CLAIMS

1. A mutated FimH polypeptide, which comprises at least one amino acid mutation relative to the amino acid sequence of the wild-type FimH polypeptide, wherein the mutation position is selected from the group consisting of: F1, P12, G14, G15, G16, A18, P26, V27, V28, Q32, N33, L34, V35, R60, S62, Y64, G65, L68, F71, T86, L107, Y108, L109, V112, S113, A115, G116, V118, A119, A127, L129, Q133, F144, V154, V155, V156, P157, T158, V163, and V185, wherein the amino acid positions are numbered according to SEQ ID NO:59.

2. The mutated FimH polypeptide according to claim 1, comprising at least one mutation selected from the group consisting of: F1I; F1L; F1V; F1M; F1Y; F1W; P12C; G14C; G15A; G15P; G16A; G16P; A18C; P26C; V27A; V27C; V28C; Q32C; N33C; L34C; L34N; L34S; L34T; L34D; L34E; L34K; L34R; V35C; R60P; S62C; Y64C; G65A; L68C; F71C; T86C; L107C; Y108C; L109C; V112C; S113C; A115V; G116C; V118C; A119C; A119N; A119S; A119T; A119D; A119E; A119K; A119R; A127C; L129C; Q133K; F144C; V154C; V156C; P157C; T158C; V163I; and V185I, or any combination thereof.

3. The mutated FimH polypeptide according to claim 2, wherein the mutated FimH polypeptide comprises mutations selected from the group consisting of:
   a) the mutations G15A and G16A;
   b) the mutations P12C and A18C;
   c) the mutations G14C and F144C;
   d) the mutations P26C and V35C;
   e) the mutations P26C and V154C;
   f) the mutations P26C and V156C;
   g) the mutations V27C and L34C;
   h) the mutations V28C and N33C;
   i) the mutations V28C and P157C;
   j) the mutations Q32C and Y108C;
   k) the mutations N33C and L109C;
   l) the mutations N33C and P157C;
   m) the mutations V35C and L107C;
   n) the mutations V35C and L109C;
   o) the mutations S62C and T86C;
   p) the mutations S62C and L129C;
   q) the mutations Y64C and L68C;
   r) the mutations Y64C and A127C;
   s) the mutations L68C and F71C;
   t) the mutations V112C and T158C;

u) the mutations S113C and G116C;
v) the mutations S113C and T158C;
w) the mutations V118C and V156C;
x) the mutations A119C and V155C;
y) the mutations L34N and V27A;
z) the mutations L34S and V27A;
aa) the mutations L34T and V27A;
ab) the mutations L34D and V27A;
ac) the mutations L34E and V27A;
ad) the mutations L34K and V27A;
ae) the mutations L34R and V27A;
af) the mutations A119N and V27A;
ag) the mutations A119S and V27A;
ah) the mutations A119T and V27A;
ai) the mutations A119D and V27A;
aj) the mutations A119E and V27A;
ak) the mutations A119K and V27A;
al) the mutations A119R and V27A;
am) the mutations G15A and V27A;
an) the mutations G16A and V27A;
ao) the mutations G15P and V27A;
ap) the mutations G16P and V27A;
aq) the mutations G15A, G16A, and V27A;
ar) the mutations G65A and V27A;
as) the mutations V27A and Q133K; and
at) the mutations G15A, G16A, V27A, and Q133K.

4. The mutated FimH polypeptide according to claim 2, comprising the sequence of any one of SEQ ID NOs: 2-58, and 60-64.

5. The mutated FimH polypeptide according to any of claims 1-4, wherein the polypeptide is isolated.

6. A pharmaceutical composition comprising (i) a mutated FimH polypeptide according to any one of claims 1-4 and (ii) a pharmaceutically acceptable carrier.

7. An immunogenic composition comprising a mutated FimH polypeptide according to any one of claims 1-4.

8. The immunogenic composition according to claim 7, further comprising at least one additional antigen.

9. The immunogenic composition according to claim 8, wherein the at least one additional antigen is a polysaccharide, or a protein.

10. The immunogenic composition according to claim 7, further comprising at least one adjuvant.

11. A nucleic acid molecule comprising a nucleotide sequence that encodes an amino acid sequence of a mutated FimH polypeptide according to any one of claims 1-4.

12. The mutated FimH polypeptide according to any of claims 1-4, wherein the polypeptide is immunogenic.

13. A recombinant mammalian cell, comprising a polynucleotide encoding a mutated FimH polypeptide according to any one of claims 1-4.

14. A culture comprising the recombinant cell of claim 13, wherein said culture is at least 5 liters in size.

15. A method for producing a mutated FimH polypeptide according to any one of claims 1-4, comprising culturing a recombinant mammalian cell according to claim 13 under suitable conditions, thereby expressing the polypeptide; and harvesting the polypeptide.

16. Use of a composition according to any one of claims 6 to 10 in the manufacture of a medicament for (i) inducing an immune response in a subject against extra-intestinal pathogenic *E. coli*, or (ii) inducing the production of opsonophagocytic and/or neutralizing antibodies in a subject that are specific to extra-intestinal pathogenic *E. coli*, wherein an effective amount of the medicament is to be administered to the subject.

17. The use according to claim 16, wherein the subject is at risk of developing a urinary tract infection.

18. The use according to claim 16, wherein the subject is at risk of developing bacteremia.

19. The use according to claim 16, wherein the subject is at risk of developing sepsis.

20. Use of a composition according to any one of claims 6 to 10 in the manufacture of a medicament for eliciting an immune response against *E. coli* in a mammal, wherein an effective amount of the medicament is to be administered to the mammal.

21. The use according to claim 20, wherein the immune response comprises opsonophagocytic and/or neutralizing antibodies against *E. coli*.

22. The use according to claim 20, wherein the immune response protects the mammal from an *E. coli* infection.

23. Use of a composition according to any one of claims 6 to 10 in the manufacture of a medicament for preventing, treating or ameliorating a bacterial infection, disease or condition in a subject, wherein an immunologically effective amount of the medicament is to be administered to the subject.