IN BRIEF

MARINE MICROBIOLOGY

Exploring the unexplored

Marine oxygen minimum zones (OMZs) are hot spots for microbial-driven matter and energy transformations, but the dynamics of virus–host interactions at these sites are poorly understood. In this study, Roux *et al.* used a combination of metagenomics and single-cell amplified genome (SAG) sequencing to investigate the viruses that infect the uncultivated sulphur-oxidizing SUP05 bacteria in an OMZ off the coast of western Canada. From a collection of 127 SAGs, they discovered five novel viral genera and estimated that approximately one-third of SUP05 are infected by one virus, although cells infected with several viruses were also detected. By examining 3 years of metagenomic data, they found that SUP05 viruses are endemic to this OMZ and are stable over time. Interestingly, the presence of a virus-encoded dissimilatory sulphite reductase suggests that these viruses probably influence bacterial sulphur metabolism, and thereby contribute to the biogeochemistry of OMZs.

ORIGINAL RESEARCH PAPER Roux, S. *et al.* Ecology and evolution of viruses infecting uncultivated SUP05 bacteria as revealed by single-cell- and meta-genomics. *eLife* **3**, e03125 (2014)

MICROBIAL ECOLOGY

Inter-kingdom interactions

Chemotaxis of the nematode *Caenorhabditis elegans* occurs in response to chemical cues secreted by bacteria, which are also its sole food source; however, little is known about how these cues are sensed. Werner *et al.* now show that the *Vibrio cholerae* autoinducer CAI-1, which is the dominant signal controlling quorum sensing in this bacterial species, functions as a chemoattractant for *C. elegans*. The authors identify the position of the CAI-1 ketone moiety as a key structural motif that is required to induce robust chemotaxis and they also show that *C. elegans* detects CAI-1 via the amphid sensory neuron AWC^{ON}. These findings demonstrate that *C. elegans* and *V. cholerae* have evolved to detect and respond to the same chemical cue and define a mechanism by which a bacterial quorum-sensing signal mediates cross-kingdom interactions.

ORIGINAL RESEARCH PAPER Werner, K. M. *et al. Caenorhabditis elegans* recognizes a bacterial quorum-sensing signal molecule through the AWC^{ON} neuron. *J. Biol. Chem.* **289**, 26566–26573 (2014)

MICROBIOME

Bacteria and the brain

Accumulating evidence suggests that the gut microbiota influences host neurological activity and behaviour. Here, the authors find that the two gut Firmicutes, *Clostridium sporogenes* and *Ruminococcus gnavus*, produce and secrete two distinct tryptophan decarboxylases that catalyse the formation of the neurotransmitter tryptamine. Tryptamine induces the release of serotonin, which is suggested to modulate gastrointestinal motility; consistent with this, the authors show that tryptamine affects colonic ion secretion. In addition, a reduction in plasma tryptophan levels owing to the activity of these enzymes would reduce serotonin levels in the brain, which suggests a possible direct mechanism by which the gut microbiota influences host behaviour. Although this enzymatic activity is rare in bacteria in general, analysis of data from the Human Microbiome Project reveals that at least 10% of the human population contains a gut bacterium that encodes a tryptophan decarboxylase.

ORIGINAL RESEARCH PAPER Williams, B. B. *et al.* Discovery and characterization of gut microbiota decarboxylases that can produce the neurotransmitter tryptamine. *Cell Host Microbe* http://dx.doi.org/10.1016/j.chom.2014.09.001 (2014)