Claims

1. Electrospun fibers comprising

i) a hydrophilic polymer that is soluble in a solvent, and wherein the hydrophilic polymer is selected from polyvinylpyrrolidone (PVP), ethylcellulose, hydroxypropylcellulose, acrylates and acrylic copolymers (Eudragit®), and mixtures thereof.

ii) a bioadhesive substance that has a solubility in said solvent of 0.5 g/100 ml or less at 25°C in said solvent, and wherein the bioadhesive substance is selected from dextrans, polyethylene oxides (PEOs), alginate, tragacanth, carrageenan, pectin, guar, xanthan, gellan, methylcellulose, hydroxypropylmethylcellulose (HPMC), polyvinylalcohol (PVA), polymers of acrylic acids (PAA derivatives), chitosan, lectins, thiolated polymers, non-ionic water-soluble polyethylene oxide resins (polyoxo WSRA), PAA-co-PEG (PEG is polyethylene glycol), and mixtures thereof.

iii) optionally, a drug substance,

wherein a part of the bioadhesive substance is attached to the fibres as small particles.

2. Electrospun fibres according to claim 1 comprising

iii) a drug substance.

3. Electrospun fibres according to claim 1 or 2, wherein the hydrophilic polymer has a solubility in said solvent of 3 g/100 ml or more at 25 °C or 10 g/100 ml or more at 25 °C.

4. Electrospun fibres according to any of the preceding claims, wherein the bioadhesive substance is at the most very slightly soluble in said solvent.

5. Electrospun fibres according to any of the preceding claims, wherein at least 90% w/w of the bioadhesive substance is present in undissolved form in the electrospun fibers.

6. Electrospun fibres according to any of the preceding claims, wherein at least 95% w/w or 99% w/w of the bioadhesive substance is present in undissolved form in the electrospun fibers.

7. Electrospun fibres according to any of the preceding claims, wherein said solvent is ethanol or ethanol-water mixtures.

8. Electrospun fibres according to claim 7, wherein said ethanol-water mixtures contain 20% v/v water or less or 10% v/v water or less.

9. Electrospun fibres according to claim 7 or 8, wherein said ethanol-water mixtures contain 5% v/v water or less such as 3% v/v water of less.

10. Electrospun fibers according to any of the preceding claims, wherein the hydrophilic polymer is PVP or Eudragit® or mixtures thereof.

11. Electrospun fibres according to any of the preceding claims, wherein the bioadhesive substance is dextran having an average molecular weight of from 400,000 Da to 2,000,000 Da, or dextran having an average molecular weight of about 2,000,000 Da.

12. Electrospun fibres according to any of claims 1-10, wherein the bioadhesive substance is polyethylene oxide having an average molecular weight of from 100,000 Da to 4,000,000 Da, or polyethylene oxide having an average molecular weight of 2,000,000 Da.

13. Electrospun fibres according to any of the preceding claims, wherein the weight ratio between the bioadhesive substance and the fibre-forming polymer in the fibres is in a range of from 0.1:1 to 10:1.

14. Electrospun fibres according to any of the preceding claims, wherein the water content is at the most about 5% w/w.

15. A composition comprising electrospun fibres as defined in any of claims 1-14.

16. A composition according to claim 15, wherein the concentration of the electrospun fibres in the composition is from 70 to 100% w/w.

17. A composition according to claim 15 or 16 in the form of a layered composition.

18. Electrospun fibres according to any one of claims 1-14 or a composition according to any one of claims 15-17, wherein an outer surface of said electrospun fibres or composition is provided with a coating.

19. Electrospun fibres according to any one of claims 1-14 or a composition according to claim 18, wherein the coating is water-impermeable, and wherein the coating comprises carbothane, polycaprolactone or polyethylene-co-vinyl acetate, or mixtures thereof.

20. Electrospun fibres as defined in any of claims 1-14 or a composition as defined in any of claims 15-19 for use in medicine.

21. Electrospun fibres as defined in any of claims 1-14 or a composition as defined in any of claims 15-19 for use in the treatment of diseases of the oral cavity.

22. A kit comprising
i) elecrtrospun fibres as defined in any of claims 1-14 or a composition as defined in any of claims 15-19, and
ii) an applicator for applying the composition in the oral cavity.

23. A method for preparing electrospun fibres as defined in any of claims 1-14, the method comprising
i) dissolving the hydrophilic polymer in a solvent,
ii) suspending the bioadhesive substance in the resulting solution from step i)
iii) adding the drug substance to the resulting dispersion from step ii)
iv) electrospinning the resulting mixture from step iii),
wherein said hydrophilic polymer is soluble in said solvent, and said bioadhesive substance has a solubility in said first solvent of 0.5 g/100 ml or less in first solvent,
to obtain electrospun fibres, wherein, in the electrospun fibers, at least 90% w/w of the bioadhesive substance is present in an undissolved form attached to the fibers.

24. A method for preparing electrospun fibres according to any of claims 1-14, the method comprising
i) dissolving the hydrophilic polymer in a solvent to obtain a first solution,
ii) dissolving or suspending the drug substance in said first solution to obtain a first mixture,
iii) suspending the bioadhesive substance in said solvent to obtain a second dispersion,
iiv) dual-electrospinning the first mixture and the second dispersion,

wherein said hydrophilic polymer is soluble in said solvent, and said bioadhesive substance has a solubility in said solvent of 0.5 g/100 ml or less in said solvent,
to obtain electrospun fibres, wherein, in the electrospun fibers, at least 90% w/w of the bioadhesive substance is present in an undissolved form attached to the fibers.

25. A method according to claim 23 or 24 further comprising a step of coating an outer surface of the fibres with a hydrophobic polymer.

26. A method according to claim 25, wherein the coated fibres are subject to heating to melt or soften the hydrophobic polymer.