SUMMARY

[06] Aspects of the present specification disclose, in part, a solid solution pharmaceutical composition comprising a therapeutic compound, one or more room temperature solid lipids. The solid solution pharmaceutical composition disclosed herein may further comprise one or more room temperature liquid lipids, one or more stabilizing agents, one or more neutralizing agents, or any combination thereof. A therapeutic compound may have an anti-inflammatory activity.

[06a] In one aspect, there is provided a solid solution pharmaceutical composition comprising:

a) one or more non-steroidal anti-inflammatory drugs (NSAIDs) in an amount of about 20% to about 40% by weight of the pharmaceutical composition;

b) one or more pharmaceutically-acceptable hard fats in an amount of at least 30% by weight of the pharmaceutical composition, wherein the one or more pharmaceutically-acceptable hard fats comprise one or more glycerolipids;

c) one or more pharmaceutically-acceptable monoglycerides or acetylated monoglycerides that is liquid at room temperature in an amount of less than 30% by weight of the pharmaceutical composition, and

d) a liquid glycol polymer in an amount of about 5% to about 15% by weight of the pharmaceutical composition;

wherein the solid solution pharmaceutical composition is formulated to be a solid at a temperature of about 15°C or lower.

[06b] In one aspect, there is provided use of a pharmaceutical composition as defined herein for the treatment of a severe pain condition.

[07] Other aspects of the present specification disclose, in part, a method of preparing a solid solution pharmaceutical composition disclosed herein. A method disclosed herein comprises the steps of a) contacting a therapeutic compound disclosed herein with one or more room temperature liquid lipids under conditions which allow the therapeutic compound to dissolve in the lipids; and b) contacting the compound/lipid solution with one or more room temperature solid lipids under conditions which allow the formation of a solid solution composition. In aspects of this method, heat is applied to dissolve the therapeutic compound into the one or more room temperature liquid lipids to create a solution. In other aspects of this method, step (a) comprises contacting a therapeutic compound disclosed herein with one or more room temperature liquid lipids and/or one or more stabilizing agents, and/or one or more neutralizing agents under conditions which allow the therapeutic compound to dissolve in the lipids.

[08] Other aspects of the present specification disclose a method of treating an individual with a severe pain condition, the method comprising the step of administering to the individual in need thereof a pharmaceutical composition disclosed herein, wherein administration results in a reduction in a symptom associated with the severe pain condition, thereby treating the individual.

[09] Other aspects of the present specification disclose a use of a solid solution pharmaceutical composition disclosed herein in the manufacture of a medicament for the treatment of a severe pain.

[010] Other aspects of the present specification disclose a solid solution pharmaceutical composition disclosed herein for use in the treatment of a severe pain.

[011] Other aspects of the present specification disclose a use of a solid solution pharmaceutical composition disclosed herein for the treatment of a severe pain.

BREIF DESCRIPTION OF THE DRAWINGS

[012] **FIG. 1** shows a differential scanning calorimetry (DSC) graph of solid solution compositions disclosed herein comprising ibuprofen. **FIG. 1A** is a DSC graph of ibuprofen alone exhibiting a melting point range of 75°C to 78°C; **FIG. 1B** is a DSC graph of GELUCIE® 43/01 alone exhibiting a melting point range of 41°C to 45°C; **FIG. 1C** is a DSC graph of a vehicle comprising GELUCIE® 43/01, MAISINE® 35-1, and PEG 400 exhibiting a melting point ranges of 32°C to 38°C and 41°C to 45°C; **FIG. 1D** is a DSC graph of Ibuprofen composition LA 35-1 exhibiting a melting point range of 32°C to 44°C; **FIG. 1E** is a

CLAIMS

1. A solid solution pharmaceutical composition comprising: a) one or more therapeutic compounds having an anti-pain activity comprising about 5% to 55% by weight of the pharmaceutical composition; b) one or more room temperature solid lipids comprising about 30% to about 75% by weight of the pharmaceutical composition; c) one or more room temperature liquid lipids comprising about 1% to about 20% by weight of the pharmaceutical composition, wherein the solid solution pharmaceutical composition has a melting point of 30°C or higher.

2. The solid solution pharmaceutical composition according to Claim 1, wherein the one or more therapeutic compound has is about 20% to about 30% by weight of the pharmaceutical composition.

3. The solid solution pharmaceutical composition according to Claim 1 or Claim 2, wherein the one or more room temperature solid lipid is about 35% to about 45% by weight of the pharmaceutical composition.

4. The solid solution pharmaceutical composition according to any one of Claims 1-3, wherein the one or more room temperature liquid lipid is about 1% to about 10% by weight of the pharmaceutical composition.

5. The solid solution pharmaceutical composition according to any one of Claims 1-4, wherein the one or more therapeutic compound is a NSAID, a PPARα agonist, a PPARβ/δ agonist, a PPARγ agonist, a Glitazar, a Ryanodine receptor antagonist, a nuclear receptor binding agent, an Angiotension II recetor antagonist, a ACE inhibitor, a phosphodiesterase inhibitor, a fibrate, a statin, a tocotrienol, a niacin, a bile acid sequestrants (resin), a cholesterol absorption inhibitor, a pancreatic lipase inhibitor, a sympathomimetic amine, a cancer drug, Metformin, Curcumin, glycyrrhetinic acid, 6-shogaol, an antibiotic, an anti-helmintic drug, or a an anti-malaria drug.

6. The solid solution pharmaceutical composition according to any one of Claims 1-5, wherein the one or more room temperature solid lipid have a melting point of about 40°C to about 50°C.

7. The solid solution pharmaceutical composition according to Claim 6, wherein the one or more room temperature solid lipids comprise one or more glycerolipids.

8. The solid solution pharmaceutical composition according to Claim 7, wherein the one or more glycerolipids comprise a triglyceride with one saturated or unsaturated fatty acid having a carbon length of C_{12}-C_{24}, two saturated or unsaturated fatty acids each having a carbon length of C_{12}-C_{24}, or three saturated or unsaturated fatty acids each having a carbon length of C_{12}-C_{24}.

9. The solid solution pharmaceutical composition according to Claims 8, wherein the one or more room temperature solid lipids comprises a mixture of saturated C_{10}-C_{18} triglycerides having a melting point range of about 41°C to 45°C.

10. The solid solution pharmaceutical composition according to any one of Claims 1-9, wherein the one or more room temperature liquid lipids comprises one or more partially hydrogenated fats.

11. The solid solution pharmaceutical composition according to any one of Claims 1-9, wherein the one or more room temperature liquid lipids comprises one or more monoglycerides.

12. The solid solution pharmaceutical composition according to Claims 8, wherein the one or more monoglycerides comprises glycerol monolinoleate.

13. The solid solution pharmaceutical composition according to any one of Claims 1-12, wherein the solid solution pharmaceutical composition further comprises one or more stabilizing agents and/or one or more neutralizing agents.

14. The solid solution pharmaceutical composition according to Claim 13, wherein the one or more stabilizing agents comprises about 1% to about 5% by weight of the pharmaceutical composition.

15. The solid solution pharmaceutical composition according to Claim 14, wherein the one or more stabilizing agents comprises a liquid glycol polymer, a monohydric alcohol, isosorbide dimethyl ether, and diethylene glycol monoethyl ether (2-(2-ethoxyethoxy)ethanol).

16. The solid solution pharmaceutical composition according to Claim 15, wherein the liquid glycol polymer is a liquid PEG polymer and/or a liquid PPG polymer.

17. The solid solution pharmaceutical composition according to Claim 15, wherein the monohydric alcohol is ethanol.

18. The solid solution pharmaceutical composition according to Claim 13, wherein the one or more neutralizing agents comprises about 5% to 55% by weight of the pharmaceutical composition.

18. The solid solution pharmaceutical composition according to Claim 18, wherein the one or more neutralizing agents comprises one or more fatty acids, sodium acetate, or triethanolamine.

19. The solid solution pharmaceutical composition according to Claim 18, wherein the one or more fatty acids comprises a C_{16}-C_{18} fatty acid

20. The solid solution pharmaceutical composition according to Claim 19, wherein the C_{16}-C_{18} fatty acid comprises stearic acid.

CLAIMS

1. A solid solution pharmaceutical composition comprising:

   a) one or more non-steroidal anti-inflammatory drugs (NSAIDs) in an amount of about 20% to about 40% by weight of the pharmaceutical composition;

   b) one or more pharmaceutically-acceptable hard fats in an amount of at least 30% by weight of the pharmaceutical composition, wherein the one or more pharmaceutically-acceptable hard fats comprise one or more glycerolipids;

   c) one or more pharmaceutically-acceptable monoglycerides or acetylated monoglycerides that is liquid at room temperature in an amount of less than 30% by weight of the pharmaceutical composition, and

   d) a liquid glycol polymer in an amount of about 5% to about 15% by weight of the pharmaceutical composition;

   wherein the solid solution pharmaceutical composition is formulated to be a solid at a temperature of about 15°C or lower.

2. The solid solution pharmaceutical composition according to Claim 1, wherein the amount of the one or more NSAIDs is about 25% to about 35% by weight of the pharmaceutical composition.

3. The pharmaceutical composition according to Claim 1 or Claim 2, wherein the one or more NSAIDs comprises a non-selective cyclo-oxygenase inhibitor, a selective cyclooxygenase 1 inhibitor, a selective cyclooxygenase 2 inhibitor or any combination thereof.

4. The pharmaceutical composition according to Claim 3, wherein the one or more NSAIDs comprises a pharmaceutically-acceptable form of a salicylate derivative NSAID, a pharmaceutically-acceptable form of a p-amino phenol derivative NSAID, a pharmaceutically-acceptable form of a propionic acid derivative NSAID, a pharmaceutically-acceptable form of an acetic acid derivative NSAID, a pharmaceutically-acceptable form of

an enolic acid derivative NSAID, a pharmaceutically-acceptable form of a fenamic acid derivative NSAID, an ester of the NSAID, or any combination thereof.

5. The pharmaceutical composition according to Claim 4, wherein the propionic acid derivative NSAID comprises a pharmaceutically-acceptable form of an Alminoprofen, a pharmaceutically-acceptable form of a Benoxaprofen, a pharmaceutically-acceptable form of a Dexketoprofen, a pharmaceutically-acceptable form of a Fenoprofen, a pharmaceutically-acceptable form of a Flurbiprofen, a pharmaceutically-acceptable form of an Ibuprofen, a pharmaceutically-acceptable form of an Indoprofen, a pharmaceutically-acceptable form of a Ketoprofen, a pharmaceutically-acceptable form of a Loxoprofen, a pharmaceutically-acceptable form of a Naproxen, a pharmaceutically-acceptable form of an Oxaprozin, a pharmaceutically-acceptable form of a Pranoprofen, or a pharmaceutically-acceptable form of a Suprofen.

6. The pharmaceutical composition according to Claim 5, wherein the propionic acid derivative NSAID is a pharmaceutically-acceptable form of an Ibuprofen.

7. The solid solution pharmaceutical composition according to any one of Claims 1-6, wherein the amount of the one or more pharmaceutically-acceptable hard fats is about 35% to about 45% by weight of the pharmaceutical composition.

8. The solid solution pharmaceutical composition according to any one of Claims 1-7, wherein the one or more pharmaceutically-acceptable hard fats have a melting point of about 40°C to about 50°C.

9. The solid solution pharmaceutical composition according to any one of Claims 1-8, wherein the one or more glycerolipids comprise a mixture of saturated C_{10}-C_{18} triglycerides having a melting point range of about 41°C to about 45°C.

10. The solid solution pharmaceutical composition according to Claim 9, wherein the one or more glycerolipids comprise a mixture of saturated C_{10}-C_{18} triglycerides having a melting point range of about 43°C.

11. The solid solution pharmaceutical composition according to any one of Claims 1-10, wherein the amount of the one or more pharmaceutically-acceptable monoglycerides or acetylated monoglycerides is about 8% to about 30% by weight of the pharmaceutical composition.

12. The solid solution pharmaceutical composition according to any one of Claims 1-11, wherein the one or more pharmaceutically-acceptable monoglycerides or an acetylated monoglycerides comprise glycerol monomyristoleate, glycerol monopalmitoleate, glycerol monosapienate, glycerol monooleate, glycerol monoelaidate, glycerol monovaccenate, glycerol monolinoleate, glycerol monolinoelaidate, glycerol monolinolenate, glycerol *monostearidonate*, *glycerol monoeicosenoate*, *glycerol monomeadate*, *glycerol* monoarachidonate, glycerol monoeicosapentaenoate, glycerol monoerucate, glycerol monodocosahexaenoate, or glycerol mononervonate.

13. The solid solution pharmaceutical composition according to Claims 12, wherein the one or more pharmaceutically-acceptable monoglycerides or acetylated monoglycerides comprise glycerol monolinoleate.

14. The solid solution pharmaceutical composition according to any one of Claims 1-13, wherein the liquid glycol polymer in an amount of about 9% to about 12% by weight of the pharmaceutical composition.

15. The solid solution pharmaceutical composition according Claim 14, wherein the liquid glycol polymer in an amount of about 10% to about 12% by weight of the pharmaceutical composition.

16. The solid solution pharmaceutical composition according to any one of Claims 1-15, wherein the liquid glycol polymer is a liquid polyethylene glycol (PEG) polymer and/or a liquid polypropylene glycol (PPG) polymer.

17. The pharmaceutical composition according to Claim 16, wherein the liquid PEG polymer and/or the liquid PPG polymer is no more than about 1,000 g/mol.

18. The pharmaceutical composition according to Claim 17, wherein the PEG polymer comprises a PEG 100, a PEG 200, a PEG 300, a PEG 400, a PEG 500, a PEG 600, a PEG 700, a PEG 800, a PEG 900, a PEG 1000, or any combination thereof.

19. The pharmaceutical composition according to Claim 17, wherein the PPG polymer comprises a PPG 100, a PPG 200, a PPG 300, a PPG 400, a PPG 500, a PPG 600, a PPG 700, a PPG 800, a PPG 900, a PPG 1000, or any combination thereof.

20. Use of a pharmaceutical composition according as defined in any one of Claims 1-19 in the manufacture of a medicament for the treatment of a severe pain condition.

21. Use of a pharmaceutical composition as defined in any one of Claims 1-19 for the treatment of a severe pain condition.

22. The use according to Claim 20 or Claim 21, wherein the severe pain condition is an acute pain, a subacute pain, or a chronic pain.

23. The use according to Claim 20 or Claim 21, wherein the severe pain condition is a nociceptive pain, a pathological pain, is a referred pain, a headache or a migraine.

24. The use according to Claim 23, wherein the nociceptive pain is a visceral pain, a deep somatic pain, a superficial somatic pain, or any combination thereof.

25. The use according to Claim 23, wherein the pathological pain is a neuropathic pain, a dysfunctional pain, or any combination thereof.

26. The use according to Claim 25, wherein the neuropathic pain is a central neuropathic pain, a peripheral neuropathic pain, a deafferentation pain, or any combination thereof.

27. The use according to Claim 26, wherein the peripheral neuropathic pain is a mononeuropathy, a mononeuropathic multiplex, a polyneuropathy, an autonomic neuropathy, neuralgia or a complex regional pain syndrome.

28. The use according to Claim 27, wherein the polyneuropathy is a distal axonopathy, a myelinopathy, or a neuronopathy.

29. The use according to Claim 23, wherein the headache is a muscular/myogenic headache, a vascular headache, a traction headache, inflammatory headache, a chronic sinusitis headache, a hormone headache, a rebound headache, an organic headache, or an ictal headache.