IN BRIEF

BACTERIAL SECRETION

A sorting platform determines the order of protein secretion in bacterial type III systems

Lara-Tejero, M. *et al. Science* **331**, 1188–1191 (2011)

Salmonella enterica subsp. *enterica* serovar Typhimurium requires a type III secretion system (T3SS) to invade the intestinal epithelium. A unique feature of T3SSs is that they allow protein secretion to occur in an ordered manner, which is required for optimal infection of the host cell. Now, Lara-Tejero *et al.* show this hierarchical secretion may occur through formation of a cytoplasmic 'sorting platform' that consists of components of the T3SS. Using subcellular fractionation and liquid chromatography–mass spectrometry, they showed that the T3SS protein SpaO forms part of a large cytoplasmic complex that is sequentially loaded (by specialized chaperone proteins) with proteins that are secreted by the T3SS. These T3SS components are highly conserved; therefore this mechanism of organizing secretion is likely to be shared with other bacteria.

BACTERIAL GENETICS

Opportunity and means: horizontal gene transfer from the human host to a bacterial pathogen

Anderson, T. M. & Seifert, H. S. *mBio* **2**, e00005-11 (2011)

Anderson and Seifert report an unusual example of horizontal gene transfer (HGT) from the human genome to the pathogen *Neisseria gonorrhoeae*. The transfer of genetic material through HGT between bacteria is common, but there are few confirmed examples of HGT between highly divergent organisms, or from host to pathogen. The authors found a 685 bp sequence in the *N. gonorrhoeae* genome that matches the human long interspersed nuclear element L1 (L1) with 98–100% sequence identity. To guard against the possibility of contamination of bacterial DNA with human DNA, they amplified the sequence using one PCR primer within the L1 and another in the bacterial DNA that flanks the L1. The function of this element is unclear, but HGT between human and pathogens may have implications for the co-evolution of the pathogen and its host.

VIRAL PATHOGENESIS

Epstein-Barr virus nuclear antigen 3C facilitates G1-S transition by stabilizing and enhancing the function of cyclin D1

Saha, A. *et al. PLoS Pathog.* **7**, e1001275 (2011)

Epstein–Barr virus (EBV) infects B cells and is associated with many diseases, including lymphomas. Saha *et al.* build on previous *in vitro* data to show that EBV nuclear antigen 3C (EBNA3C) promotes cell growth through enhancing the activity of cyclin D1 in a multi-faceted approach. Cyclin D1 is critical for cell cycle control as it allows G1–S phase transition through interacting with cyclin-dependent kinase 4 (CDK4) or CDK6. To prevent re-initiation, cyclin D1 must be degraded after replication initiation. The authors find that EBNA3C and cyclin D1 physically interact *in vivo* and that EBNA3C enhances the activity of the cyclin D1–CDK6 complex. EBNA3C inhibits the ubiquitylation of cyclin D1 that is required for its degradation and, furthermore, the viral protein blocks glycogen synthase kinase 3β-mediated nuclear export of cyclin D1. These activities increase the activity of cyclin D1, promoting cell cycle progression.