Claims

1. A composition comprising an expression system comprising at least one viral vector comprising polynucleotides encoding pneumovirus proteins, and a pharmaceutically acceptable carrier and/or excipient, wherein the expression system comprises a first polynucleotide encoding at least one protein, peptide or variant thereof, which induces a T cell response, and a second polynucleotide encoding at least one protein, peptide or variant thereof, which induces an anti-pathogenic B cell response, wherein the pneumovirus is preferably selected from the group consisting of human respiratory syncytical virus (RSV), murine pneumonia virus, bovine RSV, ovine RSV, caprine RSV, turkey rinotracheitis and metapneumovirus, preferably human metapneumovirus and avian metapneumovirus and wherein a polynucleotide which encodes a cleavage site is positioned between the first polynucleotide and the second polynucleotide.

2. The composition, of claim 1 wherein the first polynucleotide and the second polynucleotide are linked such that they are expressed as an artificial polyprotein.

3. The composition of claims 1 or 2, wherein the cleavage site is a self-cleaving site or an endopeptidase cleavage site, such as a self-cleaving site selected from the group consisting of a viral 2A peptide or 2A-like peptide of Picornavirus, insect viruses, Aphtoviridae, Rotaviruses and Trypanosoma, preferably wherein the 2A cleavage site is the 2 A peptide of foot and mouth disease virus.

4. The composition of any of claims 1 to 3, further comprising a third polynucleotide encoding a pneumovirus protein, peptide or variant thereof, preferably inducing a T cell response.

5. The composition of claim 4, wherein a polynucleotide encoding a linker, such as a flexible linker, is positioned between the second polynucleotide and the third polynucleotide.

6. The composition of any of the claims 1 to 5, wherein the viral vectors is selected from the group consisting of adenovirus vectors, adeno-associated virus (AAV) vectors, alphavirus vectors, herpes virus vectors, arena virus vectors, measles virus vectors, pox virus vectors, vesicular stomatitis virus vectors, retrovirus vectors, lentivirus vectors, and viral like particles.

7. The composition of claim 6, wherein the viral vector is selected from the group consisting of PanAd1, PanAd2, PanAd3, ChAd55, ChAd 73, ChAd83, ChAd146, ChAd147, ChAd3, ChAd4, ChAd5, ChAd6, ChAd7, ChAd8, ChAd9, ChAd10, ChAd11, ChAd16, ChAd17, ChAd19, ChAd20, ChAd22, ChAd24, ChAd26, ChAd30, ChAd31, ChAd37, ChAd38, ChAd44, ChAd63 and ChAd82.

8. The composition of any of claims 1 to 7, wherein the protein, which induces a T cell response is a non-structural and/or internal protein of a pneumovirus, and/or the protein which induces an anti-pathogenic B cell response is a structural and/or surface protein of a pneumovirus.

9. The composition of claim 8, wherein the amino acid sequence of the structural and/or surface and/or non-structural and/or internal protein comprises consecutive segments or a consensus sequence of one or more different pneumovirus isolates.

10. The composition of claim 8, wherein the protein exposed on the surface of the native virus is selected from the group of pneumovirus proteins consisting of fusion protein (F), and any of the attachment glycoproteins G, H, and HN.

11. The composition of any of claims 8 to 10, wherein the non-structural and/or internal protein is selected from the group of pneumovirus proteins consisting of nucleoprotein N, Matrix proteins M and M2, Phosphoprotein P, non structural proteins NS1 and NS2, and the catalytic subunit of the polymerase (L).

12. The composition of any of claims 1 to 11, comprising a further active ingredient, preferably selected from the group consisting of an adjuvant and an active ingredient.

13. An isolated protein mixture encoded by an expression system as defined in claims 1 to 12.

14. An isolated host cell containing the expression-system as defined in claims 1 to 12 and/or the protein mixture of claim 13.

15. The composition according to any one of claims 1 to 12, the protein mixture of claim 14, and/or the isolated cell according to claim 14, for the use in the treatment or prevention of a disease.

16. The composition, the protein mixture, and/or the isolated cell for the use of claim 15, wherein the disease is selected from infectious disease, preferably a viral infectious disease, such as a disease caused by a pneumovirus.

CLAIMS

1. An isolated protein mixture encoded by an expression system comprising at least one viral vector comprising polynucleotides encoding pneumovirus proteins, wherein the expression system comprises a first polynucleotide encoding at least one protein, peptide or variant thereof, which induces a T cell response, and a second polynucleotide encoding at least one protein, peptide or variant thereof, which induces an anti-pathogenic B cell response, wherein the pneumovirus is human respiratory syncytical virus (RSV), murine pneumonia virus, bovine RSV, ovine RSV, caprine RSV, turkey rinotracheitis and metapneumovirus, preferably human metapneumovirus and avian metapneumovirus and wherein a polynucleotide which encodes a cleavage site is positioned between the first polynucleotide and the second polynucleotide.

2. An isolated host cell containing the expression system as defined in claim 1.