Online links

Corynebacterium diphtheria
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=genomeprj&cmd=Retrieve&dopt=Overview&list_uids=87

Streptococcus agalactiae
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=genomeprj&cmd=Retrieve&dopt=Overview&list_uids=12338

BACTERIAL PATHOGENESIS

Defeating the cost of GAS

The pili of Gram-negative pathogens have important roles in virulence and protection, and their biology has been well characterized. Little is known, however, about the extended surface organelles of Gram-positive pathogens. Mora and colleagues, reporting in *Proc. Natl Acad. Sci. USA*, have now shown that the Gram-positive group A *Streptococcus* (GAS) has surface pili, and that each of the four variants corresponds to specific Lancefield T antigens and confers protection against lethal GAS challenge in a mouse model of infection.

GAS produces two major classes of protein antigens: trypsin-sensitive M antigens and trypsin-resistant T antigens. The authors initially searched the five available GAS genomes, and found that each of the four variant fibronectin-binding, collagen-binding T-antigen (FCT) regions that are in all genomes codes for pilus-like structures. The T6 antigen, recognized in the original Lancefield serotyping system, forms the backbone of one pilus; the major pilus component of each of the other three also represents specific Lancefield T antigens.

Further analyses revealed that GAS pili are composed of members of a family of extracellular matrix-binding proteins and that, structurally, they resemble the pili described for the Gram-positive *Corynebacterium diphtheria* and *Streptococcus agalactiae* (a group B *Streptococcus*; GBS). Furthermore, although the exact function of the pili remains elusive, the authors showed that, as in GBS, the components are effective protective antigens.

GAS infections can range from mild skin infections to severe, life-threatening conditions such as necrotizing fasciitis. Mora *et al.* suggest that the pilus structures they have identified could be crucial virulence factors and, as such, represent potential vaccine targets against the wide variety of GAS-induced diseases.

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References and links

ORIGINAL RESEARCH PAPER Mora *et al.* Group A *Streptococcus* produce pilus-like structures containing protective antigens and Lancefield T antigens. *Proc. Natl Acad. Sci. USA* **102**, 15641–15646 (2005)