PHYSICAL CHEMISTRY

Growing up bigger

Angew. Chem. Int. Ed. **47,** 4208–4210 (2008)

Which is smaller: hydrogen or deuterium? The standard answer is that deuterium (^{2}H) takes up less space than ^{1}H because its greater mass gives it a smaller vibration amplitude in the lowest-energy quantum state. But the veracity of this argument is temperature sensitive, say Jack Dunitz of ETH-Zurich in Switzerland and Richard Ibberson of the Rutherford Appleton Laboratory in Didcot, UK.

By taking careful measurements of the crystal structures of benzene and fully deuterated benzene at temperatures between 5 kelvin and 280 kelvin, they show that the volume of a molecule of the latter exceeds that of the former above about 170 kelvin. At such temperatures, the vibrations of the carbon–deuterium bonds include more of the higher-energy quantum states than those of C–^{1}H bonds, which means that the deuterium atoms effectively occupy more space.

GENETICS

Genes with bottle

Nature Genet. doi:10.1038/ng.151 (2008)

Researchers have pinpointed a pair of gene variants that seem to protect their carriers against head and neck cancers linked to alcohol consumption. The variants are of genes that encode alcohol dehydrogenase (ADH) enzymes, which catalyse the breakdown of alcohols into aldehydes.

Paul Brennan at the International Agency for Research on Cancer in Lyon, France, and his colleagues analysed six ADH variants in 3,876 patients with head and neck cancers and 5,278 healthy people. A variant of each of the two genes *ADH1B* and *ADH7* seemed to lower the risk of developing these cancers in alcohol drinkers, most dramatically in heavy drinkers. Carriers of the *ADH1B* variant metabolize alcohol up to 100 times faster than non-carriers.

GEOPHYSICS

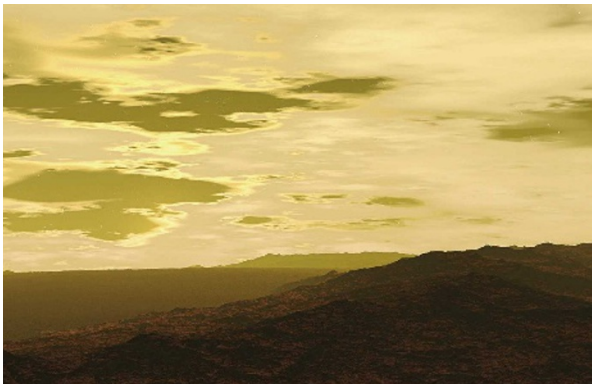
The heat is on

Earth Planet. Sci. Lett. doi:10.1016/j.epsl.2008.03.031 (2008)

A planet's interior affects its climate through volcanoes spewing out greenhouse gases. Conversely, the climate can also affect the interior, according to calculations by Adrian Lenardic, of Rice University in Houston, Texas, and his co-workers.

They worked out that temperature increases at a terrestrial planet's surface could penetrate deep into the planet, rendering its mantle less viscous and eventually shutting down the movement of tectonic plates.

For a planet such as Earth, a sustained rise of 100 kelvin over a 10-million to 100-million-year timescale could be enough to destablize plate tectonics. The authors suggest that the carbon dioxide blanket in Venus's atmosphere (artist's impression, pictured) might help to explain why it appears to have a single, static plate.



C. DARKIN/SPL

GENETICS

The sweet life

Hum. Mol. Genet. doi:10.1093/hmg/ddn137 (2008)

Different versions of the gene that encodes insulin-degrading enzyme (IDE) are associated with how long men — but not women — live, researchers have found.

Insulin metabolism had previously been linked to the lifespans of organisms commonly used in laboratory research. Jonathan Prince of the Karolinska Institute in Stockholm, Sweden and his colleagues now report that human males with one copy of a certain version of IDE and one copy of a different version make higher than usual amounts of IDE RNA and produce more insulin when they fast. These men also tended to die younger than those carrying two copies of the IDE variant.

MICROBIOLOGY

Inner lives

Science doi:10.1126/science.1155725 (2008)

How particular to humans are the microbes that eek out a living in our intestines? To find out, Jeffrey Gordon of Washington University School of Medicine in St Louis, Missouri, and his colleagues compared particular genetic sequences from gut microbes found in the faeces of 106 mammals, some wild and others from American zoos.

Among the 60 species represented in this sample, carnivores tend to have a less diverse internal flora than omnivores, and omnivores less than hervibores. Modern humans support similar gut microbes to those of other omnivores — a surprise, maybe, given the importance of agriculture and cookery in human ecological history.

JOURNAL CLUB

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An epidemiologist points to a fifth sort of human malaria.

Malaria has plagued humans since the dawn of written history, and probably since long before that. These days, biologists understand tiny mechanistic details of the workings of one human malarial parasite, *Plasmodium falciparum*, but know surprisingly little about the others. As someone who studies how pandemics are born and die — and how they might one day be prevented — these holes in our knowledge seem striking to me.

Aside from *P. falciparum* — the cause of 'malignant' malaria — parasitologists acknowledge three other human malaria parasites, *P. vivax*, *P. ovale* and *P. malariae*, each of which probably jumped from another primate host to humans independently. With so many malaria parasites plaguing other vertebrate species, however, and only basic diagnostic instruments available in most parts of the world, science could be missing new types of human malaria that have the potential to seed pandemics.

In a recent paper, Janet Cox-Singh and her colleagues build on their earlier finding that humans can harbour a fifth malaria parasite, *P. knowlesi*, which was once thought to infect only Asian monkeys. The researchers detected *P. knowlesi* DNA in about one third of 1,014 malaria patients in Malaysia, showing that this parasite is common, deadly and almost always misidentified as *P. malariae* (J. Cox-Singh *et al. Clin. Infect. Dis.* **46,** 165–171; 2008).

That an unknown animal pathogen can cause widespread human disease is reminiscent of some of the biggest scourges of the twentieth century: HIV and pandemic influenza. Reductionist, molecular approaches to tackling important plagues may be *en vogue* and a near necessity for grant funding, but I bet that an old-fashioned natural historian studying how infectious agents jump host species will be first to signal the coming of the next plague.

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