IN BRIEF

FUNGAL GENETICS

Killer sought in case of missing RNA interference

RNA interference (RNAi) systems were lost from the ancestors of some species of yeast but not from the ancestors of others. The authors investigated the consequences of restoring a functional RNAi system to *Saccharomyces cerevisiae* by introducing the genes encoding Argonaute and Dicer. Introducing RNAi interfered with the maintenance of killer, an inherited viral system consisting of two double-stranded RNAs, M and L-A. M encodes a toxin that kills neighbouring cells but confers immunity to producing cells, and L-A is required to maintain M. In the RNAi-reconstituted strain, M and L-A were processed by Argonaute and Dicer into small interfering RNAs and were then lost from the cells. In all yeast species analyzed, the presence of killer coincided with the absence of an RNAi system. These findings suggest that RNAi provides less of a selective advantage to some species than a killer system, driving its loss in certain fungal lineages.

ORIGINAL RESEARCH PAPER Drinnenberg, I. A. *et al.* Compatibility with killer explains the rise of RNAi-deficient fungi. *Science* **333**, 1592 (2011)

HOST RESPONSE

Probiotic ingestion alters mood

There is growing evidence that the intestinal microbiota interacts with the host central nervous system (CNS) to modify stress responses and anxiety behaviour; this is the so-called gut–brain axis. Bravo *et al.* now show that chronic treatment of mice with the probiotic bacterium *Lactobacillus rhamnosus* JB-1 can alter the transcript level for receptors of the neurotransmitter GABA (γ-aminobutyric acid) in the CNS in a region-dependent manner. GABA is the main neurotransmitter in the CNS, and its receptors are important pharmological targets. *L. rhamnosus* JB-1 treatment decreased corticosterone levels as well as anxiety- and stress-related behaviour when compared with mock-treated mice. Importantly, the effects of probiotic treatment were blocked in vagotomized mice, indicating the vagus nerve as the likely communication pathway in the gut–brain axis.

ORIGINAL RESEARCH PAPER Bravo, J. A. *et al.* Ingestion of *Lactobacillus* strain regulates emotional behavior and central GABA receptor expression in a mouse via the vagus nerve. *Proc. Natl Acad. Sci. USA* **108**, 16050–16055 (2011)

STRUCTURAL BIOLOGY

Gamers solve monkey virus puzzle

Foldit is a multiplayer online game in which non-specialist participants use three-dimensional problem-solving skills to manipulate protein structures in order to obtain the highest scoring (lowest-energy) model. Khatib *et al.* report that Foldit has been used to solve the structure of the retroviral protease (Pro) of Mason–Pfizer monkey virus (MPMV), a simian AIDS-causing virus. Despite MPMV Pro crystallizing as a monomer (rather than in its active, dimeric form), determining its structure by molecular replacement using either homodimer models or NMR data has been problematic for more than a decade. In a 3-week competition, Foldit players generated several models that were good enough to allow for the solution of a crystal structure. This structure revealed several features about the putative Pro dimer interface that provide opportunities for the design of new antiretroviral drugs. These efforts reveal the potential for harnessing interest in online gaming to help solve real-world scientific problems.

ORIGINAL RESEARCH PAPER Khatib, F. *et al.* Crystal structure of a monomeric retroviral protease solved by protein folding game players. *Nature Struct. Mol. Biol.* 18 Sep 2011 (doi:10.1038/nsmb.2119)