IN BRIEF

IMMUNOLOGY

A neutralizing antibody selected from plasma cells that binds to group 1 and group 2 influenza A hemagglutinins

Corti, D. *et al. Science* 28 Jul 2011 (10.1126/science.1205669)

The influenza virus protein haemagglutinin is responsible for viral adherence to and entry into the host cell. Researchers have now discovered an antibody that recognizes all 16 subtypes of haemagglutinin and neutralizes entry of group 1 and group 2 influenza A viruses. To discover this antibody, the authors isolated a total of 104,000 plasma cells from eight individuals who had recently been infected with or vaccinated against influenza virus. A high-throughput screen of the monoclonal antibodies produced by these cells identified four antibodies that can bind the haemagglutinins H1, H5 and H7. Sequence analysis revealed that these antibodies have identical variable regions, and peptide scanning showed that they bind to the fusion peptide and helix A of haemagglutinin, as further confirmed by crystallography.

PATHOGENESIS

The cost of virulence: retarded growth of *Salmonella* Typhimurium cells expressing type III secretion system 1

Sturm, A. *et al. PLoS Pathog.* **7**, e1002143 (2011)

The expression of pathogenic factors has a detrimental effect on bacterial growth *in vitro*, according to a recent study. In a log phase culture of *Salmonella enterica* subsp. *enterica* serovar Typhimurium, ~10% of the cells expressed the type III secretion system (T3SS) that is encoded in the *Salmonella* pathogenicity island 1 (SPI-1). Furthermore, using time lapse microscopy of cells that harboured a reporter gene, the authors showed that cells expressing the T3SS grow more slowly than cells not expressing the T3SS, and two populations with different growth rates were detected even for cells that did not contain the reporter. Two distinct populations were also detected in a culture of mutant bacteria that lacked the genes for the structural components of the T3SS apparatus, but not in a culture of bacteria that lacked the genes encoding secreted translocon components and effectors. The authors speculate that the T3SS promotes leakage of ions from the cells or that the energetic cost of T3SS production slows down the bacterium.

TRANSCRIPTION

A new basal promoter element recognized by RNA polymerase core enzyme

Yuzenkova, Y. *et al. EMBO J.* 26 Jul 2011 (10.1038/emboj.2011.252)

The β′ subunit of RNA polymerase (RNAP) can interact with promoters and thereby help regulate transcription. Initial measurements of *in vitro* transcription (using *Thermus aquaticus* RNAP) from a T7A1 promoter from which known regulatory elements had been removed showed that transcription occurred even in the absence of the –35 region. Furthermore, transcription was promoted by an RNAP carrying a mutant σ-subunit that could not bind the –10 region, indicating that additional regulatory elements are present in the promoter. Using the RNAP structure as a guide, the authors discovered that the β′ zipper domain of the β′ subunit is important for this transcriptional activity, and mutational analysis indicated that it probably interacts with a region around the –21 position of the promoter. Similar results were detected using RNAPs from *Escherichia coli* and *Bacillus subtilis*, indicating that this is a conserved interaction that may be part of transcription activation in many promoters.