TeeVax - A multivalent T-antigen-based vaccine against Group A Streptococcus

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Introduction

There is currently no licenced vaccine against Group A Streptococcus. The T-antigen is a potential vaccine target as it is a surface exposed virulence factor involved in adhesion and colonisation of the host. Phylogenetic studies of the gene that encodes the T-antigen (tee) suggests that a vaccine combining 18 T-antigens would provide broad coverage against existing Group A Streptococcus strains.

Summary

TeeVax is a multivalent protein vaccine, which aims to provide broad coverage by containing T-antigen domains from the majority of known strains
TeeVax proteins are soluble and immunogenic in animals
TeeVax antiserum does not cross-react with human heart tissue
TeeVax antiserum can mediate opsonophagocytosis of multiple Group A Streptococcus strains
TeeVax has the potential to provide protection from Group A Streptococcal infections

Results

Each TeeVax protein was constructed by amplifying the N or C terminal regions of the tee gene from genomic DNA of six different bacterial strains. Gene fragments were hybridised by recombinant DNA technology and subcloned into an expression plasmid containing a poly-histidine tag.

Western blot analysis showed that TeeVax antiserum did not cross-react with human heart protein medley (H) or porcine myosin (M), unlike M-protein antiserum.

Serum from rabbits immunised with TeeVax1 or TeeVax2 were tested by ELISA against a panel of full-length T-antigens. Specific and cross-reactive anti-T-antigen IgG was detected.

TeeVax1 antiserum was able to mediate killing against strains targeted by the vaccine in a bactericidal assay. Cross-opsonisation was also observed against a strain that expressed the closely related T28.2-antigen, but not a strain containing the unrelated T2-antigen.

SDS-PAGE analysis of TeeVax protein expressed in E. coli, purified by metal-affinity chromatography (Lane 1), followed by size-exclusion chromatography (Lane 2), shows a soluble protein of approximately 100 kDa.

Conclusion

TeeVax is immunogenic and can produce robust antibody responses that are cross-reactive and cross-protective against multiple GAS strains, without cross-reacting with human heart antigens.
Up to 2 more TeeVax proteins are planned to be constructed to provide broad coverage across the majority of known GAS strains.