Claims

1. A recombinant Gram-negative bacterial strain transformed with a vector which comprises in the 5' to 3' direction:
a promoter;
a first DNA sequence encoding a delivery signal from a bacterial T3SS effector protein, operably linked to said promoter; and
a second DNA sequence encoding repeated domains of a heterologous protein, wherein the repeated domains of a heterologous protein comprise a fusion protein consisting of several repetitions of a domain of a heterologous protein, or two or more domains of different heterologous proteins, wherein the two or more domains of different heterologous proteins comprise a fusion protein consisting of one or several repetitions of at least two domains of different heterologous proteins fused in frame to the 3'end of said first DNA sequence, wherein the heterologous proteins are proteins involved in apoptosis or apoptosis regulation, and
wherein the delivery signal from the bacterial T3SS effector protein encoded by the first DNA sequence comprises the YopE effector protein or an N-terminal fragment thereof or the SopE or the SteA effector protein or an N-terminal fragment thereof.

2. A recombinant Gram-negative bacterial strain transformed with a vector which comprises in the 5' to 3' direction:
a first DNA sequence encoding a delivery signal or a fragment thereof from a bacterial T3SS effector protein; and
a second DNA sequence encoding repeated domains of a heterologous protein, wherein the repeated domains of a heterologous protein comprise a fusion protein consisting of several repetitions of a domain of a heterologous protein, or two or more domains of different heterologous proteins, wherein the two or more domains of different heterologous proteins comprise a fusion protein consisting of one or several repetitions of at least two domains of different heterologous proteins fused in frame to the 3'end of said first DNA sequence, wherein the heterologous proteins are proteins involved in apoptosis or apoptosis regulation, and
wherein the delivery signal from the bacterial T3SS effector protein encoded by the first DNA sequence comprises the YopE effector protein or an N-terminal fragment thereof

or the SopE or the SteA effector protein or an N-terminal fragment thereof.

3. The recombinant Gram-negative bacterial strain of claim 1 or 2, wherein said recombinant Gram-negative bacterial strain is deficient in producing at least one T3SS effector protein.

4. The recombinant Gram-negative bacterial strain of anyone of claims 1-3 , wherein the recombinant Gram-negative bacterial strain is selected from the group consisting of the genera *Yersinia, Escherichia, Salmonella* and *Pseudomonas*.

5. The recombinant Gram-negative bacterial strain of anyone of claims 1-3, wherein the recombinant Gram-negative bacterial strain is a *Yersinia* strain or wherein the recombinant Gram-negative bacterial strain is a *Salmonella* strain.

6. The recombinant Gram-negative bacterial strain of claim 1 or 2, wherein the recombinant Gram-negative bacterial strain is a *Yersinia* strain and wherein said *Yersinia* strain is wild type or deficient in the production of at least one T3SS effector protein and wherein the delivery signal from the bacterial T3SS effector protein comprises the N-terminal 138 amino acids of the *Y. enterocolitica* YopE effector protein or, wherein the recombinant Gram-negative bacterial strain is a *Salmonella* strain and wherein said *Salmonella* strain is wild type or deficient in the production of at least one T3SS effector protein and wherein the delivery signal from the bacterial T3SS effector protein comprises the *S. enterica* SteA effector protein or the N-terminal 81 or 105 amino acids of the *S. enterica* SopE effector protein.

7. A vector which comprises in the 5' to 3' direction:
a promoter;
a first DNA sequence encoding a delivery signal from a bacterial T3SS effector protein, operably linked to said promoter, wherein the delivery signal from the bacterial T3SS effector protein comprises the YopE effector protein or an N-terminal fragment thereof or the SopE or the SteA effector protein or an N-terminal fragment thereof;
a second DNA sequence encoding repeated domains of a heterologous protein, wherein the repeated domains of a heterologous protein comprise a fusion protein consisting of several repetitions of a domain of a heterologous protein, or two or more domains of

different heterologous proteins, wherein the two or more domains of different heterologous proteins comprise a fusion protein consisting of one or several repetitions of at least two domains of different heterologous proteins fused in frame to the 3'end of said first DNA sequence,
wherein the heterologous proteins are proteins involved in apoptosis or apoptosis regulation.

8. A vector which comprises in the 5' to 3' direction:
a first DNA sequence encoding a delivery signal or a fragment thereof from a bacterial T3SS effector protein, wherein the delivery signal from the bacterial T3SS effector protein comprises the YopE effector protein or an N-terminal fragment thereof or the SopE or the SteA effector protein or an N-terminal fragment thereof; and
a second DNA sequence encoding repeated domains of a heterologous protein, wherein the repeated domains of a heterologous protein comprise a fusion protein consisting of several repetitions of a domain of a heterologous protein, or two or more domains of different heterologous proteins, wherein the two or more domains of different heterologous proteins comprise a fusion protein consisting of one or several repetitions of at least two domains of different heterologous proteins, fused in frame to the 3'end of said first DNA sequence, wherein the heterologous proteins are proteins involved in apoptosis or apoptosis regulation.

9. The recombinant Gram-negative bacterial strain of any one of claims 1-6 or the vector of claims 7 or 8, wherein the proteins involved in apoptosis or apoptosis regulation are selected from the group consisting of BH3-only proteins selected from the group consisting of Bad, BIM, Bid and tBid, Puma, Bik/Nbk, Bod, Hrk/Dp5, BNIP1, BNIP3, Bmf, Noxa, Mcl-1, Bcl-Gs, Beclin 1, Egl-1 and CED-13; caspases and intracellular signalling proteins of death receptor control of apoptosis.

10. The recombinant Gram-negative bacterial strain of any one of claims 1-6 or the vector of claim 7 or 8, wherein the repeated domain is the BH3 domain of apoptosis inducer tBID.

11. The recombinant Gram-negative bacterial strain of any one of claims 1-6 or the vector of claim 7 or 8, wherein the two or more domains of different heterologous proteins are

domains of heterologous proteins which belong to the same functional class of proteins.

12. The recombinant Gram-negative bacterial strain of any one of claims 1-6 or the vector of claim 7 or 8, wherein the two or more domains of different heterologous proteins are the BH3 domain of apoptosis inducer tBID and the BH3 domain of apoptosis regulator BAX.

13. The recombinant Gram-negative bacterial strain of any one of claims 1-6 or the vector of claim 7 or 8, wherein the vector comprises a third DNA sequence encoding a protease cleavage site, wherein the third DNA sequence is located between the 3'end of said first DNA sequence and the 5'end of said second DNA sequence.