In one aspect of the present disclosure, there is provided a liquid pharmaceutical composition suitable for administration by inhalation comprising a diluent and a suspension of particles of 9,10-dimethoxy-2-(2,4,6-trimethylphenylimino)-3-(N-carbamoyl-2-aminoethyl)-3,4,6,7-tetrahydro-2H-pyrimido[6,1-a]isoquinolin-4-one (RPL554) or a pharmaceutically acceptable salt thereof, wherein the particles of RPL554 have a particle size distribution with a Dv50 (median particle size by volume) value of from about 0.2 μm to about 5 μm.

In another aspect of the present disclosure, there is provided a nebulizer comprising a composition disclosed herein.

In a further aspect of the present disclosure, there is provided a liquid pharmaceutical composition disclosed herein for use in the treatment of the human or animal body.

In another aspect of the present disclosure, there is provided a liquid pharmaceutical composition disclosed herein for use in the treatment or prevention of a disease or condition selected from asthma, allergic asthma, hay fever, allergic rhinitis, bronchitis, emphysema, bronchiectasis, chronic obstructive pulmonary disease (COPD), adult respiratory distress syndrome (ARDS), steroid resistant asthma, severe asthma, paediatric asthma, cystic fibrosis, lung fibrosis, pulmonary fibrosis, interstitial lung disease, skin disorders, atopic dermatitis, psoriasis, ocular inflammation, cerebral ischaemia, inflammatory diseases and auto-immune diseases.

The present disclosure also provides a liquid pharmaceutical composition according to the present disclosure for use in the treatment of the human or animal body. A liquid pharmaceutical composition according to the present disclosure may be used in the treatment or prevention of a disease or

CLAIMS

1. A liquid pharmaceutical composition suitable for administration by inhalation comprising a diluent and a suspension of particles of 9,10-dimethoxy-2-(2,4,6-trimethylphenylimino)-3-(N-carbamoyl-2-aminoethyl)-3,4,6,7-tetrahydro-2H-pyrimido[6,1-a]isoquinolin-4-one (RPL554) or a pharmaceutically acceptable salt thereof, wherein the particles of RPL554 have a particle size distribution with a Dv50 (median particle size by volume) value of from about 0.2 μm to about 5 μm.

2. A liquid pharmaceutical composition according to claim 1, wherein the particles of RPL554 have a particle size distribution with a Dv50 value of from about 0.7 μm to about 2.5 μm.

3. A liquid pharmaceutical composition according to claim 1 or claim 2, wherein the concentration of particles of RPL554 in the liquid pharmaceutical composition is from about 0.01 mg/mL to about 40 mg/mL.

4. A liquid pharmaceutical composition according to any one of the preceding claims, wherein the composition has a pH of from about 6 to about 8.

5. A liquid pharmaceutical composition according to any one of the preceding claims which further comprises one or more surfactants.

6. A liquid pharmaceutical composition according to claim 5, wherein the one or more surfactants are selected from one or more non-ionic surfactants.

7. A liquid pharmaceutical composition according to claim 5 or claim 6, wherein the one or more surfactants are selected from polyoxyethylene glycol sorbitan alkyl esters and sorbitan alkyl esters.

8. A liquid pharmaceutical composition according to any one of the preceding claims which further comprises one or more buffers.

9. A liquid pharmaceutical composition according to claim 8, wherein the one or more buffers are selected from citrate or phosphate buffers.

10. A liquid pharmaceutical composition according to any one of the preceding claims, which composition comprises:

(a) the particles of RLP554 at a concentration of from about 0.01 mg/mL to about 40 mg/mL;

(b) one or more surfactants at a concentration of from about 0.01 mg/mL to about 5 mg/mL; and

(c) a buffer at a concentration of from about 5 mg/mL to about 20 mg/mL.

11. A liquid pharmaceutical composition according to any one of the preceding claims, wherein the composition further comprises a tonicity adjuster, optionally wherein the tonicity adjuster is sodium chloride.

12. A liquid pharmaceutical composition according to any one of the preceding claims, wherein the diluent is water.

13. A liquid pharmaceutical composition according to any one of the preceding claims, which composition comprises:

(a) the particles of RLP554 at a concentration of 0.01 mg/mL to 30 mg/mL;

(b) a polyoxyethylene glycol sorbitan alkyl ester at a concentration of from 0.1 mg/mL to 2 mg/mL;

(c) a sorbitan alkyl ester at a concentration of from 0.01 mg/mL to 0.1 mg/mL;

(d) a first phosphate buffer component at a concentration of from 5 mg/mL to 10 mg/mL;

(e) a second phosphate buffer component at a concentration of from 5 mg/mL to 10 mg/mL; and

(f) a tonicity adjuster at a concentration of from 2 mg/mL to 8 mg/mL.

14. A liquid pharmaceutical composition according to any one of the preceding claims, which composition comprises:

(a) the particles of RLP554 at a concentration of 0.05 mg/mL to 25 mg/mL;

(b) polyoxyethylene (20) sorbitan monolaurate (Polysorbate 20, Tween 20) at a concentration of from 0.1 mg/mL to 2 mg/mL;

(c) sorbitan monolaurate (Span 20) at a concentration of from 0.01 mg/mL to 0.1 mg/mL;

(d) monosodium phosphate monohydrate at a concentration of from 5 mg/mL to 10 mg/mL;

(e) dibasic sodium phosphate anhydrous at a concentration of from 5 mg/mL to 10 mg/mL; and

(f) sodium chloride at a concentration of from 2 mg/mL to 8 mg/mL.

15. A liquid pharmaceutical composition according to any one of the preceding claims which is suitable for administration by nebulizer.

16. A nebulizer comprising a composition according to any one of the preceding claims.

17. A liquid pharmaceutical composition according to any one of claims 1 to 15 for use in the treatment of the human or animal body.

18. A liquid pharmaceutical composition according to any one of claims 1 to 15 for use in the treatment or prevention of a disease or condition selected from asthma, allergic asthma, hay fever, allergic rhinitis, bronchitis, emphysema, bronchiectasis, chronic obstructive pulmonary disease (COPD), adult respiratory distress syndrome (ARDS), steroid resistant asthma, severe asthma, paediatric asthma, cystic fibrosis, lung fibrosis, pulmonary fibrosis, interstitial lung disease, skin disorders, atopic dermatitis, psoriasis, ocular inflammation, cerebral ischaemia, inflammatory diseases and auto-immune diseases.

19. A liquid pharmaceutical composition for use according claim 18 wherein the disease or condition is chronic obstructive pulmonary disease (COPD).