~~What is claimed is:~~

1. A manufactured pre-mixed formulation for injection comprising a suspension of

(i) a pharmaceutically acceptable non-aqueous carrier, wherein the pharmaceutically acceptable non-aqueous carrier is an oil; and

(ii) microspheres which comprise a biocompatible, biodegradable polymer and an active pharmaceutical ingredient, wherein the biocompatible, biodegradable polymer comprises a poly(lactide-co-glycolide) copolymer.

2. The formulation of Claim 1, wherein the pharmaceutically acceptable non-aqueous carrier comprises one or more triglycerides of C_6-C_{12} fatty acids; wherein the microspheres comprise a poly(lactide-co-glycolide) polymer; and wherein the active pharmaceutical ingredient is exenatide.

3. The formulation of Claim 1, wherein the microspheres have dispersed therein 1% to 10% (w/w) exenatide and 0.1% to 5% (w/w) sugar.

4. The formulation of Claim 3, wherein the sugar is glucose, dextrose, galactose, maltose, fructose, mannose, sucrose, lactose, trehalose, raffinose, acarbose, glycol, glycerol, erythritol, threitol, arabitol, ribitol, sorbitol, dulcitol, iditol, isomalt, maltitol, lactitol, mannitol, xylitol, or a combination of two or more thereof.

5. The formulation of any one of Claims 1 to 4, wherein the formulation is a sustained release formulation.

6. The formulation of Claim 1, wherein the oil is a fractionated or unfractionated coconut oil, a fractionated or unfractionated palm oil, a fractionated or unfractionated palm kernel oil, a fractionated or unfractionated sesame oil, a fractionated or unfractionated soybean oil, a fractionated or unfractionated almond oil, a fractionated or unfractionated rapeseed oil, a fractionated or unfractionated corn oil, a fractionated or unfractionated sunflower oil, a fractionated or unfractionated peanut oil, a fractionated or unfractionated olive oil, a fractionated or unfractionated castor oil, a fractionated or unfractionated soybean oil, a fractionated or unfractionated safflower oil, a fractionated or unfractionated cottonseed oil, ethyl oleate, or a combination of two or more thereof.

7. The formulation of any one of Claims 1 to 6, wherein the pharmaceutically acceptable non-aqueous carrier comprises one or more monoglycerides, one or more diglycerides, one or more triglycerides, or a combination of two or more thereof.

8. The formulation of any one of Claims 1 to 7, wherein the pharmaceutically acceptable non-aqueous carrier comprises

i) a triglyceride which comprises an ester of a C_6 fatty acid;

(ii) a triglyceride which comprises an esters of a C_8 fatty acid;

(iii) a triglyceride which comprises an ester of a C_{10} fatty acid;

(iv) a triglyceride which comprises an ester of a C_{12} fatty acid;

(v) a triglyceride which comprises esters of three C_8 fatty acids;

(vi) a triglyceride which comprises esters of three C_{10} fatty acids;

(vii) a triglyceride which comprises esters of two C_8 fatty acids and one C_{10} fatty acid;

(viii) a triglyceride which comprises esters of two C_{10} fatty acids and one C_8 fatty acid;

(ix) a triglyceride which comprises esters of two C_8 fatty acids and one C_6 fatty acid;

(x) a triglyceride which comprises esters of two C_{10} fatty acids and one C_6 fatty acid;

(xi) a triglyceride which comprises esters of one C_8 fatty acid, one C_{10} fatty acid, and one C_{12} fatty acid;

(xii) a triglyceride which comprises esters of one C_8 fatty acid, one C_{10} fatty acid, and one C_6 fatty acid or

(xiii) a combination of two or more thereof.

9. The formulation of any one of Claims 7 to 8, wherein the triglycerides comprise

(i) 0 to 2 wt% C_6 fatty acid, 65 to 80 wt% C_8 fatty acid, 20 to 35 wt% C_{10} fatty acid, and 0 to 2 wt% C_{12} fatty acid;

(ii) 0 to 2 wt% C_6 fatty acid, 50 to 65 wt% C_8 fatty acid, 30 to 45 wt% C_{10} fatty acid, and 0 to 2 wt% C_{12} fatty acid;

(iii) 0 to 2 wt% C_6 fatty acid, 45 to 65 wt% C_8 fatty acid, 30 to 45 wt% C_{10} fatty acid, 0 to 3 wt% C_{12} fatty acid; and 0 to 5 wt% linoleic acid; or

(iv) 0 to 2 wt% C_6 fatty acid, 45 to 55 wt% C_8 fatty acid, 30 to 40 wt% C_{10} fatty acid, 0 to 3 wt% C_{12} fatty acid, and 10 to 20% succinic acid.

~~10. The formulation of any one of Claims 7 to 9, wherein the triglycerides further~~ comprise 0 to 2 wt% C_{14} fatty acid.

11. The formulation of any one of Claims 1 to 10, further comprising a pharmaceutically acceptable excipient.

12. The formulation of Claim 11, wherein the pharmaceutically acceptable excipient is a sugar, a sugar alcohol, an antioxidant, a preservative, or a combination of two or more thereof.

13. The formulation of any one of Claims 1 to 12, wherein the pharmaceutically acceptable excipient is sucrose, glucose, dextrose, galactose, maltose, trehalose, fructose, maltodextrin, glycol, glycerol, erythritol, threitol, arabitol, ribitol, sorbitol, dulcitol, iditol, isomalt, maltitol, lactitol, mannitol, xylitol, benzoic acid, sorbic acid, meta cresol, sodium benzoate, potassium sorbate, methylparaben, propylparaben, butylparaben, benzalkonium chloride, sodium metabisulfite, butylated hydroxy anisole, butylated hydroxy toluene, sodium sulfite, tocopherol, thymol, ascorbate, propyl gallate, or a combination of two or more thereof.

14. The formulation of any one of claims 1 and 3-13, wherein the active pharmaceutical ingredient is a GLP-1 receptor agonist, GLP-1(7-37), GLP-1(7-36)-NH_2, exenatide, pramlintide, davalintide, Val^{27}-davalintide, metreleptin, insulin, glucagon agonist, glucagon antagonist, a chimera of a GLP-1 receptor agonist and a glucagon agonist, bovine serum albumin, sodium salicylate, salicylic acid, minocycline HCl, insulin, or a small molecule.

15. The formulation any one of Claims 1 to 14, wherein the microspheres are present in the formulation at a concentration of from 10 mg/ml to 500 mg/ml or from 20 mg/ml to 200 mg/ml.

16. The formulation of any one of Claims 1 to 15, wherein the formulation has a shelf life of at least 6 months, at least 9 months, at least one year, or at least two years.

17. The formulation of any one of Claims 1 to 16, wherein the formulation has a burst release of less than 5%, less than 1%, less than 0.5%, less than 0.25%, or less than 0.1%.

~~18. The formulation of any one of Claims 1 to 17, wherein the formulation has a burst~~ release of active pharmaceutical ingredient of 5% or less of the total AUC, 2% or less of the total AUC, or 1% or less of the total AUC, as measured in the first 24 hours after administration to the patient.

19. The formulation of any of the previous claims wherein the active pharmaceutical ingredient does not result in a circulating level of active pharmaceutical ingredient exceeding 400 pg/ml or 350 pg/ml during the first 24 hours following administration.

20. The formulation of any one of the previous claims wherein the microspheres provide a ratio of Cmax to Cave of about 3 or less and the total pore volume of the microspheres is about 0.1 mL/g or less.

21. The formulation of any one of the previous claims wherein the microspheres have an outer layer that is non-porous or less porous than the inner layer.

22. The formulation of any of the previous claims wherein the carrier is not contained within a substantial number of interior spaces or pores of the microspheres.

23. The formulation of any of the previous claims wherein the non-aqueous, non-solubilizing carrier has a viscosity of from 5 cP to 200 cP, from 10 cP to 90 cP, from 20 cP to 80 cP or from 30 cP to 70 cP.

24. Use of a formulation of any one of claims 1 to 23~~26~~ in the manufacture of a medicament for treating diabetes, stimulating insulin release; lowering plasma glucagon; reducing food intake; reducing appetite; decreasing gastric motility; delaying gastric emptying; lowering plasma lipid levels; treating impaired glucose tolerance; treating hyperglycemia; treating obesity; treating overweight; treating fatty liver disease; or treating non-alcoholic steatohepatitis in a patient in need thereof wherein the use comprises administration to the patient the medicament.

25. A kit comprising a container which comprises the formulation of any one of Claims 1 to 23 and instructions for use.

~~26. The kit of Claim 23, wherein the container is a single-dose or multi-dose pen injector,~~ single-dose or multi-dose vial, or single-dose or multi-dose cartridge.

27. The manufactured pre-mixed formulation for injection of claim 1, consisting essentially of a suspension of:

(i) a pharmaceutically acceptable carrier which consists essentially of one or more triglycerides of C_6-C_{12} fatty acids; and

(ii) microspheres which consist essentially of a poly(lactide-co-glycolide) polymer having dispersed therein about 5% (w/w) exenatide as active pharmaceutical ingredient and about 2% (w/w) sucrose; wherein the ratio of lactide:glycolide in the polymer is about 1:1.

What is claimed is:

1. A manufactured pre-mixed formulation for injection comprising a suspension of

(i) a pharmaceutically acceptable non-aqueous carrier, wherein the pharmaceutically acceptable non-aqueous carrier is an oil; and

(ii) microspheres which comprise a biocompatible, biodegradable polymer and an active pharmaceutical ingredient, wherein the biocompatible, biodegradable polymer comprises a poly(lactide-co-glycolide) copolymer.

2. The formulation of Claim 1, wherein the pharmaceutically acceptable non-aqueous carrier comprises one or more triglycerides of C_6-C_{12} fatty acids; and wherein the active pharmaceutical ingredient is exenatide.

3. The formulation of claim 1, wherein the formulation is a sustained release formulation.

4. The formulation of Claim 1 or 3, wherein the oil is a fractionated or unfractionated coconut oil, a fractionated or unfractionated palm oil, a fractionated or unfractionated palm kernel oil, a fractionated or unfractionated sesame oil, a fractionated or unfractionated soybean oil, a fractionated or unfractionated almond oil, a fractionated or unfractionated rapeseed oil, a fractionated or unfractionated corn oil, a fractionated or unfractionated sunflower oil, a fractionated or unfractionated peanut oil, a fractionated or unfractionated olive oil, a fractionated or unfractionated castor oil, a fractionated or unfractionated soybean oil, a fractionated or unfractionated safflower oil, a fractionated or unfractionated cottonseed oil, ethyl oleate, or a combination of two or more thereof.

5. The formulation of any one of Claims 1 to 4, wherein the pharmaceutically acceptable non-aqueous carrier comprises one or more monoglycerides, one or more diglycerides, one or more triglycerides, or a combination of two or more thereof.

6. The formulation of any one of Claims 1 to 5, wherein the pharmaceutically acceptable non-aqueous carrier comprises

i) a triglyceride which comprises an ester of a C_6 fatty acid;

(ii) a triglyceride which comprises an ester of a C_8 fatty acid;

(iii) a triglyceride which comprises an ester of a C_{10} fatty acid;

(iv) a triglyceride which comprises an ester of a C_{12} fatty acid;

(v) a triglyceride which comprises esters of three C_8 fatty acids;

(vi) a triglyceride which comprises esters of three C_{10} fatty acids;

(vii) a triglyceride which comprises esters of two C_8 fatty acids and one C_{10} fatty acid;

(viii) a triglyceride which comprises esters of two C_{10} fatty acids and one C_8 fatty acid;

(ix) a triglyceride which comprises esters of two C_8 fatty acids and one C_6 fatty acid;

(x) a triglyceride which comprises esters of two C_{10} fatty acids and one C_6 fatty acid;

(xi) a triglyceride which comprises esters of one C_8 fatty acid, one C_{10} fatty acid, and one C_{12} fatty acid;

(xii) a triglyceride which comprises esters of one C_8 fatty acid, one C_{10} fatty acid, and one C_6 fatty acid or

(xiii) a combination of two or more thereof.

7. The formulation of any one of Claims 1 to 6, wherein the pharmaceutically acceptable non-aqueous carrier comprises

(i) 0 to 2 wt% C_6 fatty acid, 65 to 80 wt% C_8 fatty acid, 20 to 35 wt% C_{10} fatty acid, and 0 to 2 wt% C_{12} fatty acid;

(ii) 0 to 2 wt% C_6 fatty acid, 50 to 65 wt% C_8 fatty acid, 30 to 45 wt% C_{10} fatty acid, and 0 to 2 wt% C_{12} fatty acid;

(iii) 0 to 2 wt% C_6 fatty acid, 45 to 65 wt% C_8 fatty acid, 30 to 45 wt% C_{10} fatty acid, 0 to 3 wt% C_{12} fatty acid; and 0 to 5 wt% linoleic acid; or

(iv) 0 to 2 wt% C_6 fatty acid, 45 to 55 wt% C_8 fatty acid, 30 to 40 wt% C_{10} fatty acid, 0 to 3 wt% C_{12} fatty acid, and 10 to 20 wt% succinic acid.

8. The formulation of claim 7, wherein the pharmaceutically acceptable non-aqueous carrier further comprises 0 to 2 wt% C_{14} fatty acid.

9. The formulation of any one of Claims 1 to 8, further comprising a pharmaceutically acceptable excipient.

10. The formulation of Claim 9, wherein the pharmaceutically acceptable excipient is a sugar, a sugar alcohol, an antioxidant, a preservative, or a combination of two or more thereof.

11. The formulation of claim 9, wherein the sugar is glucose, dextrose, galactose, maltose, fructose, mannose, sucrose, lactose, trehalose, raffinose, acarbose, glycol, glycerol, erythritol, threitol, arabitol, ribitol, sorbitol, dulcitol, iditol, isomalt, maltitol, lactitol, mannitol, xylitol, or a combination of two or more thereof.

12. The formulation of claim 10, wherein the pharmaceutically acceptable excipient is sucrose, glucose, dextrose, galactose, maltose, trehalose, fructose, maltodextrin, glycol, glycerol, erythritol, threitol, arabitol, ribitol, sorbitol, dulcitol, iditol, isomalt, maltitol, lactitol, mannitol, xylitol, benzoic acid, sorbic acid, meta cresol, sodium benzoate, potassium sorbate, methylparaben, propylparaben, butylparaben, benzalkonium chloride, sodium metabisulfite, butylated hydroxy anisole, butylated hydroxy toluene, sodium sulfite, tocopherol, thymol, ascorbate, propyl gallate, or a combination of two or more thereof.

13. The formulation of any one of claims 1 to 12, wherein the active pharmaceutical ingredient is exenatide, GLP-1(7-37), GLP-1(7-36)-NH_2, exenatide, pramlintide, davalintide, Val^{27}-davalintide, metreleptin, bovine serum albumin, sodium salicylate, salicylic acid, minocycline HCl, or insulin.

14. The formulation of claim 13, wherein the active pharmaceutical ingredient is exenatide.

15. The formulation of claim 14, wherein the microspheres have dispersed therein 1% to 10% (w/w) exenatide.

16. The manufactured pre-mixed formulation for injection of claim 1, consisting essentially of a suspension of:

(i) a pharmaceutically acceptable non-aqueous carrier which comprises one or more triglycerides of C_6-C_{12} fatty acids; and

(ii) microspheres which consist essentially of a poly(lactide-co-glycolide) polymer having dispersed therein about 5% (w/w) exenatide as active pharmaceutical ingredient and about 2% (w/w) sucrose; wherein the ratio of lactide:glycolide in the polymer is about 1:1.

17. The formulation of any one of the previous claims wherein the microspheres have an outer layer that is non-porous or less porous than the inner layer.

18. The formulation of any of the previous claims wherein the carrier is not contained within a substantial number of interior spaces or pores of the microspheres.

19. The formulation of any of the previous claims wherein the non-aqueous, non-solubilizing carrier has a viscosity of from 5 cP to 200 cP, from 10 cP to 90 cP, from 20 cP to 80 cP or from 30 cP to 70 cP.

20. Use of a formulation of any one of claims 1 to 19 in the manufacture of a medicament for treating diabetes, stimulating insulin release; lowering plasma glucagon; reducing food intake; reducing appetite; decreasing gastric motility; delaying gastric emptying; lowering plasma lipid levels; treating impaired glucose tolerance; treating hyperglycemia; treating obesity; treating overweight; treating fatty liver disease; or treating non-alcoholic steatohepatitis in a patient in need thereof.

21. A kit comprising a container which comprises the formulation of any one of Claims 1 to 19 and instructions for use.

22. The kit of Claim 21, wherein the container is a single-dose or multi-dose pen injector, single-dose or multi-dose vial, or single-dose or multi-dose cartridge.