Claims

1. Polypeptide comprising:
    i) the CHAP domain of LysK endolysin according to SEQ ID NO: 1 or a variant thereof exhibiting at least 80% sequence identity with the CHAP domain of LysK endolysin according to SEQ ID NO:1;
    ii) the M23 endopeptidase domain of lysostaphin according to SEQ ID NO:3 or a variant thereof exhibiting at least 80% sequence identity with the M23 endopeptidase domain of lysostaphin according to SEQ ID NO:3;
    iii) the cell wall binding domain (CBD) of ALE-1 according to SEQ ID NO:5 or a variant thereof exhibiting at least 90% sequence identity with the cell wall binding domain (CBD) of ALE-1 according to SEQ ID NO:5, and
    iv) a further peptide selected from the group consisting of an antimicrobial peptide, an amphipathic peptide, a cationic peptide, a hydrophobic peptide, a sushi peptide and a defensin.
2. The polypeptide according to claim 1, wherein the polypeptide comprises the amino acid sequence of SEQ ID NO:1, SEQ ID NO:3 and/or of SEQ ID NO:5, preferably wherein the polypeptide comprises the amino acid sequence of SEQ ID NO:3, and/or SEQ ID NO:5 even more preferably wherein the polypeptide comprises the amino acid sequence of SEQ ID NO:5.

3. The polypeptide according to claim 1, wherein the polypeptide comprises:
    i) the amino acid sequence of SEQ ID NO:2, or of a variant thereof exhibiting at least 80% sequence identity with the amino acid sequence of SEQ ID NO:2,
    ii) the amino acid sequence of SEQ ID NO:4, or of a variant thereof exhibiting at least 80% sequence identity with the amino acid sequence of SEQ ID NO:4, and/or
    iii) the amino acid sequence of SEQ ID NO:6, or of a variant thereof exhibiting at least 90% sequence identity with the amino acid sequence of SEQ ID NO:6.

4. The polypeptide according to claim 3, wherein the variant sequence of SEQ ID NO:2 exhibits one or more mutations selected from the group consisting of K16E, K27N, H50Q, T85A, G154C, G154S compared to the amino acid sequence of SEQ ID NO:2,

preferably wherein said variant sequence exhibits at least mutations K16E and H50Q compared to the amino acid sequence of SEQ ID NO:2, even more preferably wherein said variant sequence exhibits at least mutations K16E, K27N, H50Q, T85A, and G154S compared to the amino acid sequence of SEQ ID NO:2.

5. The polypeptide according to any one of claims 1 to 3, wherein the polypeptide comprises one or more sequences selected from the group consisting of SEQ ID NO:2, SEQ ID NO:4 and SEQ ID NO:6, preferably wherein the polypeptide comprises the amino acid sequence of SEQ ID NO:4, and/or SEQ ID NO:6 even more preferably wherein the polypeptide comprises the amino acid sequence of SEQ ID NO:6.

6. The polypeptide according to any one of claims 1 to 3, wherein the polypeptide comprises the amino acid sequence of SEQ ID NO:2, SEQ ID NO:4 and SEQ ID NO:6, preferably wherein the polypeptide comprises the amino acid sequence of SEQ ID NO:8 or SEQ ID NO:9, preferably wherein the polypeptide comprises the amino acid sequence of SEQ ID NO:9.

7. The polypeptide according to any one of the preceding claims, wherein the order of elements or of their respective variants is from the N- to the C-terminus:
   a) CHAP domain - M23-endopeptidase - CBD of ALE-1 - peptide, or
   b) Peptide - CHAP domain - M23-endopeptidase - CBD of ALE-1.

8. The polypeptide according to any one of the preceding claims, wherein the polypeptide comprises a tag, preferably a His_6-tag.

9. The polypeptide according to anyone of the preceding claims, wherein the further peptide is:
   i) an antimicrobial peptide selected from the group consisting of the SEQ ID Nos. from SEQ ID NO: 40 to 94,
   ii) an amphipathic peptide selected from the group consisting of SEQ ID NO: 98, SEQ ID NO: 99 and SEQ ID NO: 100,
   iii) a cationic peptide selected from the group consisting of the SEQ ID Nos. from SEQ ID NO: 11 to 39,

iv) a sushi peptide according to SEQ ID NO: 95, or

iii) a hydrophobic peptide selected from the group consisting of SEQ ID NO: 96 and SEQ ID NO: 97.

10. The polypeptide according to claim 9, wherein the further peptide is selected from the group consisting of SEQ ID NO: 38 and SEQ ID NO: 94.

11. The polypeptide according to any one of the preceding claims, wherein the polypeptide comprises a sequence selected from the group consisting of SEQ ID NO:105, SEQ ID NO: 107, SEQ ID NO:109 and SEQ ID NO:111 and variant sequences at least 90% identical to any of these four sequences.

12. The polypeptide according to anyone of the preceding claims, wherein the polypeptide does not exceed 500 amino acids in length.

13. The polypeptide according to any one of the preceding claims, wherein said polypeptide is capable of degrading the cell wall of *Staphylococcus aureus* bacteria.

14. A nucleic acid encoding a polypeptide according to any one of claims 1 to 13.

15. A vector comprising a nucleic acid according to claim 14.

16. A host cell comprising a polypeptide according to any one of claims 1 to 13, a nucleic acid according to claim 14, or a vector according to claim 15.

17. A composition comprising a polypeptide according to any one of claims 1 to 13, a nucleic acid according to claim 14, a vector according to claim 15, and/or a host cell according to claim 16, and further comprising a carrier, diluent or excipient.

18. The composition according to claim 17, wherein the carrier, diluent or excipient is pharmaceutically acceptable.

19. The composition according to claim 17, wherein the composition is an aqueous solution (preferably a buffer or a physiological solution), a powder, a suppository, an emulsion, a suspension, a gel, a lotion, a cream, salve, ointment, injectable solution, syrup, spray, inhalant, a coating composition, preferably an implant coating composition, a stent coating composition, or a catheter coating composition, or a biomaterial, preferably bone cement.

20 A device comprising a polypeptide according to any one of claims 1 to 13, a nucleic acid according to claim 14, a vector according to claim 15, a host cell according to claim 16 and/or a composition according to any one of claims 17 to 19.

21. The device of claim 20, wherein the device is a medical device, in particular wherein the device is an implant, a stent, a catheter, a plaster, a compress, or a dressing.

22. A polypeptide according to any one of claims 1 to 13 for use in a method for the treatment of the human or animal body by therapy.

23. The polypeptide for use according to claim 22, wherein the polypeptide is used for the treatment or prevention of bacterial infections in a subject, in particular for the treatment or prevention of bacterial infections with *Staphylococcus aureus* bacteria.

24. The polypeptide for use according to claim 22, wherein the polypeptide is used for the treatment of wounds of a subject, in particular acute wounds such as iatrogenic wounds, or chronic wounds, or for the treatment of dermatitis or otitis.

25. Use of a polypeptide according to any one of claims 1 to 13 for disinfecting inanimate surfaces, compositions and/or objects, in particular in the nosocomial environment or in a doctor's office.

26. Use of a polypeptide according to any one of claims 1 to 13 for preventing contamination of inanimate surfaces, compositions and/or objects with bacteria, in particular for preventing contamination with *Staphylococcus aureus* bacteria.