phosphodiesterase -3 inhibitor (examples include cilostazol), platelet aggregation inhibitors (examples include thienopyridines (example includes clopidigrel) prasugrel), Factor Xa inhibitors, dipyridamole, peripheral calcium channel blockers, diuretics, angiotensin converting enzyme inhibitors, angiotensin II receptor antagonists, direct thombin inhibitors (examples include dabigatran), coenzyme Q-10, vitamin ~~D1~~D2 (ergocalciferol) and vitamin D3 (cholecalciferol).

In a further aspect, suitably the active ingredient which may be present in the tablet, pellet or granule core is selected from sulfonylureas (examples include chlorpropamide, glyburide, glimeperide), thiazolidmediones (examples include rosiglitazone, pioglitazone), DPP-4 inhibitors, SGLT-2 inhibitors, aldose reductase inhibitors, phosphodiesterase-5 inhibitors, phosphodiesterase -3 inhibitor (examples include cilostazol), platelet aggregation inhibitors (examples include thienopyridines (example includes clopidigrel) prasugrel), Factor Xa inhibitors, dipyridamole, peripheral calcium channel blockers, diuretics, angiotensin converting enzyme inhibitors, angiotensin II receptor antagonists, direct thombin inhibitors (examples include dabigatran), coenzyme Q-10, vitamin ~~D1~~D2 (ergocalciferol) and vitamin D3 (cholecalciferol).

In a further aspect, suitably the active ingredient which may be present in the tablet, pellet or granule core is selected from sulfonylureas (examples include chlorpropamide, glyburide, glimeperide), thiazolidmediones (examples include rosiglitazone, pioglitazone), DPP-4 inhibitors, SGLT-2 inhibitors, aldose reductase inhibitors, phosphodiesterase-5 inhibitors, phosphodiesterase -3 inhibitor (examples include cilostazol), platelet aggregation inhibitors (examples include thienopyridines (example includes clopidigrel) prasugrel), Factor Xa inhibitors, dipyridamole, peripheral calcium channel blockers, diuretics, angiotensin converting enzyme inhibitors, angiotensin II receptor antagonists, direct thombin inhibitors (examples include dabigatran), coenzyme Q-10, vitamin ~~D1~~D2 (ergocalciferol) and vitamin D3 (cholecalciferol).

In a further aspect suitably the active ingredient which may be present in the tablet, pellet or granule core is selected from GPR40 agonists (examples include TAK 875 and AMG 837), antiobesity drugs (examples include Qnexa (a fixed dose combination of phentermine and topiramate), Contrave (a fixed dose combination of bupriopion and naltresone) and Lorqess (lorcaserin).

b) Spray coating a solution comprising rosuvastatin calcium and an HPMC/PEG polymer in water onto the (optionally coated) tablet, pellet or granule core to provide a rosuvastatin calcium containing layer.

In a further aspect of the invention, there is further provided a process for the manufacture of a formulation comprising:

a) Optionally coating a tablet, pellet or granule core with a sub-coating layer of an HPMC/PEG polymer (optionally comprising additional components as hereinbefore described, particularly calcium acetate or BHA, more particularly calcium acetate);

b) Spray coating a solution comprising rosuvastatin calcium and an HPMC/PEG polymer in water onto the (optionally coated) tablet, pellet or granule core to provide a rosuvastatin calcium containing layer; and

c) Coating the rosuvastatin calcium containing layer with an outer coating comprising an HPMC/PEG polymer (optionally comprising additional components, such as ferric oxide).

In one aspect of these processes above, the tablet, pellet or granule core comprises an active ingredient which is not rosuvastatin calcium. In a further aspect, this active ingredient is also not selected from any one or more of: niacin or a niacin analogue, a fibrate, metformin, a CETP inhibitor and/or aspirin. In a further aspect this active ingredient is useful for treating cardiovascular, thrombotic or diabetic diseases, although preferably is not one of the agents listed in the aspect within this paragraph above. In a further aspect, this active ingredient is selected from those listed hereinbelow:

sulfonylureas (examples include chlorpropamide, glyburide, glimeperide), thiazolidinediones (examples include rosiglitazone, pioglitazone), DPP-4 inhibitors, SGLT-2 inhibitors, aldose reductase inhibitors, phosphodiesterase-5 inhibitors, phosphodiesterase -3 inhibitor (examples include cilostazol), platelet aggregation inhibitors (examples include thienopyridines (example includes clopidigrel) prasugrel), Factor Xa inhibitors, dipyridamole, peripheral calcium channel blockers, diuretics, angiotensin converting enzyme inhibitors, angiotensin II receptor antagonists, direct thombin inhibitors (examples include dabigatran), coenzyme Q-10, vitamin ~~D1~~D2 (ergocalciferol) and vitamin D3 (cholecalciferol), GPR40 agonists (examples include TA 875 and AMG 837),

Claims

1. A process for formation of a pharmaceutical formulation comprising a rosuvastatin calcium containing layer, said process comprising spray coating a solution comprising rosuvastatin calcium and a first coating polymer in water onto a tablet, pellet or granule core.

2. A process as claimed in claim 1 comprising:
   a) Coating a tablet, pellet or granule core with a sub-coating layer of a second coating polymer; and
   b) Spray coating the solution comprising rosuvastatin calcium and a first coating polymer in water onto the coated tablet, pellet or granule core to provide a rosuvastatin calcium containing layer.

3. A process as claimed in claim 1 or 2 comprising:
   a) Optionally coating a tablet, pellet or granule core with a sub-coating layer of a second coating polymer;
   b) Spray coating the solution comprising rosuvastatin calcium and a first coating polymer in water onto the (optionally coated) tablet, pellet or granule core to provide a rosuvastatin calcium containing layer; and
   c) Coating the rosuvastatin calcium containing layer with an outer coating comprising a third coating polymer.

4. A process as claimed in any one of claims 1 to 3 wherein the tablet, pellet or granule core comprises an active ingredient which is not rosuvastatin calcium.

5. A process as claimed in claim 4 wherein the core contains an active ingredient which is not selected from any one or more of: niacin or a niacin analogue, a fibrate, metformin, a CETP inhibitor and/or aspirin.

6. A process as claimed in claim 4 or 5, wherein the core comprises an active ingredient which is selected from:

sulfonylureas, thiazolidinediones, DPP-4 inhibitors, SGLT-2 inhibitors, aldose reductase inhibitors, phosphodiesterase-5 inhibitors, phosphodiesterase -3 inhibitor, platelet aggregation inhibitors, Factor Xa inhibitors, dipyridamole, peripheral calcium channel blockers, diuretics, angiotensin converting enzyme inhibitors, angiotensin II receptor antagonists, direct thombin inhibitors, coenzyme Q-10, vitamin D1 (ergocalciferol), vitamin D3 (cholecalciferol), GPR40 agonists and antiobesity drugs.

7. A process as claimed in any one of the previous claims wherein the first coating polymer is an HMPC/PEG polymer.

8. A process as claimed in any one of the previous claims wherein the first coating polymer further comprises a stabilization agent.

9. A process as claimed in claim 8 wherein the stabilization agent is calcium acetate or BHA.

10. A process as claimed in claim 8 wherein the stabilization agent is calcium acetate.

11. A process as claimed in any one of the preceding claims wherein all the coating polymers are HMPC/PEG polymers.

12. A process as claimed in any one of claims 3 to 11 wherein the outer coating also contains ferric oxide.

13. A process as claimed in any one of the preceding claims wherein the rosuvastatin containing layer comprises rosuvastatin calcium and the first coating polymer in a ratio of between approximately 1:8 to 2:1

14. A process as claimed in any one of the preceding claims wherein the core is a tablet core.

15. A process as claimed in any one of the preceding claims wherein the core is a pellet or granule core.

16. A process as claimed in claim 15 wherein the coated pellet or granule core is further processed to form a pharmaceutical product.

17. A product obtainable by the process as claimed in any one of the preceding claims.

18. A pharmaceutical formulation comprising a tablet, pellet or granule core spray coated with a layer comprising rosuvastatin calcium in an HMPC/PEG polymer, further coated with an outer layer comprising an HMPC polymer and ferric oxide, wherein the rosuvastatin calcium containing layer is coated onto the tablet, pellet or granule core by spray coating a solution of rosuvastatin calcium and an HPMC/PEG polymer in water.

Claims

1. A process for formation of a pharmaceutical formulation comprising a rosuvastatin calcium containing layer, said process comprising spray coating a solution comprising rosuvastatin calcium, a stabilisation agent and a first coating polymer in water onto a tablet, pellet or granule core, wherein the stabilisation agent is selected from a pharmaceutically acceptable salt of an organic acid where calcium or magnesium replaces all the protons.

2. A process as claimed in claim 1 where the stabilisation agent is selected from calcium acetate, calcium lactate, calcium succinate and calcium fumarate.

3. A process as claimed in claim 2 wherein the stabilisation agent is calcium acetate.

4. A process as claimed in any one of claims 1 to 3 comprising:
   a) Coating a tablet, pellet or granule core with a sub-coating layer of a second coating polymer; and
   b) Spray coating the solution comprising rosuvastatin calcium, stabilisation agent and a first coating polymer in water onto the coated tablet, pellet or granule core to provide a rosuvastatin calcium containing layer.

5. A process as claimed in any one of claims 1 to 4 comprising:
   a) Optionally coating a tablet, pellet or granule core with a sub-coating layer of a second coating polymer;
   b) Spray coating the solution comprising rosuvastatin calcium, stabilisation agent and a first coating polymer in water onto the (optionally coated) tablet, pellet or granule core to provide a rosuvastatin calcium containing layer; and
   c) Coating the rosuvastatin calcium containing layer with an outer coating comprising a third coating polymer.

6. A process as claimed in any one of claims 1 to 5 wherein the tablet, pellet or granule core comprises an active ingredient which is not rosuvastatin calcium.

7. A process as claimed in claim 6 wherein the core contains an active ingredient which is not selected from any one or more of: niacin or a niacin analogue, a fibrate, metformin, a CETP inhibitor and/or aspirin.

8. A process as claimed in claim 6 or 7, wherein the core comprises an active ingredient which is selected from:

sulfonylureas, thiazolidinediones, DPP-4 inhibitors, SGLT-2 inhibitors, aldose reductase inhibitors, phosphodiesterase-5 inhibitors, phosphodiesterase -3 inhibitor, platelet aggregation inhibitors, Factor Xa inhibitors, dipyridamole, peripheral calcium channel blockers, diuretics, angiotensin converting enzyme inhibitors, angiotensin II receptor antagonists, direct thombin inhibitors, coenzyme Q-10, vitamin D2 (ergocalciferol), vitamin D3 (cholecalciferol), GPR40 agonists and antiobesity drugs.

9. A process as claimed in any one of the previous claims wherein the first coating polymer is an HPMC/PEG polymer.

10. A process as claimed in any one of the preceding claims wherein all the coating polymers are HPMC/PEG polymers.

11. A process as claimed in any one of claims 3 to 10 wherein the outer coating also contains ferric oxide.

12. A process as claimed in any one of the preceding claims wherein the rosuvastatin containing layer comprises rosuvastatin calcium and the first coating polymer in a ratio of between approximately 1:8 to 2:1.

13. A process as claimed in any one of the preceding claims wherein the core is a tablet core.

14. A process as claimed in any one of the preceding claims wherein the core is a pellet or granule core.

15. A process as claimed in claim 14 wherein the coated pellet or granule core is further processed to form a pharmaceutical product.

16. A pharmaceutical formulation comprising a tablet, pellet or granule core spray coated with a layer comprising rosuvastatin calcium and calcium acetate in an HPMC/PEG polymer, further coated with an outer layer comprising an HPMC polymer and ferric oxide, wherein the rosuvastatin calcium containing layer is coated onto the tablet, pellet or granule core by spray coating a solution of rosuvastatin calcium, calcium acetate and an HPMC/PEG polymer in water.

17. A coating solution comprising an HPMC/PEG polymer, rosuvastatin calcium and calcium acetate in water.