NANOCARRIERS FOR LUNG INFLAMMATION THERAPY

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application claims benefit of U.S. Provisional Application No. 62/747,987, filed October 19, 2018, which is hereby incorporated herein by reference in its entirety.

SEQUENCE LISTING

[0002] This application contains a sequence listing filed in electronic form as an ASCII.txt file entitled “321501-2340 Sequence Listing_ST25” created on October 18, 2019. The content of the sequence listing is incorporated herein in its entirety.

BACKGROUND

[0003] Acute Respiratory Distress Syndrome (ARDS) is characterized by severe hypoxemia, diffuse bilateral pulmonary infiltrates, and decreased pulmonary compliance. Currently there are no approved treatments for ARDS.

SUMMARY

[0003a] In an aspect of the present disclosure, there is provided an extracellular vesicle comprising a fusion protein that comprises surfactant protein-A (SPA) and a heterologous exosomal or lysosomal transmembrane protein, wherein the extracellular vesicle is loaded with a therapeutic cargo comprising miR146a or Y-27632.

[0003b] In a further aspect of the present disclosure, there is provided a cell comprising a nucleic acid encoding the fusion protein disclosed herein.

[0003c] In another aspect of the present disclosure, there is provided a method of producing an extracellular vesicle, comprising culturing the cell disclosed herein under conditions suitable for vesicle secretion, and isolating extracellular vesicles secreted by the cell.

[0003d] In a further aspect of the present disclosure, there is provided a use of an extracellular vesicle disclosed herein in the manufacture of a medicament for treating a lung disorder in a subject.

[0003e] In another aspect of the present disclosure, there is provided an extracellular vesicle disclosed herein for use in treating a lung disorder in a subject.

WHAT IS CLAIMED IS:

1. An extracellular vesicle comprising a fusion protein that comprises surfactant protein-A (SPA) and a heterologous exosomal or lysosomal transmembrane protein, wherein the extracellular vesicle is loaded with a therapeutic cargo comprising miR146a or Y-27632.
2. The extracellular vesicle of claim 1, wherein the therapeutic cargo comprises miR146a.
3. The extracellular vesicle of claim 1 or 2, wherein the therapeutic cargo comprises Y-27632.
4. A cell comprising a nucleic acid encoding the fusion protein of claim 1.
5. The cell of claim 4, further comprising a nucleic acid encoding a therapeutic RNA.
6. A method of producing an extracellular vesicle, comprising culturing the cell of claim 4 or 5 under conditions suitable for vesicle secretion, and isolating extracellular vesicles secreted by the cell.
7. The method of claim 6, further comprising loading the extracellular vesicle with a therapeutic drug.
8. Use of an extracellular vesicle of any one of claims 1 to 3 in the manufacture of a medicament for treating a lung disorder in a subject.
9. The use of claim 8, wherein the lung disorder comprises Acute Respiratory Distress Syndrome (ARDS).
10. An extracellular vesicle of any one of claims 1 to 3 for use in treating a lung disorder in a subject.
11. The extracellular vesicle for use of claim 10, wherein the lung disorder comprises Acute Respiratory Distress Syndrome (ARDS).