

IN BRIEF

PARASITOLOGY**Demonstration of genetic exchange during cyclical development of *Leishmania* in the sand fly vector**Akopyants, N. S. *et al. Science* **324**, 265–268 (2009)

Over 20 species of *Leishmania* exist, and speciation was generally thought to have been driven by clonal expansion following accumulation of divergent mutations. However, the demonstration that a naturally isolated strain contained markers from two different species suggested that *Leishmania* could also reproduce sexually. While investigating this possibility, Akopyants *et al.* were unable to generate hybrid parasites from parental strains *in vitro*. However, when sandflies were infected with both parental strains, hybrid parasites could be isolated. When the parental strains were injected into a mouse, no hybrid progeny could be isolated, indicating that sexual reproduction in *Leishmania* is limited to the sandfly. Sexual reproduction may be crucial to adaptation and survival under stressful conditions. Why such conditions exist in the sandfly vector but not the mammalian host remain to be determined.

SYMBIOSIS**A novel symbiosis between chemoautotrophic bacteria and a freshwater cave amphipod**Dattagupta, S. *et al. ISME J.* 9 Apr 2009 (doi:10.1038/ismej.2009.34)

In sulphide-rich marine habitats, symbioses between invertebrates and chemoautotrophic bacteria are common. Sulphidic habitats are also found in caves such as the Frasassi cave system in Italy, which contains ecosystems that rely entirely on chemoautotrophic microorganisms. Surfaces in the Frasassi caves are covered by biofilms that are predominantly composed of sulphur-cycling bacteria. Analysis of *Niphargus ictus*, a macroinvertebrate inhabitant of the Frasassi caves, showed that its exoskeleton contained abundant 'rosettes' of bacteria of a single *Thiothrix* phylotype that was distinct from the numerous *Thiothrix* phylotypes found in the biofilms. Such an association provides a constant replenishment of nutrients to the bacteria owing to the mobility of *N. ictus*. Conversely, *Thiothrix* could protect its host from toxic levels of sulphide.

VACCINES**Immunization by vaccine-coated microneedle arrays protects against lethal influenza virus challenge**Zhu, Q. *et al. Proc. Natl Acad. Sci. USA* **27** Apr 2009 (doi:10.1073/pnas.0812652106)

Inactivated influenza virus vaccines provide effective protection against infection, but vaccination coverage is generally incomplete in a population. This is due, in part, to fear of intramuscular injection by hypodermic needle, the conventional approach for vaccination. In recent years, micrometre-scale needles (microneedles) have been developed as devices to facilitate intradermal drug delivery, and patches of microneedles coated with a drug enable simple, painless administration. When Zhu *et al.* inserted microneedles coated with inactivated influenza virus into the skin of a mouse for just 5 minutes, approximately 90% of the antigen was delivered. The resulting immune responses were indistinguishable from those observed using conventional intramuscular injection, and the microneedle immunization enabled the mice to survive a lethal challenge with influenza virus. Such an effective, easy to use system is likely to be more widely acceptable to the public.