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IN BRIEF

MARINE MICROBIOLOGY

A new tale for oceanic viruses

Double-stranded DNA (dsDNA) viruses that infect bacteria and archaea are thought to be the most abundant viruses in the oceans. Electron microscopy analyses have indicated that most oceanic viruses are non-tailed; however, tailed dsDNA viruses dominate sequence and culture collections, suggesting that we have a limited understanding of the diversity of oceanic viruses and their effects on marine ecosystems. Kauffman *et al.* now report the discovery of a major lineage of non-tailed dsDNA viruses with capsids that have a double jelly roll (DJR) fold — a fold that was previously associated with non-tailed viruses but, owing to biochemical and physical features of DJR viruses, they had been systematically lost in previous surveys. This new family, named the *Autolykiviridae*, was found to have a broad host range, and DJR viruses were also found in the genomes of diverse bacterial and archaeal phyla. These findings suggest that the ecological importance of non-tailed dsDNA viruses is far greater than previously thought.

ORIGINAL ARTICLE Kauffman, K. M. *et al.* A major lineage of non-tailed dsDNA viruses as unrecognized killers of marine bacteria. *Nature* http://dx.doi.org/10.1038/nature25474 (2018)

BIOFILMS

Naturally modified cellulose in bacterial biofilms

Cellulose, a linear polysaccharide polymer, has a structural role in bacterial biofilms by providing a scaffold that protects and supports the growth of the biofilm. A recent study reported the structure of phosphoethanolamine cellulose, a modified cellulose that is produced by *Escherichia coli* and is required for extracellular matrix assembly and biofilm architecture. The authors used solid-state NMR spectroscopy to detect the phosphoethanolamine modification that had not been previously found using conventional methods. Part of the bacterial cellulose synthesis operon (the *bcsEFG* operon) was indispensable for the modification, and the putative phosphoethanolamine transferase BcsG was found to interact with the cellulose synthase complex and required input from the second messenger c-di-GMP through a BcsE-BcsF-BcsG signalling pathway. These findings have implications for the development of new cellulosic materials and biofilm formation.

ORIGINAL ARTICLE Thongsomboon, W. *et al.* Phosphoethanolamine cellulose: a naturally produced chemically modified cellulose. *Science* **359**, 334–338 (2018)

VIRAL INFECTION

Breathing alone may spread the flu

Influenza viruses have been proposed to spread through aerosols, but the importance of this mode of transmission between humans is unclear. Now, Yan *et al.* provide evidence that humans generate infectious aerosols by characterizing the virus in exhaled breath during natural breathing, prompted speech, coughing and sneezing. By analysing paired nasopharyngeal and breath samples from infected individuals, the authors observed that a significant proportion of the infected individuals shed infectious virus in aerosol particles that have the potential to spread by aerosol transmission (≤5 μm). Surprisingly, coughing and sneezing was not necessary for the generation of infectious aerosols, and sneezing did not increase the amount of viral RNA in aerosol particles. The authors argue that these findings could be used to improve models of airborne influenza virus transmission.

ORIGINAL ARTICLE Yan, J. *et al.* Infectious virus in exhaled breath of symptomatic seasonal influenza cases from a college community. *Proc. Natl Acad. Sci. USA* http://dx.doi.org/10.1073/pnas.1716561115 (2018)