Nature Reviews Microbiology | AOP, published online 3 February 2014

IN BRIEF

BACTERIAL PHYSIOLOGY

ComEA pulls in DNA in *Vibrio cholerae*

DNA uptake in naturally competent *Vibrio cholerae* requires a multi-component import machinery that resembles type IV pili (T4Ps), and it has been proposed that pilus extension and retraction are responsible for pulling DNA across the cell envelope. Blokesch and colleagues now show that the competence protein ComEA, which has a proposed role in DNA uptake in Gram-positive bacteria, is directly involved in DNA uptake in *V. cholerae*. Fluorescence microscopy experiments showed that ComEA localizes to the periplasm and associates with incoming DNA. The protein contains helix–hairpin–helix motifs, which are widespread in DNA-binding proteins, and their disruption resulted in reduced transformation efficiency. Moreover, ComEA homologues from other bacteria could functionally substitute for *V. cholerae* ComEA. These data suggest a conserved DNA-uptake mechanism in which T4Ps mediate transfer of the DNA across the outer membrane, followed by pulling of the substrate into the periplasm by ComEA via a Brownian ratchet mechanism.

ORIGINAL RESEARCH PAPER Seitz, P. *et al.* ComEA is essential for the transfer of external DNA into the periplasm in naturally transformable *Vibrio cholerae* cells. *PLoS Genet.* **10**, e1004066 (2014)

BACTERIAL SECRETION

Staphylococcal surface protein set free

Staphylococcal protein A (SpA) protects *Staphylococcus aureus* from antibody binding. Furthermore, SpA can crosslink B cell receptors and thus modulate B cell function. However, it has been unclear how SpA reaches B cells, as it is anchored to the staphylococcal cell wall. Missiakas and colleagues now show that SpA, together with part of its peptidoglycan anchor, is cleaved off the cell wall by the bacterial murein hydrolases LytN and LytM and is released into the extracellular milieu. LytN alters the peptidoglycan anchor of SpA by removing amino sugars, and LytM then cleaves the remaining pentaglycyl cross-bridge that attaches the anchor to the cell wall. Importantly, the amino sugars (MurNAc–GlcNAc) that are removed by LytN are potent immunostimulators. Thus, the released and modified form of SpA can target B cells without triggering innate immunity.

ORIGINAL RESEARCH PAPER Becker, S. *et al.* Release of protein A from the cell wall of *Staphylococcus aureus*. *Proc. Natl Acad. Sci. USA* http://dx.doi.org/10.1073/pnas.1317181111 (2014)

MICROBIAL ECOLOGY

Phage attack on flamingo food chain

The Lesser Flamingo is an endangered bird species, and the local population numbers and distribution fluctuate considerably in its main habitat — the East African Rift Valley lakes. These fluctuations are caused by unexplained decreases in the abundance of its main food source, *Arthrospira fusiformis*, which is a fast-growing, alkaliphilic cyanobacterium. Samples collected from Lake Nakura now reveal that cyanophage infection is responsible for sudden breakdowns of *A. fusiformis* biomass. The study reports cyanophage concentrations of up to 7×10^9 per ml, which are some of the highest values that have ever been reported in the environment, and *A. fusiformis* infection rates reached up to 25% of the total bacterial population. During the study, flamingo numbers at Lake Nakuru decreased from more than one million to ~1,500, which highlights the importance of phage predation for this bottom-up trophic cascade.

ORIGINAL RESEARCH PAPER Peduzzi, P. *et al.* The virus's tooth: cyanophages affect an African flamingo population in a bottom-up cascade. *ISME J.* http://dx.doi.org/10.1038/ismej.2013.241 (2014)