IN BRIEF

ENVIRONMENTAL MICROBIOLOGY

The 'pH optimum anomaly' of intracellular enzymes of *Ferroplasma acidiphilum*

Golyshina, O. V. *et al*. *Environ. Microbiol.* September 2005 (doi:10.111/j.1462–2920.2005.00907.x)

The metabolic adaptations of extremophiles continue to surprise. In a recent issue of *Environmental Microbiology*, Olga Golyshina *et al.* determined the pH optima of several intracellular enzymes from the archaeal acidophile *Ferroplasma acidiphilum*. Although *F. acidiphilum* thrives at pH 0–2, it maintains a near neutral cytoplasmic pH, implying that intracellular enzymes function optimally at a neutral pH. However, *in vitro* assays showed that these enzymes were stable at an acidic pH range. The authors suggest that this 'pH optimum anomaly' might be due to the seclusion of these enzymes inside acidic compartments in the cytoplasm of *F. acidiphilum*. Other alternatives are proposed, including the possibility that these enzymes function in multienzyme complexes with neutral pH optima.

FUNGAL PATHOGENESIS

LaeA, a regulator of morphogenetic fungal virulence factors

Bok, J.W. *et al*. *Eukaryot. Cell* **4**, 1574–1582 (2005)

The development of antifungal therapies has been hampered by the functional redundancy of fungal disease determinant genes and the troublesome side effects of potential fungicides. This study identifies LaeA — a positive regulator of secondary metabolism — as a virulence factor in the opportunistic fungus *Aspergillus fumigatus*. In a murine model of *Aspergillus* infection, *ΔlaeA* mutants showed reduced virulence associated with decreased levels of pulmonary gliotoxin. *ΔlaeA* hyphae killed fewer neutrophils than wild-type hyphae, and macrophage phagocytosis of *ΔlaeA* conidia was enhanced. LaeA is a conserved protein in filamentous fungi and, as its functions are fungal specific, it represents a promising non-toxic drug target.

ARCHAEA

Isolation of an autotrophic ammonia-oxidizing marine archaeon

Könneke, M. *et al*. *Nature* **437**, 543–546 (2005)

Although Archaea were long believed to be obligate extremophiles, it is now known that the Crenarchaeota comprise a large fraction of marine bacterioplankton. This study is the first to report the isolation of an ammonia-oxidizing chemolithotrophic marine crenarchaeote. Although this archaea was isolated from a tropical tank at the Seattle aquarium, phylogenetic analyses indicate a close relationship with the marine group 1 Crenarchaeota. This implies that nitrifying Crenarchaeota might be important contributors to global carbon and nitrogen cycles. Furthermore, this novel archaeon underscores the debate surrounding the origins of ammonia oxidation — bacterial or archaeal, mesophile or thermophile?