Neurobiology

Conservative tastes in *Drosophila*

Development **131,** 83–92 (2004)

In insects that undergo metamorphosis, the transition from a creeping larva to a flying adult is accompanied by a radical remodelling of the nervous system. It is generally accepted that all the sensory organs die during this process and are rebuilt from scratch, using cells derived from structures known as imaginal discs. However, new findings in the fruitfly *Drosophila melanogaster* challenge this view.

Nanaë Gendre and colleagues followed the fate of individual sensory neurons from their time of birth in the larva through to adulthood in the fly. They found that one gustatory (taste) organ in the larval pharynx survives metamorphosis virtually intact, and another splits to generate two gustatory organs in the adult pharynx.

Why do these particular sense organs survive? Gendre *et al.* suggest that they might be required during metamorphosis, or that it might simply be more economical to retain structures whose functions are conserved between the larva and the adult. The underlying developmental processes are also intriguing. For example, it will be interesting to discover what factors contribute to the selective survival of these sensory neurons and how they become wired into the adult nervous system. **Heather Wood**

Microelectronics

A wet transistor

Appl. Phys. Lett. **83,** 5310–5312 (2003)

Transistors that use liquid electrolytes as an active element have been shrunk to the nanoscale by Z. G. Chiragwandi and colleagues. Larger-scale versions of these electrolyte transistors have been proposed previously as electrochemical sensors and as biocompatible devices for use in physiological environments.

Chiragwandi *et al.* have used electron-beam lithography to make a silicon-based device, with electrodes just 600 nm square, that amplifies a current when a droplet of pure, deionized water is placed on top. It is a bipolar transistor: a three-terminal device in which, conventionally, the current passing between an 'emitter' and a 'collector' electrode is controlled by the voltage between the emitter and the third 'base' electrode.

In this water-based device, the current is conducted through the water by ions, and the degree of water ionization is altered by the base-emitter voltage. In other words, this voltage changes the hydrogen-ion concentration (pH) even though the ratio of H^+ to OH^- ions stays equal. So the pH determines the current through the device. The authors say that the transistor should work even in salty biological media. **Philip Ball**

Cancer

Sheep in wolf's clothing

Cancer Cell **4,** 477–482 (2003)

By definition an oncogene promotes tumour formation. But Alexander Fleischmann and colleagues find that switching off one such gene, *Fos*, can also stimulate tumour growth under specific circumstances. In other words, *Fos* can behave as a tumour suppressor as well as an oncogene.

The authors inactivated *Fos* in mice that already lacked the *Trp53* gene. *Trp53* encodes a tumour suppressor that works by blocking cell division and inducing cell death. It is frequently mutated in human cancers, and without it mice develop a wide spectrum of malignancies.

Fleischmann *et al.* find that without both *Fos* and *Trp53*, mice rapidly form tumours in the head and neck region. The pathology closely resembles the most common variant of human rhabdomyosarcoma — a childhood cancer that arises from unbridled growth of primitive muscle cells. So the authors speculate that inactivation of *Fos* might contribute to this human cancer. They further show that reintroducing *Fos* into tumour cells *in vitro* causes many of the cells to die, suggesting that *Fos* normally suppresses tumour growth by activating the cellular suicide programme.

The mice without *Trp53* and *Fos* might provide the best animal model yet of rhabdomyosarcoma. And whether *Fos* acts as an oncogene or a tumour suppressor seems to depend strictly on its context. **Marie-Thérèse Heemels**

Developmental biology

Stem cells profiled

PLoS Biol. **1,** 410–419 (2003)

Stem cells can turn into many different cell types, raising hopes that they could be used to repair damaged tissues and organs. Little is known, however, about the molecular signals that guide their conversion.

Alexei A. Sharov *et al.* have now compiled a database of 30,000 genes that are involved in early embryonic and stem-cell development in mice. The team combined new and old gene-expression data from a wide range of cell types and developmental stages; in so doing they discovered 977 previously unidentified genes. One set of 88 genes might serve as a molecular marker of developmental potential — the expression of these genes decreases from eggs to early embryos to newborns, as the cells found at these stages become progressively more restricted in the number of cell types they can generate.

The database offers a preliminary set of molecular markers with which to characterize the function and potential of different stem cells. The authors hope that the catalogue will speed research in reproductive and regenerative medicine. **Helen R. Pilcher**

Planetary science

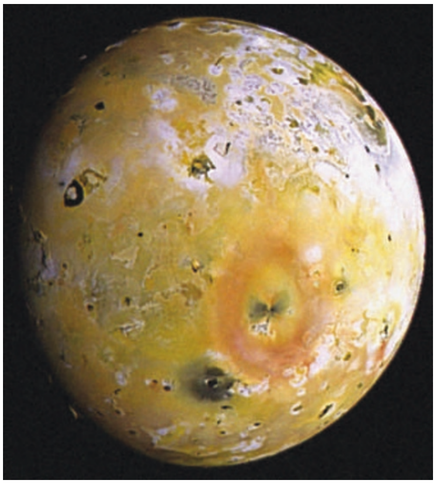
Lava at Loki

Geophys. Res. Lett. doi: 10.1029/2003GL018371 (2003)

Io, a satellite of Jupiter, seethes with volcanic activity. One of the hottest of Io's hotspots is Loki Patera (see picture), a huge area some 180 km across, which in 2001 was subject to close inspection by instrumentation on the Galileo spacecraft.

Ashley Gerard Davies has used those data to put some figures on a then-fresh bout of volcanism at Loki. A temperature profile along a lava flow can be converted into age by using a cooling curve, a calculation that also produces an estimate of the thickness of the flow. Lava was being produced from the southwest corner of the feature at a rate of about 1 km per day. Age along the flow ranged from 10 to 80 days at the furthest extent, and thickness from about 2.6 m at the source to 0.9 m.

But what is the underlying mechanism? Loki could be a massive lava lake, with the balanced creation and foundering of crust from a lava supply deep within Io. Or it could be the result of a confined, 'ponded' flow, the features of which are more a consequence of topography than the plumbing arrangements. What makes Loki tick, says Davies, remains an open question. **Tim Lincoln**



NASA

An image of Io, taken by Galileo in 1997. One large volcanic centre, Pele, is at the centre of the red circle. Loki Patera is the black horseshoe-shaped feature towards the upper left.