Geochemistry

Briny reservoir salts Vostok ice

Earth Planet. Sci. Lett. **222,** 751–765 (2004)

Lake Vostok lies nearly 4,000 m beneath the Antarctic ice cap, and is thought to be the largest subglacial lake in the world. Ice samples have been taken down to a depth about 100 m above the water surface, dating back more than 400,000 years. The upper part of the ice cap is a moving glacier, but 'accretion ice', formed by the refreezing of lake water, is found below 3,538 m.

M. De Angelis *et al.* now report the first comprehensive study of the chemistry of this accretion ice. Below 3,609 m, in the layer closest to the lake, the ice contains very little salt indeed, confirming the widely predicted freshwater status of Vostok. But, surprisingly, De Angelis *et al.* find that accretion ice in the layer above (3,538–3,608 m deep) is up to 50 times saltier than normal glacier ice; it is loaded with sodium chloride, calcium sulphate and magnesium sulphate.

The authors believe that the minerals are periodically drawn into the ice from a reservoir that is linked to a shallow bay upstream from Lake Vostok. The bay is separated from the main lake by a rock outcrop, and its deeper sediments may have originally accumulated from the evaporation of ancient sea water, millions of years before Lake Vostok disappeared beneath the ice. **Mark Peplow**

Parkinson's disease

Triggers of neuron suicide

Development **131,** 3229–3236 (2004)

In Parkinson's disease, neurons producing the neurotransmitter dopamine wither away in a brain area called the substantia nigra. Lavinia Albéri *et al.* present evidence that two developmental genes, *Engrailed1* and *Engrailed2*, may be involved in this process by triggering cell suicide in mice.

Both genes are active in the dopamine-producing neurons soon after the cells are made and throughout adulthood. In mice genetically engineered to lack them, however, these neurons are generated in the growing brain but do not survive beyond the birth of the animal.

Albéri *et al.* show that, in the mutant mice, the dopamine-producing neurons have committed cell suicide by roughly two-thirds of the way through embryo development. Neurons grown *in vitro* die within 24 hours of both *Engrailed* genes being switched off.

The death of these neurons in the mouse embryos occurs far earlier than their decline during Parkinson's disease in humans, which typically starts at age 50 or older. But the authors speculate that more subtle changes in the expression levels of *Engrailed* genes might be involved in triggering neuronal death during the disease. **Helen Pearson**

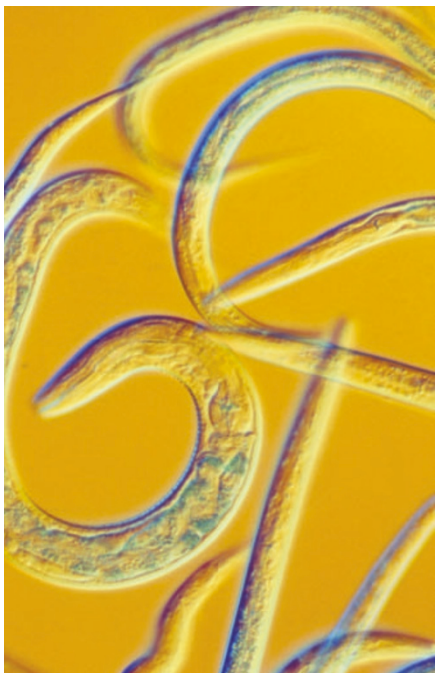
Physiology

Worms on the fumes

Neuron **42,** 731–743 (2004)

As part of the search for any genetic predisposition to alcoholism, Andrew G. Davies and colleagues work with an unlikely ally — the nematode worm *Caenorhabditis elegans*. They now report the identification of natural variation in a gene that affects the nematodes' tolerance to alcohol.

Davies *et al.* studied two strains of worm — N2 (from England) and CB4856 (from



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Hawaii) — and exposed them to alcohol fumes. The resulting concentrations in the worms' bodies were the same as those that cause intoxication in humans. The Hawaiian worms recovered more quickly from the imposed binge: after 50 minutes they moved 40% as fast as sober worms, whereas the English worms managed a mere 20% of normal speed.

Genetic analysis revealed that the English worms had higher activity levels of a receptor protein called NPR-1. Moreover, mutant English worms that lacked only this gene matched their Hawaiian counterparts in their speed of recovery.

The human equivalent of NPR-1 is the receptor for neuropeptide Y. This neuropeptide is implicated in regulating a wide variety of behaviours, and the work of Davies *et al.* adds to evidence that it is somehow involved in the development of acute tolerance to alcohol, a risk factor for alcoholism. **Laura Nelson**

Cancer

TAL order

Cancer Cell **5,** 587–596 (2004)

T-cell acute lymphoblastic leukaemia (T-ALL) is a notoriously treatment-resistant type of blood-cell cancer. More than 60% of T-ALL patients express a gene called *TAL1/SCL*, which is thought to trigger their condition, although the mechanism involved has been unclear. Jennifer O'Neil *et al.* now report that the gene's protein product causes leukaemia by indirectly disrupting immune-cell development.

Mice genetically engineered to produce tal1/scl protein show impaired immune-cell development through an inability to express certain genes, and more than 80% of the animals go on to develop the disease. *TAL1/SCL* represses genes that control immune-cell development by interfering with the action of a transcription factor called E47/HEB. It does this through the action of a protein complex, the histone deacetylase repressor complex (HDAC). Drugs that block HDAC slow the growth of isolated tumour cells, causing many to die.

The authors speculate that T-ALL patients who express *TAL1/SCL* may also be responsive to HDAC inhibitors, so the finding provides cause for further investigations. **Helen R. Pilcher**

Photovoltaics

Harnessing leaf power

Nano Lett. **4,** 1079–1083 (2004)

Could your laptop run on spinach? Perhaps. Rupa Das *et al.* have isolated photosystem I, a central engine of photosynthesis, from chloroplasts of spinach leaves and tethered it to a thin film of gold deposited on a transparent, electrically conductive material. They find that the photosystem generates an electric current in response to visible light, thereby acting as a photovoltaic cell.

The photosystem is a huge, many-molecule assembly, comprising 12 core protein subunits and hundreds of chlorophyll molecules. But it apparently remains functional when deposited on the substrate via a polyhistidine linker in the presence of peptide surfactants (which presumably surround the membrane-protein assembly to provide essential stabilization). The same trick works for the bacterial reaction centre from the photosynthetic purple bacterium *Rhodobacter sphaeroides*, a much simpler molecular assembly.

Das *et al.* hope ultimately to achieve photovoltaic power-conversion efficiencies of around 20%, which would be comparable to the best commercial inorganic solar cells. **Philip Ball**