Claims

1. 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 bacterial T3SS effector protein is selected from the group consisting of SopE, SteA, and YopE;
a second DNA sequence encoding a heterologous protein fused in frame to the 3'end of said first DNA sequence, wherein the heterologous protein is selected from the group consisting of proteins involved in apoptosis or apoptosis regulation, cell cycle regulators, ankyrin repeat proteins, reporter proteins, small GTPases, GPCR related proteins, nanobody fusion constructs, bacterial T3SS effectors, bacterial T4SS effectors and viral proteins; and optionally
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.

2. A recombinant Gram-negative bacterial strain, wherein said Gram-negative bacterial strain is transformed with the vector of claim 1,
wherein the recombinant Gram-negative bacterial strain is a *Yersinia* strain and 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, wherein the N-terminal fragment includes at least the first 20 amino acids of the YopE effector protein, or wherein the recombinant Gram-negative bacterial strain is a *Salmonella* strain and the delivery signal from the bacterial T3SS effector protein encoded by the first DNA sequence comprises the SopE or the SteA effector protein or an N-terminal fragment thereof, wherein the N-terminal fragment includes at least the first 20 amino acids of the SopE or the SteA effector protein.

3. The recombinant Gram-negative bacterial strain of claim 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 any one of claims 2-3, 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.

5. The recombinant Gram-negative bacterial strain of any one of claims 2-4, wherein the Gram-negative bacterial strain is deficient to produce an amino acid essential for growth.

6. The recombinant Gram-negative bacterial strain of any one of claims 2-5, wherein the Gram-negative bacterial strain is deficient to produce adhesion proteins binding to the eukaryotic cell surface or extracellular matrix.

7. The recombinant Gram-negative bacterial strain or the vector of any one of claims 1-6, wherein the heterologous protein is selected from the group consisting of proteins involved in apoptosis or apoptosis regulation, cell cycle regulators, and ankyrin repeat proteins.

8. The recombinant Gram-negative bacterial strain or the vector of any one of claims 1-6, wherein the proteins involved in apoptosis or apoptosis regulation are selected from the group consisting of BH3-only proteins, caspases and intracellular signalling proteins of death receptor control of apoptosis.

9. A method for delivering a heterologous protein into a eukaryotic cell comprising the following steps:
i) culturing the Gram-negative bacterial strain of any one of claims 2-6; and
ii) contacting a eukaryotic cell with the Gram-negative bacterial strain of i), wherein a fusion protein which comprises a delivery signal from a bacterial T3SS effector protein and the heterologous protein is expressed by the Gram-negative bacterial strain and is translocated into the eukaryotic cell.

10. A method of purifying a heterologous protein comprising
culturing the Gram-negative bacterial strain of any one of claims 2-6 so that a fusion protein which comprises a delivery signal from a bacterial T3SS effector protein and the heterologous protein is expressed and secreted into the supernatant of the culture.

11. The recombinant Gram-negative bacterial strain of any one of claims 2-6 for use in the delivery of a heterologous protein as a medicament or as a vaccine to a subject.

12. Use of the recombinant Gram-negative bacterial strain of any one of claims 2-6 for High Throughput Screenings of inhibitors for a cellular pathway or event triggered by the translocated heterologous protein(s).

13. A library of Gram-negative bacterial strains of any one of claims 2-6, wherein the heterologous protein encoded by the second DNA sequence of the expression vector of the Gram-negative bacterial strains is a human or murine protein and, wherein each human or murine protein expressed by a Gram-negative bacterial strains is different in amino acid sequence.