**CLAIMS**

1. An endolysin polypeptide specific for *Staphylococcus*, said polypeptide comprising:
- a polypeptide with an amino acid sequence that has at least 80% sequence identity with SEQ ID NO: 2, or
- a polypeptide with an amino acid sequence that has at least 80% sequence identity with SEQ ID NO: 1 and having a deletion of at least 5, 10, 20, 30, or 40 amino acids in the region of amino acids 156 to 199 of SEQ ID NO: 1, and wherein the endolysin polypeptide has enhanced specific endolysin activity and/or reduced immunogenicity compared to an endolysin polypeptide with the amino acid sequence according to SEQ ID NO: 1.

2. An endolysin polypeptide according to claim 1 with an amino acid sequence according to SEQ ID NO: 2.

3. A polynucleotide encoding an endolysin polypeptide according to claim 1 or 2.

4. A nucleic acid construct comprising a polynucleotide according to claim 3.

5. An expression vector comprising a nucleic acid construct according to claim 4.

6. A host cell comprising a polynucleotide according to claim 3, a nucleic acid construct according to claim 4, or an expression construct according to claim 5.

7. A method for the production of an endolysin polypeptide according to claim 1 or 2, comprising:
- culturing a host cell according to claim 6 under conditions conducive to the production of the endolysin polypeptide.

8. The method according to claim 7 further comprising, isolating and purifying the endolysin polypeptide from the culture broth.

9. The method according to claim 7 or 8 further comprising, freeze-drying the endolysin polypeptide.

10. A method for purifying an endolysin polypeptide according to claim 1 or 2 with enhanced activity comprising dialysis of an endolysin according to claim 1 or 2, or an endolysin polypeptide obtainable by a method according to claim 7, said dialysis comprising the steps of:

i) dialysis against a buffer comprising a chelating compound, and

ii) dialysis against a divalent metal ion-containing buffer.

11. The method according to claim 10 further comprising, a divalent metal ion selected form the group consisting of $Co^{2+}$, $Cu^{2+}$, $Mg^{2+}$, $Ca^{2+}$, $Mn^{2+}$ and $Zn^{2+}$.

12. A composition comprising an endolysin polypeptide according to claim 1 or 2, or an endolysin polypeptide obtainable by a method according to claim 7 or 8, or a host cell according to claim 6.

13. A composition comprising a polynucleotide according to claim 3, or a nucleic acid construct according to claim 4, or an expression vector according to claim 5.

14. A pharmaceutical composition comprising an endolysin polypeptide according to claim 1, or 2, or an endolysin polypeptide obtainable by a method according to claim 7 to 11, or a host cell according to claim 6, said pharmaceutical composition further comprising a pharmaceutically acceptable excipient.

15. A pharmaceutical composition comprising a polynucleotide according to claim 3, or a nucleic acid construct according to claim 4, or an expression vector according to claim 5, said pharmaceutical composition further comprising a pharmaceutically acceptable excipient.

16. A composition according to any one of claims 12 to 15, further comprising one or more additional active ingredients selected from the group consisting of a bacteriophage or phage, a phage endolysin derived from such phage and an antibiotic.

17. A composition according to claim 12 or 14, for use as a medicament.

18. A composition for use as a medicament according to claim 17, in the treatment of a condition associated with infection with a *Staphylococcus.*

19. Use of an endolysin polypeptide according to claim 1 or 2, or an endolysin polypeptide obtainable by a method according to claim 7 or 8, or a host cell according to claim 6, or a composition according to claim 12, 14 or 16, in the manufacture of a medicament for the treatment of a condition associated with infection with a *Staphylococcus*.

20. Use of an endolysin polypeptide according to claim 1 or 2, or an endolysin polypeptide obtainable by a method according to claim 7 or 8, or a host cell according to claim 6, or a composition according to claim 13, 14 or 16, as a food additive or a disinfectant.

21. Use of an endolysin polypeptide according to claim 1 or 2, or an endolysin polypeptide obtainable by a method according to claim 7 or 8, or a host cell according to claim 6, or a composition according to claim 13, 14 or 16, for *in vitro* detecting a *Staphylococcus*.

22. The use according to claim 21, in an *in vitro* diagnostic application.