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~~ing~~ surfactant protein-A (SPA)~~ or CD200,~~ and a~~n~~ heterologous exosomal or lysosomal transmembrane protein, wherein the extracellular vesicle is loaded with a therapeutic cargo comprising miR146a or Y-27632.

~~**[0003b]** In another aspect of the present disclosure, there is provided an extracellular vesicle comprising the fusion protein disclosed herein.~~

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

[0003c~~d~~] 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~~e~~] 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~~f~~] 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 ~~comprising~~ that comprises surfactant protein-A (SPA) ~~or CD200,~~ and a~~n~~ heterologous exosomal or lysosomal transmembrane protein, wherein the extracellular vesicle is loaded with a therapeutic cargo comprising miR146a or Y-27632.

~~2. An extracellular vesicle comprising the fusion protein of claim 1.~~

~~3. The extracellular vesicle of claim 2, further comprising a therapeutic cargo.~~

~~4.~~2. The extracellular vesicle of claim ~~3~~1, wherein the therapeutic cargo comprises miR146a.

~~5.~~3. The extracellular vesicle of claim ~~3 1~~ or ~~2 4~~, wherein the therapeutic cargo comprises Y-27632.

~~6.~~4. A cell comprising a nucleic acid encoding the fusion protein of claim 1.

~~7.~~5. The cell of claim ~~4~~6, further comprising a nucleic acid encoding a therapeutic RNA.

~~8.~~6. A method of producing an extracellular vesicle, comprising culturing the cell of claim ~~6 4~~ or ~~5 7~~ under conditions suitable for vesicle secretion, and isolating extracellular vesicles secreted by the cell.

~~9.~~7. The method of claim ~~6~~8, further comprising loading the extracellular vesicle with a therapeutic drug.

~~10.~~8. Use of an extracellular vesicle of any one of claims ~~3 1~~ to ~~3 5~~ in the manufacture of a medicament for treating a lung disorder in a subject.

~~11.~~9. The use of claim ~~10~~8, wherein the lung disorder comprises Acute Respiratory Distress Syndrome (ARDS).

~~12~~10. An extracellular vesicle of any one of claims ~~1 3~~ to ~~3 5~~ for use in treating a lung disorder in a subject.

~~13~~11. The extracellular vesicle for use of claim ~~12~~10, wherein the lung disorder comprises Acute Respiratory Distress Syndrome (ARDS).