IN BRIEF

BIOFILMS

Self-organization in high-density bacterial colonies: efficient crowd control

Cho, H. *et al. PLoS Biol.* **5**, e302 (2007)

Biofilms are highly organized, complex assemblages of differentiated bacteria surrounded by an extracellular matrix. It has been suggested that early in biofilm development bacteria overcome the adverse environmental conditions that can stimulate biofilm formation by moving to small chambers or cavities, within which they can grow to high densities and which might facilitate quorum sensing. Levchenko and colleagues analysed how bacteria grow in confined spaces by using a bespoke microfluidic device that allowed them to follow the growth of *Escherichia coli* in confined chambers of various shapes and sizes, combined with computer simulations. They found that bacterial colonies gradually begin to self-organize and that this allows bacterial cells to escape from their confined spaces. Cell shape was also highlighted as a key factor in self-organization.

VIROLOGY

Axonal transport mediates West Nile virus entry into the CNS and induces acute flaccid paralysis

Samuel, M. A. *et al. Proc. Natl Acad. Sci. USA* **104**, 17140–17145 (2007)

West Nile virus (WNV) is an important cause of epidemic encephalitis, but the mechanisms by which this neurotropic flavivirus enters the central nervous system (CNS) remain largely unknown. Melanie Samuel and colleagues used a trichamber compartmentalized neuronal-culture system to investigate whether WNV can be transported within axons. The results indicated that the virus can spread through axons, in both the retrograde and anterograde directions. This bidirectional spread required intact axons, and was found to be mediated by the release of infectious WNV particles from distal axons. That WNV enters the CNS by axonal transport *in vivo* was confirmed using a hamster model of infection, which showed that *in vivo*, retrograde axonal transport of WNV induces acute flaccid paralysis. Treatment with a therapeutic neutralizing antibody prevented the development of paralysis, which suggests a possible avenue for the development of new therapeutics.

STRUCTURAL BIOLOGY

Structure of a NHEJ polymerase-mediated DNA synaptic complex

Brissett, N. C. *et al. Science* **318**, 456–459 (2007)

DNA double-strand breaks (DSBs) pose an acute threat to the survival of all cells, and must be repaired to ensure genomic stability. In eukaryotes, non-homologous end joining (NHEJ) is one of the main pathways for DSB repair. In recent years, however, it has been shown that many bacterial genera also possess a NHEJ system, which comprises the DNA-end-binding protein Ku and a specialized DNA ligase, LigD. The crystal structure of the polymerase domain of the *Mycobacterium tuberculosis* LigD protein in synaptic complex with DNA is now reported by Brisset and colleagues in *Science*. The structure confirmed that *M. tuberculosis* LigD — and presumably other bacterial NHEJ ligases — can direct the alignment of non-homologous DNA ends by promoting the formation of a DNA-end-bridging complex.