CLAIMS

1. Use of:

(i) an isolated protein comprising

(a) the sequence of SEQ ID NO: 1 (p*17) or SEQ ID NO: 21 (p*18);

(b) the sequence of SEQ ID NO: 1 or SEQ ID NO: 21 conjugated to a carrier protein, fragment or epitope thereof; or

(ii) an isolated nucleic acid encoding the protein of (a) or (b),

in the manufacture of a medicament for treating or preventing a group A streptococcal bacterial infection in a mammal; wherein the isolated protein, or the isolated nucleic acid is to be intramuscularly administered to the mammal to thereby prevent or treat the group A streptococcal bacterial infection in the mammal, and wherein intramuscular administration of the isolated protein or the isolated nucleic acid elicits a mucosal immune response and/or induces mucosal immunity to the group A streptococcal bacterial infection in the mammal.

2. The use of claim 1, wherein the group A streptococcal bacterial infection is a group A streptococcal skin infection, a group A streptococcal intranasal infection or an invasive group A streptococcal infection.

3. The use of claim 1 or claim 2, wherein the group A streptococcal bacterial infection is selected from the group consisting of cellulitis, erysipelas, impetigo, scarlet fever, a throat infection, acute pharyngitis, bacteraemia, toxic shock syndrome, necrotizing fasciitis, acute rheumatic fever, acute glomerulonephritis and any combination thereof.

4. The use of any one of claims 1 to 3, wherein a single immunization of the mammal with said medicament provides the mammal with protection against group A streptococcal bacterial skin disease.

5. The use of any one of claims 1 to 3, wherein a single immunization of the mammal with said medicament provides the mammal with protection against a group A streptococcal skin infection.

6. The use of any one of claims 1 to 3, wherein a single immunization of the mammal with said medicament provides the mammal with protection against a group A streptococcal intranasal infection.

7. The use of any one of claims 1 to 3, wherein a single immunization of the mammal with said medicament provides the mammal with protection against an invasive group A streptococcal infection.

8. The use of any one of claims 1 to 7, wherein the carrier protein comprises thyroglobulin, albumin, a toxin, a toxoid or any mutant cross-reactive material (CRM).

9. The use of any one of claims 1 to 8, wherein the carrier protein comprises a toxin from tetanus, diphtheria, pertussis, *Pseudomonas, E. coli, Staphylococcus* or *Streptococcus*.

10. The use of claim 8 or claim 9, wherein the carrier protein is diphtheria toxoid.

11. The use of any one of claims 1 to 10, wherein the medicament further comprises an immunogenic fragment of a SpyCEP protein or wherein an immunogenic fragment of a SpyCEP protein is to be co-administered to the mammal.

12. The use of claim 11, wherein the immunogenic fragment of the SpyCEP protein comprises:

(i) the SpyCEP peptide of SEQ ID NO:23;

(ii) a SpyCEP peptide variant consisting of an amino acid sequence at least 90% identical to SEQ ID NO: 23;

(iii) the SpyCEP peptide of (i) or the SpyCEP peptide variant of (ii) further consisting of one or a plurality of lysine residues at an N- and/or C-terminus thereof;

(iv) the K4S2 peptide of SEQ ID NO: 24; or

(v) any one of (i) to (iv) conjugated to a carrier protein.

13. A composition comprising:

(i) an isolated protein comprising:

(a) the sequence of SEQ ID NO: 1 (p*17) or SEQ ID NO: 21 (p*18);

(b) the sequence of SEQ ID NO: 1 or SEQ ID NO: 21 conjugated to a carrier protein, fragment or epitope thereof; or

(ii) an isolated nucleic acid encoding the isolated protein of (a) or (b); and an immunogenic fragment of a SpyCEP protein, or an isolated nucleic acid that encodes the SpyCEP immunogenic fragment,

wherein the composition is formulated for (a) eliciting a mucosal immune response to group A streptococcal bacteria in a mammal; (b) inducing mucosal immunity against a group A streptococcal bacterial infection in a mammal; or (c) treating or preventing a group A streptococcal bacterial infection in a mammal by eliciting a mucosal immune response, or inducing mucosal immunity to the group A streptococcal bacterial infection in the mammal, and wherein the composition is formulated for intramuscular administration.

14. The composition of claim 13, being formulated to achieve protection against group A streptococcal bacterial skin disease by way of single immunization of the mammal.

15. The composition of claim 13, being formulated to achieve protection against group A streptococcal skin infection by way of a single immunization of the mammal.

16. The composition of claim 13, being formulated to achieve protection against group A streptococcal intranasal infection by way of a single immunization of the mammal.

17. The composition of claim 13, being formulated to achieve protection against invasive group A streptococcal infection by way of a single immunization of the mammal.

18. The composition of any one of claims 13-17, wherein the immunogenic fragment of the SpyCEP protein comprises:

(i) the SpyCEP peptide of SEQ ID NO: 23;

(ii) a SpyCEP peptide variant consisting of an amino acid sequence at least 90% identical to SEQ ID NO: 23;

(iii) the SpyCEP peptide of (i) or the SpyCEP peptide variant of (ii) further consisting of one or a plurality of lysine residues at an N- and/or C-terminus thereof;

(iv) the K4S2 peptide of SEQ ID NO: 24; or

(v) any one of (i) to (iv) conjugated to a carrier protein, fragment or epitope thereof.

19. The use of any one of claims 1-12, or the composition of any one of claims 13-18, wherein the sequence is SEQ ID NO:1 (p*17).