IN BRIEF

VIRAL IMMUNE EVASION

Retroviral infection *in vivo* requires an immune escape virulence factor encrypted in the envelope protein of oncoretroviruses

Schlecht-Louf, G. *et al. Proc. Natl Acad. Sci. USA* **107**, 3782–3787 (2010)

Retroviral envelope (Env) proteins have an immunosuppressive activity that can be removed by the deletion of specific residues. The authors 'switched off' the immunosuppressive capacity of the Friend murine leukaemia virus (FrMLV) Env and assessed its importance in virus physiology *in vivo*. Wild-type virus causes high viraemia, whereas mice infected with mutant FrMLV had barely detectable or undetectable viraemia 7 and 14 days after infection, respectively. The Env residues suppress immune responses mediated by natural killer cells and T cells at early and late stages of infection, respectively. Injection with the mutated virus protected the mice against subsequent infections with wild-type virus, suggesting that deletion of the immunosuppressive domain of Env could be a retroviral vaccine strategy.

BIOFILMS

Treponema denticola biofilm-induced expression of a bacteriophage, toxin-antitoxin systems and transposases

Mitchell, H.L. *et al. Microbiology* **156**, 774–788 (2010)

In this study the authors developed a continuous culture system that allows the parallel growth of biofilm and planktonic forms of *Treponema denticola* to assess differences in the expression of proteins involved in the persistence of *T. denticola* in biofilms. Many genes were upregulated in the biofilm *T. denticola*, including the major virulence factor cystalysin, outer sheath proteins, several toxin–antitoxin systems and a family of transposases. The increased expression of virulence factors indicates that *T. denticola* might be more virulent when growing in a biofilm. They also identified for the first time a lysogenic phage (ϕtd1) that is incorporated in the *T. denticola* genome and found that its lytic genes are upregulated during biofilm growth, producing excised and circularized phages. These data suggest that when *T. denticola* grows in mixed-species biofilms there is high potential for gene transfer to increase virulence and facilitate biofilm persistence.

BACTERIAL PHYSIOLOGY

Acetylation of metabolic enzymes coordinates carbon source utilization and metabolic flux

Wang, Q. *et al. Science* **327**, 1004–1007 (2010)

Lysine acetylation controls many processes in eukaryotes, including metabolism, and now this study shows that it also has an integral role in *Salmonella enterica* metabolism. The authors show that 90% of the acetylated proteins in *S. enterica* have metabolic functions. These include three central metabolic enzymes (GapA, AceA and AceK), the function of which was regulated by the *S. enterica* major acetyltransferase, PatA, and the NAD^+-dependent deacetylase CobB. Furthermore, the protein acetylation status depended on the carbon source, as mutants lacking PatA grew better on citrate medium, whereas those lacking CobB grew better on glucose medium. PatA and CobB levels were in fact found to be differentially regulated on the basis of carbon source, revealing an important regulatory circuit that controls metabolism through acetylation.