

IN BRIEF

ENVIRONMENTAL MICROBIOLOGY**Engineered membrane superchannel improves bioremediation potential of dioxin-degrading bacteria**

Aso, Y. *et al.* *Nature Biotechnol.* 15 Jan 2006 (doi:10.1038/nbt1181)

Scientists from Kyoto University, Japan, have found a way to improve the efficiency with which certain bacteria degrade environmentally hazardous pollutants. The researchers took their cue from a soil-dwelling bacteria, *Sphingomonas* sp. A1 (strain A1), which possesses a specialized membrane transport system known as a 'superchannel'. The superchannel concentrates macromolecules in a pit formed in the outer membrane, after which periplasmic binding proteins and an ATP-binding cassette transporter import these macromolecules into the cell. Reporting in *Nature Biotechnology*, Aso *et al.* describe how a dioxin-degrading sphingomonad and a polypropylene-glycol-degrading sphingomonad were engineered to incorporate the superchannel into their cell membranes, a manoeuvre that markedly improved the biodegrading activity of both sphingomonads. In view of these promising results, this technique has the potential to be used as a strategy to improve the bioremediation capacities of other bacteria.

TECHNIQUES AND APPLICATIONS***daime*, a novel image analysis program for microbial ecology and biofilm research**

Daims, H., Lückner, S. & Wagner, M. *Environ. Microbiol.* **8**, 200–213 (2006)

The study of microbial communities in their natural habitats has been revolutionized by advances in fluorescence microscopy and molecular techniques. But, to answer the big questions in microbial ecology, these descriptive data must be combined with quantitative analyses, which rely on software image packages that often have suboptimal 3D visualization functionality. Enter *daime* or 'digital image analysis in microbial ecology' — a new computer program developed by Holger Daims, Sebastian Lückner and Michael Wagner from the University of Vienna, Austria. *daime* analyses digital images of microorganisms that have been acquired using epifluorescence or confocal microscopy and is specifically geared to the needs of microbial ecologists, integrating 3D visualization functions and image analysis. In the latest issue of *Environmental Microbiology*, the authors describe the features of *daime* and illustrate the utility of this software in a proof of principle experiment.

BACTERIAL PHYSIOLOGY**South-seeking magnetotactic bacteria in the Northern Hemisphere**

Simmons, S. L., Bazylinski, D. A. & Edwards, K. J. *Science* **311**, 371–374 (2006)

This work describes the identification of large populations of polar magnetotactic bacteria in the Northern Hemisphere that respond to high oxygen levels by swimming towards geomagnetic south, the opposite direction to that predicted by the current model of magnetotaxis. The adaptive advantage of this unusual behaviour is unclear and suggests that models of magnetotaxis developed in the laboratory might be too simplistic to reflect bacterial responses to the complex chemical composition of freshwater and marine environments.