IN BRIEF

BACTERIAL PATHOGENESIS

DNase Sda1 provides selection pressure for a switch to invasive group A streptococcal infection

Walker, M. J. *et al. Nature Med.* 15 July 2007 (doi:10.1038/nm1612)

To investigate the *in vivo* selective pressures that determine the switch from mucosal to invasive infection for group A *Streptococcus* (GAS), Walker *et al.* analysed the invasive GAS clone M1t1. M1t1 has acquired phage-encoded virulence factors including the DNase Sda1, which helps the bacteria escape neutrophil extracellular traps (NETs). Severe invasive infections with M1t1 are associated with mutations in the *covRS* two-component system that downregulate the expression of the cysteine protease SpeB. The authors showed that *in vivo* the selective pressure for the rapid loss of SpeB comes from the phage-encoded Sda1. The loss of the surface-encoded SpeB prevents degradation of the DNase Sda1, thus allowing the bacteria to escape NETs.

TECHNIQUES & APPLICATIONS

Dissecting biological 'dark matter' with single-cell genetic analysis of rare and uncultivated TM7 microbes from the human mouth

Marcy, Y. *et al. Proc. Natl Acad. Sci. USA* **104**, 11889–11894 (2007)

In this manuscript, Marcy *et al.* compare the challenge that faces microbiologists interested in microbial diversity with that facing astronomers interested in 'dark matter'. One approach that microbiologists can use when estimating microbial diversity is single-cell genomic analysis. Marcy *et al.* present a microfluidic device that can be used for the direct isolation and genomic amplification of individual microbial cells. The device can process eight samples in parallel, and genomic amplification takes place in nanolitre volumes, which increases the specific template concentration. The device was tested on the oral microbiota using subgingival crevice biofilm samples. Rather than a comprehensive survey, the authors wanted to analyse the diversity in a specific phylum, TM7, for which no sequenced representatives are available. The genomes of two TM7 cells were sequenced, and the resulting data provided insights into the metabolic capabilities of members of this rare phylum.

BIOFILMS

Metal ions may suppress or enhance cellular differentiation in *Candida albicans* and *Candida tropicalis* biofilms

Harrison, J. J. *et al. Appl. Environ. Microbiol.* **73**, 4940–4949 (2007)

In addition to increased resistance to antibiotics, microbial biofilms also show increased resistance to metal ions compared with planktonic populations. Writing in *Applied and Environmental Microbiology*, Joe Harrison and colleagues now show that the presence of metal ions can affect cellular differentiation in fungal biofilms. Using a range of techniques, Harrison *et al.* examined the effect of sub-inhibitory concentrations of ten different metal ions, including Zn^{2+} and Cu^{2+}, on the architecture of both *Candida albicans* and *Candida tropicalis* biofilms. They found that almost all the metal ions examined either suppressed or enhanced the yeast–hyphal transition, leading to the formation of distinct biofilm structures.