

GENETICS

Fast disease factor

One hallmark of Alzheimer's disease is the presence in patients' cerebrospinal fluid of high levels of a protein called tau, and of a specific phosphorylated version of tau known as ptau₁₈₁. Researchers have now linked a variant of a gene that is involved in tau modification to faster progression of the neurodegenerative disease.

Carlos Cruchaga at Washington University in St. Louis, Missouri, and his co-workers screened hundreds of spinal-fluid samples for 384 variants of 34 tau-related genes. They teased out one, rs1868402, that was associated with ptau₁₈₁ levels. In another group of 259 patients, the researchers found that those carrying the version of rs1868402 associated with high ptau₁₈₁ levels had clinical symptoms that worsened twice as fast as average, and six times faster than those with the variant linked to low ptau₁₈₁ levels.

PLoS Genet. 6, e1001101 (2010)

BIOMIMETICS

Material monitors mugginess

Inspired by the natural design of the Hercules beetle, researchers have created a film that changes colour according to the ambient humidity.

In muggy weather, microscopic pockets in the insect's shell trap water, transforming the beetle (*Dynastes hercules*; pictured) from khaki-green to black. Seung-Yop Lee and Jungyu Park of Sogang University in Seoul and their colleagues generated porous plastic films

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ANIMAL BEHAVIOUR

Same-shaped shoals

Small marine crustaceans, such as krill, and larger clupeid fish, which include sardines and anchovies, swim together in large shoals of a strikingly similar 'lozenge' shape.

Andrew Brierley and Martin Cox at the University of St Andrews in Fife, UK, used multibeam sonar to survey populations of krill (*Euphausia superba*; pictured) off the western Antarctic Peninsula. When they compared their observations with published studies on

fish behaviour, they found a fairly constant ratio between shoals' surface area and volume, even though the size and packing density of krill and clupeid fish shoals varies widely.

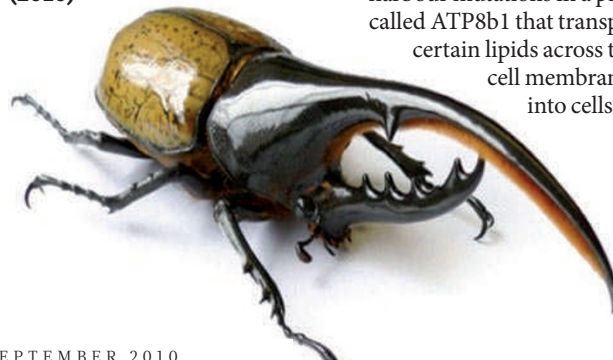
The duo's modelling work suggests that the consistent shoal shape balances the creatures' needs, maximizing their exposure to oxygen while minimizing their risk of predation.

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with a structure similar to that of the beetle's cuticle. At 25% humidity, the material appears blue-green, but at 98% it changes to red.

A sensor made from the material would not need electricity and could be used in small medical or agricultural devices.

Appl. Phys. Lett. 97, 103701 (2010)



CELL BIOLOGY

Lung lipid hurts breathing

Clues from a rare disease shed light on how pneumonia damages the lungs.

People with a condition called Byler's disease are prone to pneumonia. They also harbour mutations in a protein called ATP8b1 that transports certain lipids across the cell membrane into cells.

Rama Mallampalli of the University of Pittsburgh in Pennsylvania and his colleagues reasoned that ATP8b1 might shield the lungs from inflammation by removing cardiolipin, a lipid prevalent in injured lungs, from the airways.

The researchers found high levels of cardiolipin in the lungs of patients with pneumonia. Studies in mice showed that cardiolipin inhibits the function of alveolar surfactant, an oily substance that keeps airways open. Mice with mutated ATP8b1 had higher levels of cardiolipin in lung fluid and were more susceptible to lung damage caused by infection. The authors suggest that high