Claims:

1) A pre-formulation comprising a low viscosity, non-liquid crystalline, mixture of:

a) at least one neutral diacyl lipid and/or at least one tocopherol;

b) at least one phospholipid;

c) at least one biocompatible, oxygen containing, low viscosity organic solvent;

wherein at least one bioactive agent is dissolved or dispersed in the low viscosity mixture and wherein the pre-formulation forms, or is capable of forming, at least one liquid crystalline phase structure upon contact with an aqueous fluid.

2) A pre-formulation as claimed in claim 1 wherein said liquid crystalline phase structure is bioadhesive.

3) A pre-formulation as claimed in claim 1 or claim 2 wherein component a) consists essentially of diacyl glycerols, especially glycerol dioleate.

4) A pre-formulation as claimed in claim 1 or claim 2 wherein component a) consists essentially of at least one tocopherol.

5) A pre-formulation as claimed in claim 1 or claim 2 wherein component a) consists essentially of a mixture of GDO and tocopherol.

6) A pre-formulation as claimed in any of claims 1 to 5 wherein component b) is selected from phosphatidylcholines, phosphatidylethanolamines, phosphatidylserines, phosphatidylinositols and mixtures thereof.

7) A preformulation as claimed in any of claims 1 to 6 having a viscosity of 0.1 to 5000 mPas.

8) A preformulation as claimed in any of claims 1 to 7 having a molecular solution, L_2 and/or L_3 phase structure.

9) A preformulation as claimed in any of claims 1 to 8 having a ratio of a) to b) of between 95:5 and 5:95 by weight.

10) A preformulation as claimed in any of claims 1 to 9 having 0.5 to 50% component c) by weight of components a) + b) + c).

11) A preformulation as claimed in any of claims 1 to 10 wherein component c) is selected from alcohols, ketones, esters , ethers, amides, sulphoxides and mixtures thereof.

12) A preformulation as claimed in any of claims 1 to 11 additionally comprising up to 10% by weight of a)+b) of a charged amphiphile.

13) A preformulation as claimed in any of claims 1 to 12 wherein said active agent is selected from drugs, antigens, nutrients, cosmetics, fragrances, flavourings, diagnostic agents, vitamins, dietary supplements and mixtures thereof.

14) A preformulation as claimed in calim 13 wherein said drus is selected from hydrophilic small molecule drugs, lipophilic small molecule drugs, amphiphilic small molecule drugs, peptides, proteins, oligonucleotids and mixtures thereof.

15) A preformulation as claimed in claim 13 wherein said drug is selected from somatostatin related peptides, interferons, glucagon-like peptides 1 and 2, GnRH agonists, GnRH antagonists, bisphosponates, chlorhexidine and mixtures thereof.

16) A preformulation as claimed in any of claims 1 to 15 which is administrable by injection.

17) A preformulation as claimed in any of claims 1 to 15 which is administrable by spraying, dipping, rinsing, application from a pad or ball roller, painting, dropping, aerosol spraying or pump spraying.

18) An injectable preformulation as claimed in any of claims 1 to 16 which forms a depot providing continuous release of active agent for at least two weeks, wherein said active agent comprises at least one selected from

i. octreotide
ii. human growth hormone
iii. interferon alpha
iv. leuprolide

19) An injectable preformulation as claimed in any of claims 1 to 16 which forms a depot providing continuous release of active agent for at least two weeks, wherein said active agent comprises at least one selected from

i. risperidone
ii. olanzapine
iii. testosterone undecanoate

20) A topical formulation as claimed in any of claims 1 to 15 for intraoral administration which forms a bioadhesive, controlled release product, wherein said active agent comprises at least one selected from

i. benzydamine
ii. tramadol

21) A topical preformulation as claimed in any of claims 1 to 15 suitable for intraoral administration for treatment of periodontal and topical infections, wherein the active agent is chlorhexidine gluconate, and where the preformulation is applied as a liquid product which forms a surface gel *in situ* between 1 second. and 5 min after application.

22) A non-parenteral formulation as claimed in any of claims 1 to 15 for intranasal spray administration which forms a bioadhesive, controlled release product, wherein said active agent comprises at least one selected from

i. fentanyl
ii. diazepam

23) A topical formulation as claimed in any of claims 1 to 15 suitable for ocular administration, wherein said active agent comprises at least one selected from diclofenac, pilocarpine, levocabastine hydrochloride, ketotifen fumarate, timolol, betaxolol, carteolol, levobunolol, dorzolamide, brinzolamide, epinephrine, dipivefrin, clonidine, apraclonidine, brimonidine, pilocarpine, atanoprost, travoprost, bimatoprost, unoprostone, pilocarpine hydrochloride, dexamethasone, chloramphenicol, and indomethacin.

24) A non-parenteral formulation as claimed in any of claims 1 to 15 for dermatological administration which forms a bioadhesive, controlled release product, wherein the active agent is selected from;

i. acyclovir

ii. testosterone undecanoate.

25) A topical formulation as claimed in any of claims 1 to 15 for dermatological administration which forms a bioadhesive, controlled release product, wherein the active agent is selected from cosmetic agents, fragrances, flavourings, essential oils UV absorbing agents and mixtures thereof.

26) A process for the formation of a pre-formulation suitable for the administration of a bioactive agent to a (preferably mammalian) subject, said process comprising forming a non-liquid crystalline, low viscosity mixture of

a) at least one neutral diacyl lipid and/or at least one tocopherol;

b) at least one phospholipid;

c) at least one biocompatible, oxygen containing low viscosity, organic solvent; and dissolving or dispersing at least one bioactive agent in the low viscosity mixture, or in at least one of components a, b or c prior to forming the low viscosity mixture.

27) A process as claimed in claim 26 wherein said preformulation is a preformulation as claimed in any of claims 1 to 25.

28) The use of a non-liquid crystalline, low viscosity mixture of:

a) at least one neutral diacyl lipid and/or at least one tocopherol;

b) at least one phospholipid;

c) at least one biocompatible, oxygen containing, low viscosity organic solvent; wherein at least one bioactive agent is dissolved or dispersed in the low viscosity mixture in the manufacture of a pre-formulation for use in the sustained administration of said active agent, wherein said pre-formulation is capable of forming at least one liquid crystalline phase structure upon contact with an aqueous fluid.

29) The use as claimed in claim 28 wherein said preformulation is a preformulation as claimed in any of claims 1 to 25.

30) A method of treatment or prophylaxis of a human or non-human animal subject comprising administration of a preformulation as claimed in any of claims 1 to 25.

31) The method of claim 30 for the treatment of a condition selected from bacterial infection, fungal infection, skin soreness, eye conditions, genital soreness, infections and conditions for the finger and/or toe nails, travel sickness, addiction including nicotine addiction, periodontal infection, conjunctivitis, glaucoma and hormone deficiency or imbalance.

32) The method of claim 30 for prophylaxis against at least one condition selected from infection during surgery, infection during implantation, sunburn, infection at the site of burns, cuts or abrasions, oral infections, genital infections and infections resulting from activities resulting in exposure to infective agents.

Claims

1. A pre-formulation comprising a low viscosity, non-liquid crystalline, mixture of:
   a) at least one diacyl glycerol and/or at least one tocopherol;
   b) at least one phosphatidylcholine;
   c) at least one biocompatible solvent selected from monool alcohols, ketones, esters, ethers, amides, sulphoxides and mixtures thereof;
   wherein at least one bioactive agent is dissolved or dispersed in the low viscosity mixture, wherein the pre-formulation forms, or is capable of forming, at least one liquid crystalline phase structure upon contact with an aqueous fluid and wherein the low viscosity, non-liquid crystalline, mixture has a viscosity of 0.1 to 5000 mPas at 20°C.

2. A pre-formulation comprising a low viscosity, non-liquid crystalline, mixture of:
   a) at least one tocopherol and optionally at least one diacyl glycerol;
   b) at least one phosphatidylcholine;
   c) at least one biocompatible, oxygen containing, low viscosity organic solvent;
   wherein at least one bioactive agent is dissolved or dispersed in the low viscosity mixture, wherein the pre-formulation forms, or is capable of forming, at least one liquid crystalline phase structure upon contact with an aqueous fluid and wherein the low viscosity, non-liquid crystalline, mixture has a viscosity of 0.1 to 5000 mPas at 20°C.

3. A pre-formulation as claimed in claim 1 or claim 2 wherein said liquid crystalline phase structure is bioadhesive.

4. A pre-formulation as claimed in any of claims 1 to 3 wherein component a) consists essentially of diacyl glycerols.

5. A pre-formulation as claimed in claim 4 wherein said diacyl glycerols comprise glycerol dioleate.

6. A pre-formulation as claimed in any of claims 1 to 3 wherein component a) consists essentially of at least one tocopherol.

7. A pre-formulation as claimed in claim any of claims 1 to 3 wherein component a) consists essentially of a mixture of GDO and tocopherol.

8. A pre-formulation as claimed in any of claims 1 to 7 having a molecular solution, L_2 and/or L_3 phase structure.

9. A pre-formulation as claimed in any of claims 1 to 8 having a ratio of a) to b) of between 95:5 and 5:95 by weight.

10. A pre-formulation as claimed in any of claims 1 to 9 having 0.5 to 50% component c) by weight of components a) + b) + c).

11. A pre-formulation as claimed in any of claims 2 to 10 wherein component c) is selected from alcohols, ketones, esters , ethers, amides, sulphoxides and mixtures thereof.

12. A pre-formulation as claimed in any of claims 1 to 11 additionally comprising up to 10% by weight of a)+b) of a charged amphiphile.

13. A pre-formulation as claimed in any of claims 1 to 12 wherein said active agent is selected from drugs, antigens, nutrients, cosmetics, fragrances, flavourings, diagnostic agents, vitamins, dietary supplements and mixtures thereof.

14. A pre-formulation as claimed in calim 13 wherein said drus is selected from hydrophilic small molecule drugs, lipophilic small molecule drugs, amphiphilic small molecule drugs, peptides, proteins, oligonucleotids and mixtures thereof.

15. A pre-formulation as claimed in claim 13 wherein said drug is selected from somatostatin related peptides, interferons, glucagon-like peptides 1 and 2, GnRH agonists, GnRH antagonists, bisphosponates, chlorhexidine and mixtures thereof.

16. A pre-formulation as claimed in any of claims 1 to 15 which is administrable by injection.

17. A pre-formulation as claimed in any of claims 1 to 15 which is administrable by spraying, dipping, rinsing, application from a pad or ball roller, painting, dropping, aerosol spraying or pump spraying.

18. An injectable pre-formulation as claimed in any of claims 1 to 16 which forms a depot providing continuous release of active agent for at least two weeks,
wherein said active agent comprises at least one selected from
i. octreotide

ii. human growth hormone
iii. interferon alpha
iv. leuprolide

19. An injectable pre-formulation as claimed in any of claims 1 to 16 which forms a depot providing continuous release of active agent for at least two weeks, wherein said active agent comprises at least one selected from

i. risperidone
ii. olanzapine
iii. testosterone undecanoate

20. A topical formulation as claimed in any of claims 1 to 15 for intraoral administration which forms a bioadhesive, controlled release product, wherein said active agent comprises at least one selected from

i. benzydamine
ii. tramadol

21. A topical pre-formulation as claimed in any of claims 1 to 15 suitable for intraoral administration for treatment of periodontal and topical infections, wherein the active agent is chlorhexidine gluconate, and where the pre-formulation is applied as a liquid product which forms a surface gel *in situ* between 1 second. and 5 min after application.

22. A non-parenteral formulation as claimed in any of claims 1 to 15 for intranasal spray administration which forms a bioadhesive, controlled release product, wherein said active agent comprises at least one selected from

i. fentanyl
ii. diazepam

23. A topical formulation as claimed in any of claims 1 to 15 suitable for ocular administration, wherein said active agent comprises at least one selected from diclofenac, pilocarpine, levocabastine hydrochloride, ketotifen fumarate, timolol, betaxolol, carteolol, levobunolol, dorzolamide, brinzolamide, epinephrine, dipivefrin, clonidine, apraclonidine, brimonidine, pilocarpine, atanoprost, travoprost, bimatoprost, unoprostone, pilocarpine hydrochloride, dexamethasone, chloramphenicol, and indomethacin.

24. A non-parenteral formulation as claimed in any of claims 1 to 15 for dermatological administration which forms a bioadhesive, controlled release product, wherein the active agent is selected from;

i. acyclovir

ii. testosterone undecanoate.

25. A topical formulation as claimed in any of claims 1 to 15 for dermatological administration which forms a bioadhesive, controlled release product, wherein the active agent is selected from cosmetic agents, fragrances, flavourings, essential oils UV absorbing agents and mixtures thereof.

26. The use of a pre-formulation as claimed in any of claims 1 to 25 in the manufacture of a medicament for delivery of a bioactive agent to a human or non-human animal body in a method comprising administering said pre-formulation to said body whereby to form at least one liquid crystalline phase structure upon contact with an aqueous fluid *in vivo* following administration.

27. The use as claimed in claim 26 wherein said pre-formulation is administered by a method selected from subcutaneous injection, intramuscular injection, intra-cavity injection through tissue, intra-cavity injection into an open cavity without tissue penetration, spraying, rolling, wiping, dabbing, painting, rinsing, or dropping.

28. A method for the preparation of a liquid crystalline composition comprising exposing a pre-formulation as claimed in any of claims 1 to 25 to an aqueous fluid *in vivo*.

29. A process for the formation of a pre-formulation suitable for the administration of a bioactive agent to a (preferably mammalian) subject, said process comprising forming a non-liquid crystalline, low viscosity mixture of

a) at least one neutral diacyl glycerol and/or at least one tocopherol;

b) at least one phosphatidylcholine;

c) at least one biocompatible solvent having a viscosity of no more than 15 mPas at 20°C selected from monool alcohols, ketones, esters, ethers, amides, sulphoxides and mixtures thereof;

and dissolving or dispersing at least one bioactive agent in the low viscosity mixture, or in at least one of components a, b or c prior to forming the low viscosity mixture, wherein the low viscosity, non-liquid crystalline, mixture has a viscosity of 0.1 to 5000 mPas at 20°C.

30. A process for the formation of a pre-formulation suitable for the administration of a bioactive agent to a (preferably mammalian) subject, said process comprising forming a non-liquid crystalline, low viscosity mixture of

a) at least one tocopherol and optionally at least one diacyl glycerol;

b) at least one phosphatidylcholine;

c) at least one biocompatible, oxygen containing, low viscosity organic solvent; and dissolving or dispersing at least one bioactive agent in the low viscosity mixture, or in at least one of components a, b or c prior to forming the low viscosity mixture,

wherein the low viscosity, non-liquid crystalline, mixture has a viscosity of 0.1 to 5000 mPas at 20°C.

31. A process as claimed in claim 29 or claim 30 wherein said pre-formulation is a pre-formulation as claimed in any of claims 1 to 25.

32. The use of a pre-formulation as claimed in any of claims 1 to 25 in the manufacture of a medicament for use in the sustained administration of an active agent.

33. The use of claim 32 for the treatment of a condition selected from bacterial infection, fungal infection, skin soreness, eye conditions, genital soreness, infections and conditions for the finger and/or toe nails, travel sickness, addiction including nicotine addiction, periodontal infection, conjunctivitis, glaucoma and hormone deficiency or imbalance.

34. The use of claim 32 for prophylaxis against at least one condition selected from infection during surgery, infection during implantation, sunburn, infection at the site of burns, cuts or abrasions, oral infections, genital infections and infections resulting from activities resulting in exposure to infective agents.