A Novel Treatment of Streptococcus pneumoniae Infections (BGN)

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Streptococcus pneumoniae (S. pneumonia) is part of the flora of the human respiratory tract, and can cause mucosal and invasive infections such as otitis media, pneumonia, sepsis and meningitis. The mucosal epithelial surfaces, with their tight junctions, constitute the first line of defense that prevents the entry of pathogens and their products. In case of pathogen spread to middle ear or the lungs otitis media and pneumonia might develop. In case of severe invasion, bacteremia might deteriorate and cause high rates of morbidity and mortality. The growing resistance to antibiotics and the limitations of the currently available polysaccharide based vaccines (Pneumovax and prevenar) encourage the search for new therapeutic modalities against S. pneumoniae. Moreover, the high mortality that followed pandemic influenza infection is believed not to be caused by the influenza virus itself but rather as a result of secondary bacterial infection with bacteria such as S. pneumoniae. Thus, an antibacterial treatment that can be given at the time of a viral infection of viral spread in closed communities may prevent secondary bacterial life threatening clinical diseases.

The Technology

In a previous study, using proteomic and immune-proteomic approaches, a group of several proteins with age dependent antigenicity in infants were identified. This group of proteins was demonstrated to elicit a protective immune response against
S. pneumoniae in various mouse models. Subsequently, by using a random combinatorial peptide library we have identified a number of bacterial cell wall proteins capable of interfering with the adhesion of S. pneumoniae to cultured human epithelial cells, followed by the identification of their human homologous sequences. Peptides synthesized according to these human homologous sequences were shown to (a) interfere with the adhesion of the S. pneumoniae to human cells. (b) reduce reduction of nasopharyngeal and lung colonization following intranasal inoculation with a sub-lethal bacterial dose and (c) reduce mortality following an intra-peritoneal challenge.

Applications

Treating S. pneumoniae infection in high risk populations, especially infants and elderly.
Preventing S. pneumoniae infection in infants and elderly with virus infection.

Patent Status

Patent pending

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