Summary

In one aspect, the present disclosure refers to an attenuated human metapneumovirus rC-85473 strain comprising genetic modifications of the sequence SEQ ID NO: 1 attenuating the virulence of said strain, characterised in that said genetic modifications of sequence SEQ ID NO.1 comprise, or consist in, the inactivation of the gene encoding for the SH protein, and/or the inactivation of the gene encoding for the G protein. In another aspect, the present disclosure refers to an *in vitro* use of the attenuated virus strain as disclosed herein, as expression vector of at least one exogenous gene in target cells of human metapneumovirus. In another aspect, the present disclosure refers to the attenuated virus strain as disclosed herein, for use as a medicament. In another aspect, the present disclosure refers to a use of the attenuated virus strain as disclosed herein in the manufacture of a medicament for preventing and/or treating infections by viruses of the Pneumoviridae family. In another aspect, the present disclosure refers to a use of the attenuated virus strain as disclosed herein in the manufacture of a medicament for preventing and/or treating infections by viruses, wherein at least one viral antigen is expressed by said attenuated virus strain. In another aspect, the present disclosure refers to a vaccine composition comprising, in a pharmaceutically acceptable vehicle, at least one attenuated virus strain as disclosed herein, and optionally an adjuvant.

PRIOR ART

Tables 1, 2 and 3 below list the different approaches under development for obtaining living attenuated vaccines from wild hMPV strains.

Virus strains are considered as being attenuated *in vitro* when they exhibit decreased replicative capacity compared to the wild type (WT) virus, and/or when these virus strains lead to the more restricted formation of infectious outbreaks, notably of syncytia (adjacent cells fusing following viral infection). *In vivo,* attenuated virus strains replicate at a lower maximum load and/or induce less severe pathology (in terms of weight loss or inflammatory profile or histo-pathological damage) than the wild virus strain.

Table 1. List of living vaccine candidates attenuated on the basis of a strain of hMPV virus having one or more mutations, developed or under development

CLAIMS

1. Attenuated human metapneumovirus rC-85473 strain comprising genetic modifications of the sequence SEQ ID NO:1 attenuating the virulence of said strain, characterised in that said genetic modifications of sequence SEQ ID NO.1 comprise, or consist in, the inactivation of the gene encoding for the SH protein, and/or the inactivation of the gene encoding for the G protein.

2. Attenuated virus strain according to claim 1, characterised in that said strain comprises the sequence SEQ ID NO.2.

3. Attenuated virus strain according to claim 1, characterised in that said strain comprises the sequence SEQ ID NO.3.

4. Attenuated virus strain according to claim 1, characterised in that said genetic modifications of sequence SEQ ID NO.1 comprise, or consist in, the inactivation of the two genes encoding for the G protein and the SH protein.

5. Attenuated virus strain according to one of claims 1 to 4, of which the sequence comprises at least one exogenous gene.

6. *In vitro* use of an attenuated virus strain according to claim 5, as expression vector of at least one exogenous gene in target cells of human metapneumovirus.

7. Attenuated virus strain according to one of claims 1 to 6, for use as a medicament.

8. Use of an attenuated virus strain according to one of claims 1 to 5 in the manufacture of a medicament for preventing and/or treating infections by viruses of the Pneumoviridae family.

9. The use according to claim 8, wherein the viruses of the Pneumoviridae family are human metapneumoviruses.

10. The use according to claim 8, wherein viruses of the Pneumoviridae family are orthopneumoviruses, such as the human syncytial respiratory virus.

11. Use of attenuated virus strain according to claim 5 in the manufacture of a medicament for preventing and/or treating infections by viruses, wherein at least one viral antigen is expressed by said attenuated virus strain.

12. Vaccine composition comprising, in a pharmaceutically acceptable vehicle, at least one attenuated virus strain according to one of claims 1 to 5, and optionally an adjuvant.

13. Vaccine composition according to claim 12, characterised in that it is in a pharmaceutical form intended for administration by inhalation.