CLAIMS

1) A recombinant gram-negative bacterial cell comprising:

   a) an expression vector comprising a recombinant polynucleotide encoding DsbC; and

   b) one or more polynucleotides encoding an antibody or an antigen binding fragment thereof specifically binding to CD154;

   c) a mutated Tsp gene encoding a Tsp protein having 50% or less of the protease activity of a wild-type non-mutated Tsp protein as shown in SEQ ID NO: 26 and;

   d) a mutated spr gene encoding an spr protein whose wild-type sequence is shown in SEQ ID NO: 24 comprising a mutation affecting the amino acid C94 ; and

wherein said gram-negative bacterial cell is selected from E. coli strains K12 and W3110, and wherein the bacterial cell is isogenic to said strains except for the recombinant polynucleotide encoding DsbC, the one or more polynucleotides encoding an antibody or an antigen binding fragment thereof specifically binding to CD154 and the mutated Tsp gene and the mutated spr gene.

2) The gram-negative bacterial cell according to claim 1, wherein DsbC comprises a histidine-tag at the N-terminus or the C-terminus.

3) The gram-negative bacterial cell according to claim 1 or 2, wherein the expression vector comprises a polynucleotide having the sequence given in SEQ ID NO:45 or SEQ ID NO:51.

4) The gram-negative bacterial cell according to any one of claims 1 to 3, wherein the antibody or antigen binding fragment thereof comprises a heavy chain variable domain comprising three CDRs having the sequence given in SEQ ID NO: 1 for CDRH1, SEQ ID NO: 2, for CDRH2 and SEQ ID NO: 3 for CDRH3 and a variable domain light chain comprising three CDRs having the sequence given in SEQ ID NO: 4 for CDRL1, SEQ ID NO: 5 for CDRL2 and SEQ ID NO: 6 for CDRL3.

5) The gram-negative bacterial cell according to claim 4, wherein the one or more polynucleotides encode an antibody comprising the light chain variable region sequence given in SEQ ID NO:8 and the heavy chain variable region given in SEQ ID NO:10.

6) The gram-negative bacterial cell according to any of claims 1 to 5, wherein the antibody is a Fab or Fab' fragment.

7) The gram-negative bacterial cell according to claim 6, wherein the Fab or Fab' fragment comprises a light chain having the sequence given in SEQ ID NO:12 and a heavy chain having the sequence given in SEQ ID NO:14 or 16.

8) The gram-negative bacterial cell according to any one of claims 1 to 7, wherein the gram-negative bacterial cell comprises a first expression vector comprising a recombinant polynucleotide encoding DsbC and a second expression vector comprising one or more polynucleotides encoding an antibody or an antigen binding fragment thereof specifically binding to CD154.

9) The gram-negative bacterial cell according to any one of claims 1 to 7, wherein the expression vector comprising a recombinant polynucleotide encoding DsbC additionally comprises one or more polynucleotides encoding an antibody or an antigen binding fragment thereof specifically binding to CD154.

10) The gram-negative bacterial cell according to any preceding claim, wherein the mutation in the spr gene encoding an spr protein results in a change of the amino acid cysteine to alanine at position 94 (C94A).

11) The gram-negative bacterial cell according to any of claims 1 to 10, which comprises an expression vector comprising a recombinant polynucleotide encoding DsbC and a dicistronic message for producing an antibody or antigen binding fragment thereof specifically binding to CD154, in which the upstream cistron contains DNA coding for the light chain of the antibody and the downstream cistron contains DNA coding for the corresponding heavy chain, characterised in that the dicistronic message comprises a sequence selected from IGS1 (SEQ ID NO: 33), IGS2 (SEQ ID NO: 34), IGS3 (SEQ ID NO: 35) and IGS4 (SEQ ID NO: 36).

12) A method for producing an antibody or an antigen binding fragment thereof specifically binding to CD154 comprising:

a) culturing a recombinant gram-negative bacterial cell as defined in any of claims 1 to 11 in a culture medium under conditions effective to express the antibody or the antigen binding fragment thereof specifically binding to CD154 and the recombinant polynucleotide encoding DsbC; and

b) recovering the antibody or an antigen binding fragment thereof specifically binding to CD154 from the periplasm of the recombinant gram-negative bacterial cell and/or the culture medium.

13) A method according to claims 12, wherein the method further comprises a step of attaching an effector molecule to an amino acid at or towards the C-terminal end of the heavy chain and/or the light chain of the antibody.

14) A method according to claim 13, wherein the effector molecule comprises poly(ethyleneglycol) or methoxypoly(ethyleneglycol).

15) A method according to claim 14, wherein the method comprises attaching to one of the cysteine residues at the C-terminal end of the heavy chain a lysyl-maleimide group wherein each amino group of the lysyl residue has covalently linked to it a methoxypoly(ethyleneglycol) residue having a molecular weight of about 20,000 Da.