# IN BRIEF

## BIOTECHNOLOGY

### Direct injection of functional single-domain antibodies from *E. coli* into human cells

Blanco-Toribio, A. *et al. PLoS ONE* **5,** e15227 (2010)

Single-domain antibodies (sdAbs) are small antibody fragments composed of a single variable domain that retains the affinity for its cognate antigen. Blanco-Toribio *et al.* showed that sdAbs could be engineered to be injected into human cells by non-invasive *Escherichia coli* carrying a type III secretion system. The process did not require bacterial invasion or transfer of genetic material to the human cell. The injected sdAbs accumulated in the cytoplasm of HeLa cells at concentrations of $10^5$–$10^6$ molecules per cell, and they formed functional complexes with their intracellular antigens.

## MICROBIAL ECOLOGY

### A new anaerobic ammonium-oxidizing community enriched from peat soil

Hu, B.-L. *et al. Appl. Environ. Microbiol.* 10 Dec 2010 (doi:10.1128/AEM.02402-10)

Anaerobic ammonium-oxidizing (anammox) bacteria are recognized as an important sink for fixed nitrogen in the oceans, although they are also present in fresh water and soil. As none of these microorganisms has yet been isolated in pure culture, they are studied using either culture-independent methods or enrichment cultures. Hu *et al.* started an enrichment culture in a sequencing batch reactor with a sample taken from a peat soil in the Netherlands. After 8 months of incubation using water from the sampling site and increasing ammonium and nitrite concentrations, they observed that anammox cells accounted for 40–50% of the enrichment culture and consisted predominantly of two phylotypes closely related to '*Candidatus* Jettenia asiatica' and '*Candidatus* Brocadia fulgida', respectively. The enrichment culture displayed physiological parameters that were typical of other anammox bacteria, and also contained the diagnostic ladderane lipids, which are unique to these microorganisms.

## PRIONS

### Transfer of a prion strain to different hosts leads to emergence of strain variants

Mahal, S. P. *et al. Proc. Natl Acad. Sci. USA* **107**, 22653–22658 (2010)

Prions consist of a misfolded form ($PrP^{Sc}$) of a host glycolipoprotein ($PrP^{C}$) and can cause neurodegenerative diseases known as transmissible spongiform encephalopathies. Prion populations can be categorized into distinct strains, including those that cause disease with consistent characteristics (such as incubation time) or that can infect certain cell lines. Strain identity is thought to be determined by the conformation of $PrP^{Sc}$ and to be maintained by seeded conversion of $PrP^{C}$. A prion strain (22L) derived from mouse brain could infect two mouse neuroblastoma cell lines, R33 and PK1; in PK1 cells, infection occurred even in the presence of the glycosylation inhibitor swainsonine. These characteristics remained stable when the prions were replicated either in R33 cells or in PK1 cells in the presence of swainsonine. However, when transferred to PK1 cells in the absence of the inhibitor, the prions gradually lost both the ability to infect R33 cells and the swainsonine resistance; these changes were associated with a variation in the conformational stability of $PrP^{Sc}$. The original 22L phenotype could be gradually recovered by propagating the prions in mouse brains again.