

Claims

1. A core-shell microparticle comprising a biodegradable polymer with at least two or more surface cavities for use in the treatment of vascular disease, wherein the shell
5 further comprises one or more drugs.
2. A microparticle for use according to claim 1 wherein the treatment comprises treatment of arterial inflammation.
- 10 3. A microparticle for use according to claim 1 or claim 2 wherein the treatment comprises treatment of atherosclerosis and/or prevention of restenosis.
4. A microparticle for use according to any one of claims 1 to 3, wherein the shell
15 comprises one or more anti-inflammatory drugs.
5. A microparticle for use according to claim 4 wherein at least one anti-inflammatory drug is a steroid, preferably dexamethasone.
6. A microparticle for use according to any one of claims 1 to 5 wherein the shell
20 comprises an immunosuppressant drug, preferably sirolimus.
7. A microparticle for use according to any one of claims 1 to 6 wherein the biodegradable polymer is selected from an aliphatic polyester, aromatic copolyester, polyamide, poly(ester-amide), polyurethane, polyanhydride,
25 polysaccharide, and blends or copolymers thereof.
8. A microparticle for use according to any one of claims 1 to 7 wherein the biodegradable polymer is poly(lactic-co-glycolic acid).
- 30 9. A microparticle for use according to claim 8, wherein the ratio of glycolic acid to lactic acid is from 1:4 to 4:1.

10. A microparticle for use according to any one of claims 1 to 9 wherein the average diameter of the particle is from 1 to 6 μm .
11. A microparticle for use according to any one of claims 1 to 10, wherein the core-shell microparticle is
- 5 (a) introduced into a blood vessel; and
- (b) subjected to a pressure wave such that the core-shell microparticle is embedded into biological tissue.
12. A microparticle for use according to claim 11, wherein the microparticle is introduced to a diseased site within a blood vessel on the surface of a balloon, or via a catheter.
13. A microparticle for use according to claim 11 or 12, wherein the pressure wave is
- 15 high intensity focused ultrasound.
14. A microparticle for use according to claim 13, wherein the pressure wave has a frequency of from 0.25 MHz to 2 MHz and a pressure of from 2 MPa to 4 MPa.
15. A microparticle for use according to any one claims 11 to 14, wherein the microparticle is subjected to ultrasound imaging after administration.
16. A microparticle for use according to claim 15, wherein the ultrasound imaging occurs at a mechanical index of 2 or less, preferably 1.2 or less.
17. A pharmaceutical composition for use in the treatment of a vascular disease as defined in any one of claims 1 to 3, wherein the pharmaceutical composition comprises a plurality of microparticles as defined in any one of claims 4 to 10 and a pharmaceutically acceptable carrier or diluent.
18. A pharmaceutical composition according to claim 17, wherein the diluent is water or an aqueous solution.
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19. A core-shell microparticle comprising a biodegradable polymer with at least two or more surface cavities, wherein the shell further comprises one or more drugs, wherein the one or more drugs are selected from anti-inflammatory drugs, immunosuppressants, anti-proliferative drugs, anti-coagulants and combinations thereof.
20. A microparticle according claim 19 wherein the shell comprises a steroid, preferably dexamethasone.
21. A microparticle according to claim 19 or 20 wherein the shell comprises an immunosuppressant, preferably sirolimus.
22. A microparticle according to any one of claims 19 to 21, wherein the microparticle is defined as in any one of claims 7 to 10.
23. A pharmaceutical composition comprising a plurality of microparticles according to any one of claims 19 to 22 and a pharmaceutically acceptable carrier or diluent.
24. A pharmaceutical composition according to claim 23, wherein the diluent is water or an aqueous solution.