Claims

1. A drug delivery device configured to be removably inserted in a patient's mouth and for continuous or semi-continuous intraoral administration of a pharmaceutical composition comprising a drug, said device comprising:

(i) a fastener to removably secure said drug delivery device to a surface of said patient's mouth;

(ii) a pump selected from a spring, an elastomer, compressed gas, and a propellant-driven pump; and

(iii) a drug reservoir comprising a pharmaceutical composition, the volume of said drug reservoir being from 0.1 mL to 5 mL, wherein the drug reservoir is equipped with a flow restrictor that sets the administration rate of said pharmaceutical composition, wherein the pharmaceutical composition (a) has a shear viscosity at 37 °C greater than 10,000 cP and (b) comprises a suspension of particles of said one or more drugs, wherein the volume fraction of the one or more drugs in the pharmaceutical composition is greater than 0.2.

2. The drug delivery device of claim 1, wherein said pharmaceutical composition has a shear viscosity of greater than 50,000 cP at 37ºC.

3. The drug delivery device of claim 2, wherein said pharmaceutical composition has a shear viscosity at 37 °C greater than 250,000 cP.

4. The drug delivery device of claim 1, wherein said pump is a propellant-driven pump comprising a fluid propellant having a boiling point of less than 37 °C at 1 atm pressure.

5. The drug delivery device of claim 4, wherein said fluid propellant is 1,1,1,2 tetrafluoroethane.

6. The drug delivery device of claim 1, wherein said drug reservoir is metallic.

7. The drug delivery device of claim 6, wherein said drug reservoir comprises titanium.

8. The drug delivery device of claim 1, wherein said drug delivery device is configured to withstand a patient's bite with a force of at least 200 Newtons.

9. The drug delivery device of claim 1, wherein the total volume of said drug reservoir and said pump is less than 2 mL.

10. The drug delivery device of claim 1, wherein said drug reservoir or said pump is configured to be worn in the buccal vestibule and comprises a fluidic channel from the buccal side to the lingual side of a patient's teeth for dispensing said pharmaceutical composition on the lingual side of the teeth.

11. The drug delivery device of claim 1, wherein said drug delivery device is configured to deliver said pharmaceutical composition over a period of from 4 hours to 168 hours.

12. The drug delivery device of claim 1, wherein said pump is a spring-driven pump.

13. The drug delivery device of claim 1, wherein said pump is an elastomer-driven pump.

14. The drug delivery device of claim 1, wherein said pump is a compressed gas-driven pump.

15. The drug delivery device of claim 1, wherein the volume fraction of the one or more drugs in the pharmaceutical composition is greater than 0.4.

16. The drug delivery device of claim 1, wherein said drug delivery device further comprises a tube, channel, or orifice in fluid communication with the drug reservoir.

17. The drug delivery device of claim 16, wherein said tube, channel, or orifice comprises a length of less than 4 cm.

18. The drug delivery device of claim 17, wherein the drug particle diameters at all maxima of the particle size distribution are smaller than $1/5^{th}$ of the narrowest internal diameter of said tube, channel, or orifice.

19. The drug delivery device of any of claims 1-18, wherein said pharmaceutical composition comprises levodopa and/or carbidopa, or a pharmaceutically acceptable salt thereof.

20. The drug delivery device of any one of claims 1-19, wherein the pharmaceutical composition comprises:

(i) a suspension of carbidopa at a concentration of 50 mg/mL to 500 mg/mL; and

(ii) a carrier fluid comprising an oil;

wherein the pharmaceutical composition is infusible, and wherein less than 2% of the carbidopa is oxidized and the pharmaceutical composition does not separate to form two or more fluids differing in their carbidopa concentrations by more than 5% when stored for a period of 6 months at a temperature of 5 ± 3°C or at 25°C.

21. The drug delivery device of any one of claims 1-18, wherein the pharmaceutical composition comprises:

(i) a carrier fluid comprising an oil and a surfactant;

(ii) a suspension of solid particles of drug in said carrier fluid with a concentration greater than 2 M; and

(iii) a shear viscosity of greater than 10,000 cP at 37 °C;

wherein said suspension remains free of sedimented solid drug for 6 months or more at 25 °C.

22. The drug delivery device of claim 21, wherein said pharmaceutical composition has a shear viscosity at 37 °C greater than 50,000 cP.

23. The drug delivery device of any one of claims 1-19, wherein the pharmaceutical composition comprises:

(i) a carrier fluid comprising an oil;

(ii) a suspension of solid particles of levodopa and/or carbidopa in said carrier fluid with a concentration greater than 2 M; and

(iii) a shear viscosity of greater than 10,000 cP at 37 °C.

24. The drug delivery device of claim 23, wherein said carrier fluid comprises an oil-in-water or water-in-oil emulsion.

25. The drug delivery device of claim 23, wherein said pharmaceutical composition remains free of sedimented solid drug for 6 months or more at 25 °C.

26. The drug delivery device of claim 23, wherein said carrier fluid further comprises a surfactant.

27. The drug delivery device of claim 26, wherein said surfactant is a non-ionic surfactant.

28. The drug delivery device of claim 26 or 27, wherein said carrier fluid further comprises water.

29. The drug delivery device of claim 28, wherein said carrier fluid comprises less than 20 % (w/w) water.

30. The drug delivery device of claim 23, wherein said pharmaceutical composition comprises a paste.

31. The drug delivery device according to claim 1 when used in treating a disease in said patient, wherein said disease is selected from: bacterial infections, cancer, pain, organ transplantation, disordered sleep, epilepsy and seizures, anxiety, mood disorders, post-traumatic stress disorder, arrhythmia, hypertension, heart failure, spasticity, and diabetic nephropathy.

32. The drug delivery device according to claim 19 or 23 when used in treating Parkinson's disease in said patient, configured to deliver the pharmaceutical composition to said patient by removably attaching the device to an intraoral surface of said patient or by continuous or semi-continuous administration into the mouth of said patient.