IN BRIEF

ENVIRONMENTAL MICROBIOLOGY

Isolation and cultivation of Walsby's square archaeon

Bolhuis, H. *et al*. *Environ*. *Microbiol*. 24 Sep 2004 (doi: 10.1111/j.1462-2920.2004.004692.x)

The most hyperhalophilic microorganism known — Walsby's square-celled archaeon — has finally been cultivated. Bolhuis *et al.* used low-nutrient hypersaline artificial seawater (HAS) media to enrich the organism. After two years square cells dominated, but only when a bacterial halophile, *Salinibacter ruber*, was also present. Colonies (isolated on agarose-solidified medium) were grown as pure liquid cultures in HAS (carbon source sodium pyruvate) and provisionally named *Haloquadratum walsbyi*. *H. walsbyi* cells grow to a huge 20 × 20–40 μm but are less than 0.5 μm thick. Tolerance of *H. walsby* to 3.3 M NaCl and more than 2 M $MgCl_2$ makes it a model for the extraterrestrial life that might be found in the magnesium-dominated brines on Jupiter's moons, Europa and Ganymede.

VIROLOGY

The 1.2-Mb genome sequence of Mimivirus

Raoult, D. *et al. Science* 14 Oct 2004 (doi: 10.1126/science.1101485)

Reporting in *Science*, Raoult *et al.* have sequenced the genome of the largest known virus. With a 400-nm icosahedral capsid, Mimivirus, which infects amoebae, is similar in size to mycoplasmas. It is the only representative of the *Mimiviridae*, a family of nucleocytoplasmic large DNA viruses (NCLDV). Approximately 30% of the 911 *bona fide* identified ORFs were provisionally assigned functions and many encoded homologues of components of the protein translation, folding and DNA repair pathways in eukaryotic cells as well as new enzymatic pathways. Mimivirus contains genes representing 7 of the 63 clusters of orthologous groups of proteins (COGs) that are conserved in all branches of life, and seems to have evolved through gene loss from a more complex ancestor. The authors speculate that Mimivirus might have diverged from cellular life before eukaryotes.

BACTERIAL PHYSIOLOGY

Accumulation of Mn(II) in *Deinococcus radiodurans* facilitates γ-radiation resistance

Daly, M. J. *et al*. *Science* 30 Sep 2004 (doi: 10.1126/science.1103185)

Deinococcus radiodurans survives exposure to high levels of γ-radiation (or dessication), which can result in production of reactive oxygen species (ROS) that damage DNA. The mechanism(s) that repair this damage are not clear. In common with other radiation-resistant bacteria, such as *Enterococcus*, *Lactobacillus* and cyanobacterial species, *D. radiodurans* accumulates Mn(II), which is required for stress survival. The authors note that Mn(II) is unlikely to protect DNA from strand breaks, or to remove ROS as a cofactor of Mn superoxide dismutase. Fe(II) removes ROS by a Fenton reaction but Mn(II) does not participate in Fenton chemistry and how Mn(II) removes ROS is not clear. *D. radiodurans* has the most active bacterial catalase of any bacterial species, and this enzyme could function to remove Mn-dismuted oxygen radicals and promote survival from oxidizing stress.