CLAIMS

1. A method of immunising against *Staphylococcus aureus* infection comprising a step of administering to a human patient a single dose of an Immunogenic composition comprising a *Staphylococcus aureus* Type 5 capsular saccharide conjugated to a carrier protein to form a *S. aureus* Type 5 capsular saccharide conjugate, wherein the *S. aureus* Type 5 capsular saccharide conjugate is administered at a saccharide dose of 3-500, 5-25µg, 3-20µg, 3-12µg, 5-10µg, 7-20µg, 7-15µg or 8-12µg.

2. The method of claim 1 wherein the immunogenic composition comprises a *S. aureus* Type 8 capsular saccharide conjugated to a carrier protein to form a *S. aureus* Type 8 capsular saccharide conjugate, wherein the *S. aureus* Type 8 capsular saccharide conjugate is administered at a saccharide dose of 3-50µg, 5-25µg, 3-20µg, 3-12µg, 5-10µg, 7-20µg, 7-15 µg or 8-12µg.

3. The method of claim 1 or 2 wherein the *S. aureus* Type 5 capsular saccharide has a molecular weight of over 25kDa, 40kDa or 50kDa or between 25-300kDa, 50-250kDa, 70-150kDa, 25-125kDa, 90-125kDa, 30-100kDa, 35-75KDa or 40-70kDa.

4. The method of any one of claims 1-3 wherein the *S. aureus* Type 8 capsular saccharide has a molecular weight of over 25kDa, 40kDa or 50kDa or between 25-300kDa, 50-250kDa, 70-150kDa, 25-125kDa, 90-125kDa, 30-100kDa, 35-75KDa or 40-70kDa.

5. The method of any one of claims 1-4 wherein the carrier protein to which the Type 5 capsular saccharide is conjugated is selected from the group consisting of tetanus toxoid, diphtheria toxoid, CRM197, alpha toxoid, ClfA, *Pseudomonas aeruginosa* exoprotein A.

6. The method of any one of claims 1-5 wherein the carrier protein to which the Type 8 capsular saccharide is conjugated Is selected from the group consisting of tetanus toxoid, diphtheria toxoid, CRM197, alpha toxoid, ClfA and *Pseudomonas aeruginosa* exoprotein A.

7. The method of claim 5 or 6 wherein the carrier protein is tetanus toxoid.

8. The method of any one of claims 1-7 wherein the *S. aureus* Type 5 capsular saccharide and/or the *S. aureus* Type 8 capsular saccharide is 50-100% or 75-100% O-acetylated.

9. The method of any one of claims 1-8 wherein the *S. aureus* Type 5 capsular saccharide *S. aureus* and/or *the* Type 8 capsular saccharide is directly conjugated to the carrier protein.

10. The method of any one of claims 1-9 wherein the *S. aureus* Type 5 capsular saccharide is conjugated using a cyanylating reagent.

11. The method of any one of claims 1-10 wherein the *S. aureus* Type 8 capsular saccharide is conjugated using a cyanylating reagent.

12. The method of claim 10 or 11 wherein the cyanylating reagent Is CDAP.

13. The method of any one of claims 1-12 wherein the ratio of polysaccharide to protein in the *S aureus* Type 5 capsular saccharide conjugate is between 1:5 and 5:1 (w.w) or between 1:2 and 2:1 *(w/w),* 1 2 to 1:5 *(wlw)* or 1 1 and 1 2 (wlw).

14. The method of any one of claims 1-13 wherein the ratio of polysaccharide to protein in the *S. aureus* Type 8 capsular sacchande conjugate is between 1.5 and 51 (w:w) or *between* 1:2 and 2:1 (w/w), 1 2 to 1:5 (w/w) or 1:1 and 1:2 (w/w).

15. The method of any one of claims 1-14 wherein the same saccharide dose of *S. aureus* Type 5 capsular sacccharide and *S. aureus* Type 8 capsular saccharide is present in the immunogenic composition.

16. The method of any one of claims 1-15 wherein the Immunogenic composition further comprises a ClfA protein or fragment thereof.

17. The method of claim 16 wherein the ClfA protein or fragment thereof is at least 90% identical to the polypeptide sequence of any one of SEQ ID NO:3-12 along the full length thereof.

18. The method of claim 16 or 17 wherein the ClfA protein or fragment thereof is a fragment of ClfA comprising a N2 domain.

19. The method of claims 16-18 wherein the ClfA protein or fragment thereof is a fragment of ClfA comprising a N3 domain.

20. The method of any one of claims 16-19 wherein the ClfA protein or fragment thereof is a fragment of ClfA comprising a N1 domain.

21. The method of any one of claims 16-20 wherein the ClfA protein or fragment thereof comprises the N2-N3 domains and has a polypeptide sequence at least 90% identical to the sequence of SEQ ID NO: 6 , 7, 11, 12, 15, 16, 17 or 18.

22. The method of any one of claims 16-21 wherein the ClfA protein or fragment thereof contains an amino acid substitution which reduces the ability of CIFA to bind to fibrinogen.

23. The method of claim 22 wherein the ClfA protein or fragment thereof contains an amino acid substitution at at least one of amino acids A1a254, Tyr256, Pro336, Tyr338, 11e387, Lys389, Tyr474, Giu526 or Va1527.

24 The method of claim 22 wherein amino acid Pro336 is mutated to Ser and/or Y338 is mutated to Ala

25. The method of any one of claims 16-24 wherein the ClfA protein or fragment thereof is present in the immunogenic composition as an unconjugated protein.

26 The method of any one of claims 16-24 wherein the ClfA protein or fragment thereof is conjugated to the *S. aureus* Type 5 capsular saccharide

27 The method of any one of claims 16-24 wherein the ClfA protein or fragment thereof Is conjugated to the *S. aureus* Type 8 capsular saccharide.

28. The method of any one of claims 16-18 wherein the ClfA protein or fragment thereof is present in the immunogenic composition at a dose of 5-50, 10-30, 5-15 or 20-40 rig.

29. The method of any one of claims 1-28 wherein the single dose of the immunogenic composition is administered 5-60, 6-40, 7-30 or 7-15 days before a planned hospital procedure.

30. The method of any preceding claim wherein the immunogenic composition comprises an alpha toxoid.

31. The method of claim 30 wherein the alpha toxoid has an amino acid sequence at least 90% identical to SEQ ID NO:1, 2, 13 or 14

32. The method of claim 30 or 31 wherein the alpha toxoid contains a point mutation which decreases toxicity of the alpha toxoid.

33. The method of claim 32 wherein the alpha toxoid contains a point mutation at amino acid 35.

34. The method of claim 33, wherein the point mutation at amino acid 35 replaces a histidine with an arginine amino acid.

35. The method of any one of claims 30-34 wherein the alpha toxoid is present in the immunogenic composition as an unconjugated protein.

36. The method of any one of claims 30-35 wherein the alpha toxoid Is conjugated to the *S. aureus* Type 5 capsular saccharide

37. The method of any one of claims 30-36 wherein the alpha toxoid is conjugated to the *S. aureus* Type 8 capsular saccharide.

38. The method of any one of claims 30-37 wherein the alpha toxoid is present in the immunogenic composition at a dose of 5-50, 10-30, 5-15 or 20-40

39. The method of any one of claim 30-38 wherein the ClfA and alpha toxoid are present at the same dose in the immunogenic composition.

40. The method of any preceding claim wherein the immunogenic composition does not contain an oil in water emulsion.

41. The method of any preceding claim wherein the Immunogenic composition is unadjuvanted.

42. An immunogenic composition comprising a *Staphylococcus aureus* Type 5 capsular saccharide conjugated to a carrier protein to form a *S. aureus* Type 5 capsular saccharide conjugate, wherein the *S. aureus* Type 5 capsular saccharide conjugate is administered at a saccharide dose of 3-50µg, 5-25µg, 3-2014, 3-12µg, 5-10pg, 7-20pig, 7-15Ag or 8-12Ag, for use in treatment or prevention of *Staphylococcus aureus* Infection in which a human patient is immunised with a single dose of the immunogenic composition

43. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of claim 42 wherein the immunogenic composition comprises a *S. aureus* Type 8 capsular saccharide conjugated to a carrier protein to form a *S. aureus* Type 8 capsular saccharide conjugate, wherein the *S. aureus* Type 8 capsular saccharide conjugate is administered at a saccharide dose of 3-501.1g, 5-25pg, 3-2014, 3-12µg, 5-10µg, 7-2014, 7-151..0 or 8-12µg.

44. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of claim 42 or 43 wherein the S. *aureus* Type 5 capsular saccharide has a molecular weight of over 25kDa, 40kDa or 50k0a or between 25-300kDa, 50-250kDa, 70-150kDa, 25-125kDa, 90-125kDa, 30-100kDa, 35-75KDa or 40-70k0a,

45. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 42-44 wherein the *S. aureus* Type 8 capsular saccharide has a molecular weight of over 25kDa, 40kDa or 50kDa or between 25-300kDa, 50-250kDa, 70-150kDa, 25-125kDa, 90-125kDa, 30-100kDa, 35-75KDa or 40-70kDa,

46. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 42-45 wherein the carrier protein to which the Type 5 capsular saccharide Is conjugated is selected from the group consisting of tetanus toxoid, diphtheria toxoid, CRM197, alpha toxoid, ClfA, *Pseudomonas aeruginosa* exoprotein A.

47. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 42-46 wherein the carrier protein to which the Type 8 capsular saccharide is

conjugated is selected from the group consisting of tetanus toxoid, diphtheria toxoid, CRM197, alpha toxoid, ClfA and *Pseudomonas aeruginosa* exoprotein A

48. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of claim 46 or 47 where in the carrier protein is tetanus toxoid.

49. The immunogenic composition for use in treatment or prevention of *S aureus* infection of any one of claims 42-48 wherein the *S aureus* Type 5 capsular saccharide and /or the *S. aureus* Type 8 capsular saccharide is 50-100% or 75-100% 0-acetylated.

50. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 42-49 wherein the *S. aureus* Type 5 capsular saccharide and/or the *S aureus* Type 8 capsular saccharide is directly conjugated to the carrier protein.

51. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 42-50 wherein the *S. aureus* Type 5 capsular saccharide is conjugated using a cyanylating reagent.

52. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 42-51 wherein the *S. aureus* Type 8 capsular saccharide is conjugated using a cyanylating reagent

53. The Immunogenic composition for use in treatment or prevention of S. *aureus* infection of claim 51 or 52 wherein the cyanylating reagent is CDAP.

54. The immunogenic composition for use in treatment or prevention of *S. aureus* Infection of any one of claims 42-53 wherein the ratio of polysaccharide to protein in the *S. aureus* Type 5 capsular saccharide conjugate is between 1:5 and 5:1 (w:w) or between 1 2 and 2:1 *(w/w),* 1 2 to 1:5 (w/w) or 1:1 and 1:2 (w/w)

55. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 42-54 wherein the ratio of polysaccharide to protein in the *S. aureus* Type 8 capsular saccharide conjugate is between 1:5 and 51 (w.w) or between 1:2 and 2:1 (w/w), 1'2 to 1:5 (w/w) or 1.1 and 1:2 (w/w)

56. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of ay one of claims 42-55 wherein the same saccharide dose of *S aureus* Type 5 capsular saccharide and *S. aureus* Type 8 capsular saccharide is present in the immunogenic composition.

57. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 42-56 wherein the immunogenic composition further comprises a ClfA protein or fragment thereof.

58. The immunogenic composition for use in treatment or prevention of *S. aureus* Infection of claim 57 wherein the ClfA protein or fragment thereof is at least 90% identical to the polypeptide sequence of any one of SEQ ID NO 3-12 or 15-18 along the full length thereof.

59. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of claim 57 or 58 wherein the ClfA protein or fragment thereof is a fragment of ClfA comprising a N2 domain.

60 The immunogenic composition for use in treatment or prevention of *S. aureus* Infection of claims 57-59 wherein the ClfA protein or fragment thereof is a fragment of ClfA comprising a N3 domain.

61. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 57-60 wherein the ClfA protein or fragment thereof is a fragment of ClfA comprising a N1 domain.

62 The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 57-58 wherein the ClfA protein or fragment thereof comprises the N2-N3 domain and has a polypeptide sequence at least 90% identical to the sequence of SEQ ID NO:6 , 7, 11, 12, 15, 16, 17 or 18.

63. The Immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 57-62 wherein the ClfA protein or fragment thereof contains an amino acid substitution which reduces the ability of ClfA to bind to fibrinogen.

64. The immunogenic composition for use in treatment or prevention of *S aureus* infection of claim 63 wherein the ClfA protein or fragment thereof contains an amino acid substitution at at least one of amino acids A1a254, Tyr256, Pro336, Tyr338, 11e387, Lys389, Tyr474, Giu526 or Va1527.

65. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of claim 63 wherein amino acid Pro336 is mutated to Ser and/or Y338 is mutated to Ala

66. The immunogenic composition for use In treatment or prevention of *S. aureus* infection of any one of claims 57-65 wherein the ClfA protein or fragment thereof is present In the immunogenic composition as an unconjugated protein

67. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 57-65 wherein the ClO; protein or fragment thereof is conjugated to the *S. aureus* Type 5 capsular saccharide.

68. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 57-65 wherein the CIIA protein or fragment thereof is conjugated to the S. *aureus* Type 8 capsular saccharide.

69 The immunogenic composition for use in treatment or prevention of *S, aureus* infection of any one of claims 57-68 wherein the ClfA protein or fragment thereof Is present in the immunogenic composition at a dose of 5-50, 10-30, 5-15 or 20-40 jig,

70. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 42-69 wherein the single dose of the immunogenic composition is administered 560, 6-40, 7-30 or 7-15 days before a planned hospital procedure

71. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any preceding claim wherein the immunogenic composition comprises an alpha toxoid.

72. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of claim 71 wherein the alpha toxoid has an amino acid sequence at least 90% identical to SEQ ID NO: 1,2, 13 or 14.

73. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of claim 71 or 72 wherein the alpha toxoid contains a point mutation which decreases toxicity of the alpha toxoid

74 The immunogenic composition for use in treatment or prevention of *S. aureus* infection of claim 73 wherein the alpha toxoid contains a point mutation at amino acid 35.

75 The immunogenic composition for use in treatment or prevention of *S. aureus* infection of claim 74, wherein the point mutation at amino acid 35 replaces a histidine35 with an arginine.

76. The immunogenic composition for use in treatment or prevention of *S. aureus* Infection of any one of claims 71-75 wherein the alpha toxoid is present in the immunogenic composition as an unconjugated protein

77 The immunogenic composition for use in treatment or prevention of *S aureus* infection of any one of claims 71-76 wherein the alpha toxoid is conjugated to the *S. aureus* Type 5 capsular saccharide.

78. The immunogenic composition for use in treatment or prevention of *S aureus* infection of any one of claims 71-77 wherein the alpha toxoid is conjugated to the *S. aureus* Type 8 capsular saccharide

79. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 71-78 wherein the alpha toxoid is present in the immunogenic composition at a dose of 5-50, 10-30, 5-15 or 20-40 lig

80. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claim 71-79 wherein the ClfA and alpha toxoid are present at the same dose in the Immunogenic composition.

81. The immunogenic composition for use in treatment or prevention of *S aureus* infection of any one of claims 42-80 wherein the immunogenic compositiOn does not contain an oil in water emulsion.

82. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 42-81 wherein the immunogenic composition is unadjuvanted

83 An immunogenic composition comprising a *S. aureus* Type 5 capsular saccharide conjugated to a carrier protein, a *S. aureus* Type 8 capsular saccharide conjugated to a carrier protein, a CIFA protein or fragment thereof comprising at least 10 amino acids taken contiguously from any one of SEQ ID NO: 3-12 or 15-18_and an alpha toxoid wherein the alpha toxoid is present in the immunogenic composition at a dose of 5-50. 10-30 5-15 or 20-40 1.ta

84. The immunogenic composition of claim 83 wherein the *S. aureus* Type 5 capsular saccharide conjugate is present at a saccharide dose of 3-504, 5-2514, 3-201.1g, 3-12m, 5-101.1g, 7-2014, 715µg or 8-121.1g.

85, The immunogenic composition of claim 83 or 84 wherein the *S. aureus* Type 8 capsular saccharide conjugate Is present at a saccharide dose of 3-504, 5-254, 3-204, 3-124, 5-101.tg, 7-20µg, 7-151.1g or 8-12pg.

86. The immunogenic composition of any one of claims 83-85 wherein the *S. aureus* Type 5 capsular saccharide has a molecular weight of over 25kDa, 40kDa or 50kDa or between 25-300kDa, 50-250kDa, 70-150kDa, 25-125kDa, 90-125kDa, 30-100kDa, 35-75KDa or 40-70kDa.

87. The immunogenic composition of any one of claims 83-86 wherein the *S. aureus* Type 8 capsular saccharide has a molecular weight of over 25kDa, 40kDa or 50kDa or between 25-300kDa, 50-250kDa, 70-150kDa, 25-125kDa, 90-125kDa, 30-100kDa, 35-75

88. The immunogenic composition of any one of claims 83-87 wherein the carrier protein to which the Type 5 capsular saccharide is conjugated is selected from the group consisting of tetanus toxoid, diphtheria toxoid, CRM197, alpha toxoid, ClfA, *Pseudomonas aeruginosa* exoprotein A

89. The immunogenic composition of any one of claims 83-88 wherein the carrier protein to which the Type 8 capsular saccharide is conjugated is selected from the group consisting of tetanus toxoid, diphtheria toxoid, CRM197, alpha toxoid, ClfA and *Pseudomonas aeruginosa* exoprotein A.

90. The immunogenic composition of claim 88 or 89 wherein the carrier protein is tetanus toxoid.

91. The immunogenic composition of any one of claims 83-90 wherein the *S. aureus* Type 5 capsular saccharide and /or the S. aureus Type 8 capsular saccharide is 50-100% or 75-100% 0-acetylated.

92. The immunogenic composition of any one of claims 83-91 wherein the *S aureus* Type 5 capsular saccharide and/or the *S. aureus* Type 8 capsular saccharide is directly conjugated to the carrier protein

93. The immunogenic composition of any one of claims 83-92 wherein the *S. aureus* Type 5 capsular saccharide is conjugated using a cyanylating reagent

94. The immunogenic composition of any one of claims 83-93 wherein the *S aureus* Type 8 capsular saccharide is conjugated using a cyanylating reagent.

95. The Immunogenic composition of claim 93 or 94 wherein the cyanylating reagent is CDAP.

96. The immunogenic composition of any one of claims 83-95 wherein the ratio of polysaccharide to protein in the *S. aureus* Type 5 capsular saccharide conjugate is between 1:5 and 5:1 (w w) or between 1 2 and 2:1 (w/w), 1:2 to 1:5 (wlw) or 1:1 and 1.2 *(w/w),*

97. The immunogenic composition of any one of claims 83-96 wherein the ratio of polysaccharide to protein In the *S. aureus* Type 8 capsular saccharide conjugate is between 1:5 and 5:1 (w.w) or between 1:2 and 2:1 (w/w), 1:2 to 1:5 (w/w) or 1:1 and 1:2 (w/w).

98. The immunogenic composition of ay one of claims 83-97 wherein the same saccharide dose of *S. aureus* Type 5 capsular saccharlde and *S. aureus* Type 8 capsular saccharlde is present in the Immunogenic composition.

99. The immunogenic composition of any one of claims 83-98 wherein the immunogenic composition further comprises a ClfA protein or fragment thereof comprising at least 10 amino acids taken contiguously from any one of SEQ ID NO:3-12 or 15-18.

100. The immunogenic composition of claim 99 wherein the ClfA protein or fragment thereof is at least 90% identical to the amino acid sequence of any one of SEQ ID NO:3-12 or 15-18 along the full length of thereof.

101. The immunogenic composition of claim 99 or 100 wherein the CIFA protein or fragment thereof Is a fragment of ClfA comprising a N2 domain.

102. The immunogenic composition of claims 99-101 wherein the ClfA protein or fragment thereof is a fragment of ClfA comprising a N3 domain.

103 The immunogenic composition of any one of claims 99-102 wherein the ClfA protein or fragment thereof is a fragment of ClfA comprising a N1 domain.

104. The immunogenic composition of any one of claims 99-103 wherein the ClfA protein or fragment thereof comprises the N2-N3 domain and has an amino acid sequence at least 90% identical to the sequence of SEQ ID NO 6 ,7, 11, 12, 15, 16, 17 or 18.

105. The immunogenic composition of any one of claims 99-104 wherein the ClfA protein or fragment thereof contains an amino acid substitution which reduces the ability of ClfA to bind to fibrinogen.

106. The Immunogenic composition of claim 105 wherein the ClfA protein or fragment thereof contains an amino acid substitution at at least one of amino acids A1a254, Tyr256, Pro336, Tyr338, I1e387, Lys389, Tyr474, Glu526 or Va1527

107, The immunogenic composition of claim 105 wherein amino acid Pro336 is mutated to Ser and/or Tyr338 is mutated to Ala.

108 The immunogenic composition of any one of claims 99-107 wherein the ClfA protein or fragment is present in the immunogenic composition as an unconjugated protein.

109. The Immunogenic composition of any one of claims 99-107 wherein the ClfA protein or fragment thereof is conjugated to the *S. aureus* Type 5 capsular saccharide.

110 The immunogenic composition of any one of claims 99-107 wherein the CM protein or fragment thereof is conjugated to the *S. aureus* Type 8 capsular saccharide.

111. The immunogenic composition of any one of claims 99-110 wherein the ClfA protein or fragment thereof is present in the immunogenic composition at a dose of 5-50, 10-30, 5-15 or 2040 pg.

112. The immunogenic composition of claim 111 wherein the immunogenic composition has a volume of 0.5m1.

113. The immunogenic composition of any one of claims 83-112 wherein the immunogenic composition comprises an alpha toxoid.

114 The immunogenic composition of claim 113 wherein the alpha toxoid has an amino acid sequence at least 90% identical to SEQ ID NO:1, 2, 3 or 4.

115. The immunogenic composition of claim 113 or 114 wherein the alpha toxoid contains a point mutation which decreases toxicity of the alpha toxoid.

116. The immunogenic composition of claim 115 wherein the alpha toxoid contains a point mutation at amino acid 35.

117. The immunogenic composition of claim 116, wherein the point mutation at amino acid 35 replaces *a histidlne* with an arginine or a Jeucine amino acid.

118. The immunogenic composition of any one of claims 113-117 wherein the alpha toxoid is present in the immunogenic composition as an unconjugated protein.

119, The immunogenic composition of any one of claims 113-118 wherein the alpha toxoid is conjugated to the *S. aureus* Type 5 capsular saccharide.

120, The immunogenic composition of any one of claims 113-119 wherein the alpha toxoid is conjugated to the *S. aureus* Type 8 capsular saccharide.

121, The immunogenic composition of any one of claims 113-120 wherein the ClfA and alpha toxoid are present at the same dose in the immunogenic composition.

122. The immunogenic composition of any one of claims 83-121 wherein the immunogenic composition does not contain oil In water emulsion,

123. The immunogenic composition of any *one* of claims 83-122 wherein the immunogenic composition is unadjuvanted.

124. A vaccine comprising the immunogenic composition of any one of claims 83-123 and a pharmaceutically acceptable excipient.

125. A process for making the immunogenic composition of any one of claims 83-123 or the vaccine of claim 125 comprising the steps of a) conjugating a *S. aureus* Type 5 capsular saccharide to a carrier protein to form a *S. aureus* Type 5 capsular saccharide conjugate, b) conjugating a *S. aureus* Type 8 capsular saccharide conjugated to a carrier protein to form a *S. aureus* Type 8 capsular saccharide conjugate, and c) combining the *S. aureus* Type 5 capsular saccharide conjugate, the *S. aureus* Type 8 capsular saccharide conjugate, a ClfA protein or fragment thereof and an alpha toxoid to form the immunogenic composition.

126. The immunogenic composition of any one of claims 83-123 or the vaccine of claim 124[125] for use In the treatment or prevention of S. *aureus* infection in a human subject.

127 The immunogenic composition for use of claim 126 wherein the human subject is undergoing a surgical procedure, optionally cardio-thoracic surgery.

128. The immunogenic composition for use of claim 127 wherein the human subject is immunised with a single dose of the immunogenic compositions of any one of claims 83-123 or the vaccine 'of claim 124 at a time point 5-60, 6-40, 7-30 or 7-15 days before undergoing the surgical procedure.

129. A method of treatment comprising the step of administering to a human subject at risk of developing a *S. aureus* infection an immunologically effective amount of the immunogenic composition of any one of claims 83-123 or the vaccine of claim 124.

130. The method of claim 129 wherein the human subject is undergoing a surgical procedure, optionally cardio-thoracic surgery.

131 The method of claim 130 wherein the human subject is immunised with a single dose of the immunogenic compositions of any one of claims 83-123 or the vaccine of claim 124 at a time point 5-60, 6-40, 7-30 or 7-15 days before undergoing the surgical procedure

CLAIMS

1. An immunogenic composition comprising a *Staphylococcus aureus* Type 5 capsular saccharide conjugated to a carrier protein to form a *S. aureus* Type 5 capsular saccharide conjugate, wherein the *S. aureus* Type 5 capsular saccharide conjugate is administered at a saccharide dose of 3-50μg, 5-25μg, 3-20μg, 3-12μg, 5-10μg, 7-20μg, 7-15μg or 8-12μg, for use in treatment or prevention of *Staphylococcus aureus* infection in which a human patient is immunised with a single dose of the immunogenic composition.

2. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of claim 1 wherein the immunogenic composition comprises a *S. aureus* Type 8 capsular saccharide conjugated to a carrier protein to form a *S. aureus* Type 8 capsular saccharide conjugate, wherein the *S. aureus* Type 8 capsular saccharide conjugate is administered at a saccharide dose of 3-50μg, 5-25μg, 3-20μg, 3-12μg, 5-10μg, 7-20μg, 7-15μg or 8-12μg.

3. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of claim 1 or 2 wherein the *S. aureus* Type 5 capsular saccharide has a molecular weight of over 25kDa, 40kDa or 50kDa or between 25-300kDa, 50-250kDa, 70-150kDa, 25-125kDa, 90-125kDa, 30-100kDa, 35-75KDa or 40-70kDa.

4. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 1-3 wherein the *S. aureus* Type 8 capsular saccharide has a molecular weight of over 25kDa, 40kDa or 50kDa or between 25-300kDa, 50-250kDa, 70-150kDa, 25-125kDa, 90-125kDa, 30-100kDa, 35-75KDa or 40-70kDa.

5. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 1-4 wherein the *S. aureus* Type 5 capsular saccharide and /or the *S. aureus* Type 8 capsular saccharide is 50-100% or 75-100% O-acetylated.

6. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 1-5 wherein the ratio of polysaccharide to protein in the *S. aureus* Type 5 capsular saccharide conjugate is between 1:5 and 5:1 (w:w) or between 1:2 and 2:1 (w/w), 1:2 to 1:5 (w/w) or 1:1 and 1:2 (w/w).

7. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 1-6 wherein the ratio of polysaccharide to protein in the *S. aureus* Type 8 capsular saccharide conjugate is between 1:5 and 5:1 (w:w) or between 1:2 and 2:1 (w/w), 1:2 to 1:5 (w/w) or 1:1 and 1:2 (w/w).

8. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of ay one of claims 1-7 wherein the same saccharide dose of *S. aureus* Type 5 capsular

saccharide and *S. aureus* Type 8 capsular saccharide is present in the immunogenic composition.

9. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 1-8 wherein the immunogenic composition further comprises a ClfA protein or fragment thereof.

10. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of claim 9 wherein the ClfA protein or fragment thereof is at least 90% identical to the polypeptide sequence of any one of SEQ ID NO:3-12 or 15-18 along the full length thereof.

11. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 9-10 wherein the ClfA protein or fragment thereof contains an amino acid substitution which reduces the ability of ClfA to bind to fibrinogen.

12. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of claim 11 wherein the ClfA protein or fragment thereof contains an amino acid substitution at at least one of amino acids Ala254, Tyr256, Pro336, Tyr338, Ile387, Lys389, Tyr474, Glu526 or Val527.

13. The immunogenic composition for use in treatment or prevention of *S. aureus* infection of any one of claims 1-12 wherein the single dose of the immunogenic composition is administered 5-60, 6-40, 7-30 or 7-15 days before a planned hospital procedure.

14. An immunogenic composition comprising a *S. aureus* Type 5 capsular saccharide conjugated to a carrier protein, a *S. aureus* Type 8 capsular saccharide conjugated to a carrier protein, a ClfA protein or fragment thereof and an alpha toxoid.

15. A process for making the immunogenic composition of claim 14 comprising the steps of a) conjugating a *S. aureus* Type 5 capsular saccharide to a carrier protein to form a *S. aureus* Type 5 capsular saccharide conjugate, b) conjugating a *S. aureus* Type 8 capsular saccharide conjugated to a carrier protein to form a *S. aureus* Type 8 capsular saccharide conjugate, and c) combining the *S. aureus* Type 5 capsular saccharide conjugate, the *S. aureus* Type 8 capsular saccharide conjugate, a ClfA protein or fragment thereof and an alpha toxoid to form the immunogenic composition.

16. Use of an immunogenic composition comprising a *Staphylococcus aureus* Type 5 capsular saccharide conjugated to a carrier protein to form a *S. aureus* Type 5 capsular saccharide conjugate, in the manufacture of a medicament for use in treatment or prevention of *Staphylococcus aureus* infection in which a human patient is immunised with a single dose of the immunogenic composition, wherein the *S. aureus* Type 5 capsular saccharide

conjugate is to be administered at a saccharide dose of 3-50μg, 5-25μg, 3-20μg, 3-12μg, 5-10μg, 7-20μg, 7-15μg or 8-12μg.

17. The use of claim 16, wherein the immunogenic composition comprises a *S. aureus* Type 8 capsular saccharide conjugated to a carrier protein to form a *S. aureus* Type 8 capsular saccharide conjugate, wherein the *S. aureus* Type 8 capsular saccharide conjugate is to be administered at a saccharide dose of 3-50μg, 5-25μg, 3-20μg, 3-12μg, 5-10μg, 7-20μg, 7-15μg or 8-12μg.

18. The use of claim 16 or 17, wherein the *S. aureus* Type 5 capsular saccharide has a molecular weight of over 25kDa, 40kDa or 50kDa or between 25-300kDa, 50-250kDa, 70-150kDa, 25-125kDa, 90-125kDa, 30-100kDa, 35-75KDa or 40-70kDa.

19. The use of any one of claims 16-18, wherein *S. aureus* Type 8 capsular saccharide has a molecular weight of over 25kDa, 40kDa or 50kDa or between 25-300kDa, 50-250kDa, 70-150kDa, 25-125kDa, 90-125kDa, 30-100kDa, 35-75KDa or 40-70kDa.

20. The use of any one of claims 16-19, wherein the *S. aureus* Type 5 capsular saccharide and /or the *S. aureus* Type 8 capsular saccharide is 50-100% or 75-100% O-acetylated.

21. The use of any one of claims 16-20, wherein the ratio of polysaccharide to protein in the *S. aureus* Type 5 capsular saccharide conjugate is between 1:5 and 5:1 (w:w) or between 1:2 and 2:1 (w/w), 1:2 to 1:5 (w/w) or 1:1 and 1:2 (w/w).

22. The use of any one of claims 16-21, wherein the ratio of polysaccharide to protein in the *S. aureus* Type 8 capsular saccharide conjugate is between 1:5 and 5:1 (w:w) or between 1:2 and 2:1 (w/w), 1:2 to 1:5 (w/w) or 1:1 and 1:2 (w/w).

23. The use of any one of claims 16-22, wherein the same saccharide dose of *S. aureus* Type 5 capsular saccharide and *S. aureus* Type 8 capsular saccharide is present in the immunogenic composition.

24. The use of any one of claims 16-23, wherein the immunogenic composition further comprises a ClfA protein or fragment thereof.

25. The use of claim 24, wherein the ClfA protein or fragment thereof is at least 90% identical to the polypeptide sequence of any one of SEQ ID NO:3-12 or 15-18 along the full length thereof.

26. The use of any one of claims 24-25, wherein the ClfA protein or fragment thereof contains an amino acid substitution which reduces the ability of ClfA to bind to fibrinogen.

27. The use of claim 26, wherein the ClfA protein or fragment thereof contains an amino acid substitution at at least one of amino acids Ala254, Tyr256, Pro336, Tyr338, Ile387, Lys389, Tyr474, Glu526 or Val527.

28. The use of any one of claims 16-27, wherein the single dose of the immunogenic composition is to be administered 5-60, 6-40, 7-30 or 7-15 days before a planned hospital procedure.