What is Claimed:

1. A method of reducing weight gain or inducing weight loss comprising administering to an adult human in need thereof an extended half-life GLP-1/GIP coagonist peptide at a weekly dosage of about 1 mg to about 40 mg.

2. The method of claim 1, wherein the weekly dosage is about 2 mg to about 10 mg.

3. The method of claim 1 or 2, wherein the adult human has excess body weight, diabetes mellitus type II, insulin resistance, alcoholic liver disease, non-alcoholic fatty liver disease (NAFLD), or metabolic syndrome.

4. A method of treating hyperglycemia, reducing blood glucose levels, or normalizing blood glucose levels comprising administering to an adult human in need thereof an extended half-life GLP-1/GIP coagonist peptide at a weekly dosage of about 1 mg to about 40 mg per week.

5. The method of claim 4, wherein the weekly dosage is about 2 mg to about 10 mg

6. The method of claim 4 or 5, wherein the adult human has diabetes mellitus type I, diabetes mellitus type II, or gestational diabetes.

7. The method of any one of claims 1-6, wherein the extended half-life GLP-1/GIP coagonist peptide is administered once per week.

8. The method of any one of claims 1-6, wherein the extended half-life GLP-1/GIP coagonist peptide is administered twice per week.

9. The method of any one of the preceding claims, wherein the extended half-life GLP-1/GIP coagonist peptide exhibits a GLP-1 percentage potency within about 10-fold of the GIP percentage potency.

10. The method of any one of the preceding claims, wherein the extended half-life GLP-1/GIP coagonist peptide has an EC_{50} at the GLP-1 receptor within about 10-fold of the EC_{50} at the GIP receptor.

11. The method of any one of the preceding claims, wherein the extended half-life GLP-1/GIP coagonist peptide exhibits a GIP percentage potency of at least 1% or a GLP-1 percentage potency of at least 1%.

12. The method of any one of the preceding claims, wherein the extended half-life GLP-1/GIP coagonist peptide exhibits a half-life of about 4 days to about 7 days.

13. The method of any one of the preceding claims, wherein the extended half-life GLP-1/GIP coagonist peptide comprises a polyethylene glycol moiety that has a molecular weight of about 30,000 Daltons to about 60,000 Daltons.

14. The method of claim 13, wherein the polyethylene glycol moiety has a molecular weight of about 40,000 Daltons.

15. The method of any one of the preceding claims, wherein the extended half-life GLP-1/GIP coagonist peptide is any of SEQ ID NOs: 5-94, 99-169, 173-413, or an amino acid sequence that comprises up to 6 amino acid modifications compared to any of SEQ ID NOs: 5-94, 99-169, 173-413.

16. The method of claim 15, wherein the GLP-1/GIP coagonist peptide is any of SEQ ID NOs: 75, 99-103, 140, 153, 166, and 261, or an amino acid sequence that comprises up to 6 amino acid modifications compared to any of SEQ ID NOs: 75, 99-103, 140, 153, 166, and 261.

17. The method of any one of the preceding claims, further comprising administering a second therapeutic agent.

18. The method of claim 17, wherein the second therapeutic agent is an anti-diabetic agent.

19. The method of claim 18, wherein the second therapeutic agent is an anti-obesity agent.

20. The method of claim any one of the preceding claims, wherein the extended half-life GLP-1/GIP coagonist peptide is administered in a pharmaceutical composition.

21. The method of claim 20, wherein the pharmaceutical composition is administered via subcutaneous, intravenous, or intramuscular injection.

22. The method of claim 21, wherein the pharmaceutical composition is administered by subcutaneous injection.

23. The method of claims 1 or 4, wherein administration of the extended half-life GLP-1/GIP coagonist peptide results in an increase in insulin level, a decrease in glucose level, an increase in C-peptide level, a decrease in HbA_{1c} level, or a decrease in fructosamine level, or any combination thereof.

24. The method of any one of claims 20-23, wherein the extended half-life GLP-1/GIP coagonist peptide is administered from a pre-filled syringe.

CLAIMS

1. A pegylated GLP-1/GIP coagonist peptide for use in reducing weight gain, inducing weight loss, treating hyperglycemia, reducing blood glucose levels, or normalizing blood glucose levels in an adult human, wherein the use is characterized by a weekly dosage of about 1 mg to about 40 mg.

2. The peptide of claim 1, wherein the weekly dosage is about 2 mg to about 10 mg.

3. The peptide of claim 1 or 2, wherein the adult human has obesity, excess body weight, diabetes mellitus type II, insulin resistance, alcoholic liver disease, non-alcoholic fatty liver disease (NAFLD), or metabolic syndrome.

4. The peptide of claim 1 or 2, wherein the adult human has diabetes mellitus type I, diabetes mellitus type II, or gestational diabetes.

5. The peptide of any one of claims 1-4, wherein the peptide is for administering once per week.

6. The peptide of any one of claims 1-6, wherein the peptide is for administering twice per week.

7. The peptide of any one of the preceding claims, wherein (i) the extended half-life GLP-1/GIP coagonist peptide exhibits a GLP-1 percentage potency within about 10-fold of the GIP percentage potency, (ii) the extended half-life GLP-1/GIP coagonist peptide has an EC_{50} at the GLP-1 receptor within about 10-fold of the EC_{50} at the GIP receptor, (iii) the extended half-life GLP-1/GIP coagonist peptide exhibits a GIP percentage potency of at least 1% or a GLP-1 percentage potency of at least 1%.

8. The peptide of any one of the preceding claims, wherein the peptide comprises a polyethylene glycol moiety that has a molecular weight of about 30,000 Daltons to about 60,000 Daltons, optionally, wherein the polyethylene glycol moiety has a molecular weight of about 40,000 Daltons.

9. The peptide of any one of the preceding claims, wherein the peptide comprises SEQ ID NO: 153.

10. The peptide of any one of the preceding claims, wherein the peptide is for administering with a second therapeutic agent, optionally, wherein the second therapeutic agent is an anti-diabetic agent or an anti-obesity agent.

11. The peptide of any one of the preceding claims, wherein the administration is via subcutaneousinjection.

12. The peptide of any one of the preceding claims, wherein in the use is for producing an increase in insulin level, a decrease in glucose level, an increase in C-peptide level, a decrease in HbA_{1c} level, or a decrease in fructosamine level, or any combination thereof.

13. Use of a pegylated GLP-1/GIP coagonist peptide in the manufacture of a medicament for reducing weight gain, inducing weight loss, treating hyperglycemia, reducing blood glucose levels, or normalizing blood glucose levels in an adult human, wherein the use is characterized by a weekly dosage of about 1 mg to about 40 mg.

14. The use of claim 13, wherein the weekly dosage is about 2 mg to about 10 mg.

15. The use of claim 13 or 14, wherein the adult human has obesity, excess body weight, diabetes mellitus type II, insulin resistance, alcoholic liver disease, non-alcoholic fatty liver disease (NAFLD), or metabolic syndrome.

16. The use of claim 13 or 14, wherein the adult human has diabetes mellitus type I, diabetes mellitus type II, or gestational diabetes.

17. The use of any one of claims 13-16, wherein the peptide is to be administered once per week.

18. The use of any one of claims 13-16, wherein the peptide is to be administered twice per week.

19. The use of any one of claims 13-18, wherein (i) the extended half-life GLP-1/GIP coagonist peptide exhibits a GLP-1 percentage potency within about 10-fold of the GIP percentage potency, (ii) the extended half-life GLP-1/GIP coagonist peptide has an EC_{50} at the GLP-1 receptor within about 10-fold of the EC_{50} at the GIP receptor, (iii) the extended half-life GLP-1/GIP coagonist peptide exhibits a GIP percentage potency of at least 1% or a GLP-1 percentage potency of at least 1%.

20. The use of any one of claims 13-19, wherein the peptide comprises a polyethylene glycol moiety that has a molecular weight of about 30,000 Daltons to about 60,000 Daltons, optionally, wherein the polyethylene glycol moiety has a molecular weight of about 40,000 Daltons.

21. The use of any one of claims 13-20, wherein the peptide comprises SEQ ID NO: 153.

22. The use of any one of claims 13-21, wherein the peptide is to be administered with a second therapeutic agent, optionally, wherein the second therapeutic agent is an anti-diabetic agent or an anti-obesity agent.

23. The use of any one of claims 13-22, wherein the administration is via subcutaneous injection.

24. The use of any one of claims 13-23, wherein the use is for producing an increase in insulin level, a decrease in glucose level, an increase in C-peptide level, a decrease in HbA_{1c} level, or a decrease in fructosamine level, or any combination thereof.