



Dual Protection Vaccine (*S. pneumoniae* and *N. meningitidis*)

Vaccine formulations that include an immunogenic composition for inducing antibodies to S. pneumoniae and N. meningitidis, and methods for producing and using the formulation.

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Inventor

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Field

Vaccines

Technology

Microbiology and medical bacteriology

Key Features

- Composition can be administered in a number of different routes
- Effective for providing dual protection against infections
- Reduces vaccine preparation and administration costs

Stage of Development

Animal studies have been conducted.

Status

Seeking research and development & licensing partner.

Patent Status

Patent application filed

Technology

Howard University has developed vaccine formulations that include an immunogenic composition for inducing antibodies to *S. pneumoniae* and *N. meningitidis*, providing dual protection against infections. Further, they have determined methods for producing the immunogenic composition as well as methods for their use. Advantageously, the conjugated composition provided can reduce costs of preparing and administering the vaccine.

Formulation

The vaccine includes at least one *N. meningitidis* capsular polysaccharide conjugated to a pneumococcal protein. In a preferred aspect, the immunogenic composition comprises recombinant PsaA ("rPsaA") from *S. pneumoniae* and capsular polysaccharide from *N. meningitidis* serotype C. Pneumococcal protein acts as an antigen as well as a carrier protein for *N. meningitidis* capsular polysaccharide in the vaccine. Thus, the vaccine is effective for providing dual protection against infections by *S. pneumoniae* and *N. meningitidis*.

Several pneumococcal proteins are universally found in all serotypes of *S. pneumoniae* which have been tested. Studies have shown that these proteins are capable of eliciting protective antibodies in laboratory animals. The protein pneumococcal surface antigen A (PsaA) is one such protein. This protein has been found by immunological and PCR methods in all *S. pneumoniae* tested including 23 vaccine serotypes as well as clinical isolates from various countries. In an important aspect, the rPsaA used in the immunogenic composition described herein includes at least the residues at positions 21 to 319 of SEQ ID NO: 1.

The capsular polysaccharide of *N. meningitidis* serogroup C and PsaA are provided in conjugated form. In a preferred aspect, the capsular polysaccharide and PsaA are conjugated by covalent linkage.

A method is provided for generating an immune response in a subject against pneumococcal surface antigen A (PsaA) and capsular polysaccharide from *N. meningitidis* serotype C. The method comprises administering to a subject an effective amount for producing antibodies specific to rPsaA and capsular polysaccharide from *N. meningitidis* serotype C. Administering to a subject a combination of rPsaA and capsular polysaccharide from *N. meningitidis* serotype C in covalently linked form is effective for generating an immune response in the subject. Immunogenicity of the conjugated pneumococcal surface antigen A (PsaA) and capsular polysaccharide is significantly increased over the immune response seen for antigen when administered individually. More than a 40 fold increase in immunogenicity is seen for conjugated PsaA as compared to non-conjugated PsaA, and more than a 170 fold increase in immunogenicity is seen for conjugated capsular polysaccharide as compared to non-conjugated capsular polysaccharide.

The immunogenic composition may be administered to a subject by a number of different routes, including intramuscular, intranasal, oral, sub-cutaneous, transdermal administration, and transmucosal administration. In addition these compositions provide dual protection against *S. pneumoniae* and *N. meningitidis* infection, and utilize PsaA as a protein carrier for polysaccharide.

Advantageously, this immunogenic formulation can reduce the costs of preparing and administering the vaccine. This is a particularly important benefit to developing and underdeveloped countries because the vaccine will reduce the economic and medical burden to the countries which have high rates of pneumococcal and meningococcal disease.

Opportunity: Seeking research and development & licensing partner.