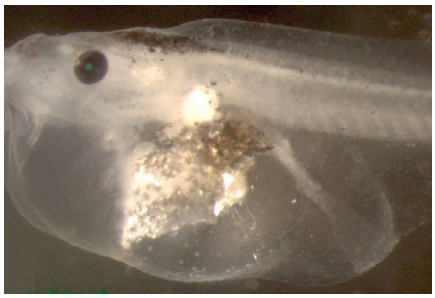
Frog model for muscular dystrophy



Facioscapulohumeral muscular dystrophy (FSHD) causes progressive muscle atrophy and is the third most common myopathy worldwide. Over half of FSHD patients also have abnormal eye vascularization that can lead to vision problems. Using Xenopus as a model organism, Ryan Wuebbles, Meredith Hanel and Peter Jones examined the role of *frg1* (FSHD region gene 1), a gene involved in muscle development. They found that FRG1 is highly expressed in the vasculature and plays a role in angiogenesis and vascular organization. This suggests that misregulation of the *FRG1* gene may cause concomitant vascular and muscular deficits associated with FSHD.

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A mouse model for Wolf-Hirschhorn syndrome

Wolf-Hirschhorn syndrome (WHS) is caused by a deletion in the short arm of chromosome 4. WHS patients have characteristic craniofacial features and a wide variety of phenotypes, including mental retardation, cardiac defects and skeletal malformations. In order to identify the genes involved in WHS, Catarina Catela and colleagues inactivated the fibroblast growth factor receptor-like 1 (*Fgfrl1*) gene in mice, which is located on the short arm of chromosome 4. The mutant mice exhibit several abnormalities that are common to WHS patients, including short stature, thick cardiac valves and diaphragm defects.

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Psychiatric medication studied in amoebae

Lithium is a mood stabilizer used for the treatment of bipolar disorder (manic depression), which causes dramatic changes in energy, behavior and mood. Lithium's mechanism of therapeutic action remains unknown. Here, Jason King, Regina Teo and colleagues use the amoeba Dictyostelium and cultured human neutrophils to show that lithium has a major effect on phosphatidylinositol (3,4,5)-trisphosphate (PIP_3) signaling. This pathway may be important in the pathogenesis and treatment of bipolar disorder.

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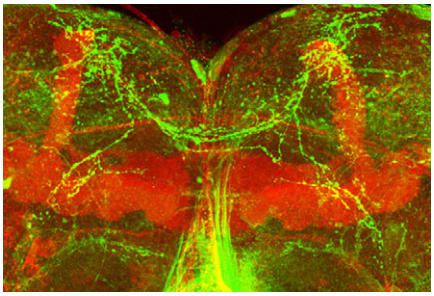
A Drosophila model for Huntington's disease



Sheng Zhang and colleagues report here the development of a Drosophila model for Huntington's disease (HD), which recapitulates many of the symptoms seen in humans Deletion of the huntingtin gene in flies leads to progressively impaired mobility, an age-associated reduction in axonal termini complexity and a shortened life span. These neurological symptoms are exacerbated further by expression of the mutant huntingtin protein that is produced in HD patients. (see Journal Club article on page 199).

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