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IN BRIEF

MICROBIOME

Copy-catting host signalling molecules

Small molecules produced by the host microbiota have been hypothesized to influence host physiology. In a recent study, Cohen *et al.* identified microbial *N*-acyl amides that mimic human signalling molecules and interact with host G protein-coupled receptors (GPCRs) to regulate gastrointestinal tract physiology. The authors searched the Human Microbiome Project database for genes that encode *N*-acyl synthases and found that such genes were enriched in the gastrointestinal microbiota. After characterizing the gene products, they found that bacterial and host *N*-acyl amides that interact with the host GPCR GPR119 share functional and biochemical similarities. Bacterial GPR119 agonists were able to regulate metabolic hormones and glucose homeostasis in mice as efficiently as human agonists. The findings suggest that mimicry of host signalling molecules by the resident microbiota may be a common phenomenon.

ORIGINAL ARTICLE Cohen, L. J. *et al.* Commensal bacteria make GPCR ligands that mimic human signalling molecules. *Nature* http://dx.doi.org/10.1038/nature23874 (2017)

ARCHAEAL BIOLOGY

Plasmid propagation by virus-like particles

A defining feature that differentiates plasmids from viruses is their mechanism of propagation from cell to cell. Plasmids are transferred from donor to recipient as naked DNA, through cell–cell contact or in unstructured extracellular vesicles. A new study describes a novel mechanism of plasmid dissemination in archaea that uses specialized membrane vesicles similar to a virus. Electron microscopy of *Halorubrum lacusprofundi* R1S1 revealed virus-like particles (VLPs) budding from the surface of cells. Isolated VLPs were able to infect a plasmid-free *H. lacusprofundi* strain, resulting in the biogenesis of VLPs. The VLPs contained a ~50 kb plasmid that encodes proteins that were found to specifically incorporate into the VLPs. The authors hypothesize that these proteins carry out roles similar to vesicle coatamers that drive the assembly of transport vesicles and that this mechanism of DNA transfer may represent an evolutionary link between viruses and plasmids.

ORIGINAL ARTICLE Erdmann, S. *et al.* A plasmid from an Antarctic haloarchaeon uses specialized membrane vesicles to disseminate and infect plasmid-free cells. *Nat. Microbiol.* http://dx.doi.org/10.1038/s41564-017-0009-2 (2017)

VIRAL INFECTION

A bacteriophage-like entry pathway in eukaryotes

Most eukaryotic viruses release their genomes once they have entered host cells through endocytosis, pinocytosis or phagocytosis, whereas bacteriophages typically eject their DNA after they have attached to, and penetrated, the host membrane. A recent study of *Paramecium bursaria* chlorella virus 1 (PBCV1) reported that the algal virus uses a bacteriophage-like entry pathway. The authors observed that the binding of PBCV1 to host membranes induces the formation of a tunnel through which the viral DNA translocates into the cytoplasm. Once there, the genome condenses prior to being rapidly transported to the nucleus. DNA condensation has been proposed to be an important pulling force during bacteriophage genome ejection. Together, these observations imply that mechanisms that are considered to be unique to prokaryotic viruses could be more widespread in the tree of life than previously thought.

ORIGINAL ARTICLE Milrot, E. *et al.* Structural studies demonstrating a bacteriophage-like replication cycle of the eukaryote-infecting *Paramecium bursaria* chlorella virus-1. *PLoS Pathog.* **13**, e1006562 (2017)