of six animals to congenitally blind individuals and sighted people, all with closed eyes, asking them to compare the animals' sizes. Using functional brain imaging, the researchers showed that the lateral occipital cortex became active in both groups. But when lists of non-living objects, such as tools, were read out, a different area of the visual cortex — the medial fusiform gyrus — was activated.

Evolution may have selected for hard-wiring that separates neural categories for animals — towards which humans have important emotional responses — from those for non-living things, the authors say.

CANCER

From the source

Nature Med. **15,** 907–913 (2009)

Tumours in a particularly aggressive form of breast cancer may originate from cells lining the mammary duct — not from mammary stem cells as previously thought.

Jane Visvader and Geoffrey Lindeman at the Walter and Eliza Hall Institute of Medical Research in Victoria, Australia, and their colleagues compared the breast tissue of healthy women with and without mutations in the gene *BRCA1*, which significantly increase the risk of breast cancer.

Tissue with mutated *BRCA1* harboured a larger population of luminal progenitor cells, and these were able to proliferate without the growth factor necessary for the division of other cell types, including mammary stem cells. Uncontrolled growth is a feature of cancer cells. The authors also found that normal luminal progenitors, precancerous tissue from *BRCA1* carriers and basal breast tumours had similar gene-expression profiles.

BIOPHYSICS

Protein friction

Science **325,** 870–873 (2009)

Motor proteins that carry cargo around the cell by 'walking' along microtubule filaments are slowed by the friction caused by the rupturing of chemical bonds as they go.

Jonathon Howard of the Max Planck Institute of Molecular Cell Biology and Genetics in Dresden, Germany, Erik Schäffer of the Technical University of Dresden and their colleagues measured this friction *in vitro*. Using optical tweezers, they dragged a microsphere coated in kinesin-8 — a motor protein from yeast — over an immobilized microtubule. They calculate that, at top speed, friction between a kinesin molecule and its filament dissipates about half of the chemical energy that the cell usually supplies to drive the motor along its track.

IMMUNOLOGY

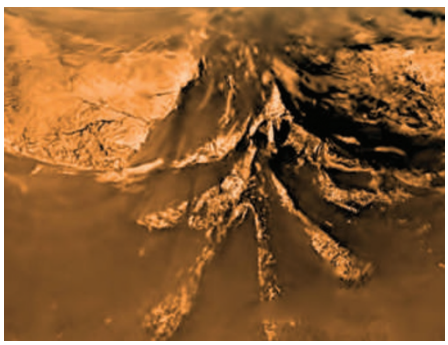
Helping the helpers

Immunity doi:10.1016/j.immuni.2009.08.001 (2009)

In the immune system, 'helper' T cells secrete signalling molecules called cytokines to activate other immune cells. A subset of helper cells, $CD4^+$ T_h17 cells, can trigger autoimmune diseases such as multiple sclerosis when they release the proinflammatory cytokine IL-17.

Kingston Mills and his colleagues at Trinity College in Dublin have now implicated another type of T cell, the γδ T cell, in autoimmunity. The group showed that γδ T cells are an innate source of IL-17 and other signalling molecules, which they produce when activated by particular cytokines *in vitro* and in live mice.

The authors found IL-17-secreting γδ T cells in the brains of mice with an autoimmune disease — and that transplanting these alongside $CD4^+$ cells conferred disease on other mice. *In vitro*, activated γδ T cells amplified the production of IL-17 by $CD4^+$ T_h17 cells.



ESA/NASA/UNIV. ARIZONA

PLANETARY SCIENCE

What an atmosphere

Icarus doi:10.1016/j.icarus.2009.07.040 (2009)

The atmospheric shroud of Saturn's large moon Titan includes methane — lending it its orange hue (picured above) and an element of mystery, because sunlight breaks the gas down relatively quickly. If Titan's store of methane were limited to its lakes and rivers, it would have lost the gas from its atmosphere long ago. So where is it coming from?

Olivier Mousis at the University of Arizona in Tucson and his colleagues rule out one idea: that a reaction between subsurface water and rock is continually replenishing the methane. The ratio of deuterium and hydrogen in the gas is not consistent with a geological origin, they find.

Instead, their analysis suggests that Titan scooped up all of its methane 4.5 billion years ago when it was formed — and could have as much as 1,300 times the amount seen in its atmosphere still trapped in its interior.

JOURNAL CLUB

Heather Stoll
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A biogeochemist sees the value of diversity in a changing ocean.

Ocean acidification in response to excess carbon dioxide in the atmosphere could become a problem for marine organisms, especially those that make skeletons or shells out of calcium carbonate. Corals and clams are at risk, as are the coccolithophorids — microscopic algae that are, by volume, the most important shell producers.

These algae have been the guinea pigs in a series of lab studies measuring their response to acidified seawater. But I worry about whether these studies give us an accurate picture of the future. They typically start with clones — descendants of a single cell — grown in acidified conditions for only a few weeks. This set-up precludes the kind of natural selection and adaptation that might occur over decades and centuries in the ocean.

To cloud the waters further, different labs often obtain conflicting results on the same species, a situation some attribute to subtle differences in methods. Fortunately, a recent study by Gerald Langer of the Autonomous University of Barcelona in Spain and his colleagues provides a more satisfying and ultimately more optimistic explanation (G. Langer *et al. Biogeosci. Discuss.* **6,** 4361–4383; 2009). These reserachers grew four different strains of a calcifying algae, *Emiliania huxleyi*, at different seawater pH levels, and showed that the response to acidification varies significantly among the strains. They argue convincingly that these diverse responses have a genetic basis.

Identifying diverse responses among strains of a species puts us one step closer to capturing the true potential of adaptation in this group of organisms. It would be naive to assume that this puts coccolithophorids out of harm's way. However, diversity is good insurance in a changing ocean. Moreover, I am hopeful that scientific experiments are starting to take that into account.

Discuss this paper at **http://blogs.nature.com/nature/journalclub**