CLAIMS:

1. A liquid pharmaceutical formulation comprising a GLP-1 analogue having the amino acid sequence set forth in SEQ ID NO:3, wherein the liquid pharmaceutical formulation is at a pH of between 6.5 ± 0.5 and 7.5 ± 0.5 and comprises **a)** histidine HCl at a concentration of about 10 mM ± 10%, **b)** a sugar-based tonicity agent at a concentration of from 100 mM to 450 mM **c)** polysorbate 20 at a concentration of from 0.005 to 0.05% and **d)** an amino acid excipient at a concentration of from 5 mM to 75 mM.

2. The liquid pharmaceutical formulation of claim 1, wherein the sugar-based tonicity agent is mannitol at a concentration of from 150 mM to 350 mM.

3. The liquid pharmaceutical formulation of claim 1, wherein the sugar-based tonicity agent is sucrose at a concentration of from 145 mM to 440 mM.

4. The liquid pharmaceutical formulation of claim 1, wherein the amino acid excipient is methionine at a concentration of from 5 mM to 25 mM.

5. The liquid pharmaceutical formulation of claim 1, wherein the amino acid excipient is proline at a concentration of from 25 mM to 75 mM.

6. The liquid pharmaceutical formulation of claim 1, wherein the GLP-1 analogue is at a concentration of from 50 μg/ml to 2 mg/ml.

7. The liquid pharmaceutical formulation of claim 1, wherein the GLP-1 analogue is at a concentration of from 100 μg/ml to 1 mg/ml

8. The liquid pharmaceutical formulation of claim 1, wherein the GLP-1 analogue is at a concentration of from 100 μg/ml to 500 μg/ml.

9. The liquid pharmaceutical formulation of claim 1, wherein the GLP-1 analogue is at a concentration of 300 μg/ml ± 20%.

10. The liquid pharmaceutical formulation of claim 1, wherein the surfactant is polysorbate 20.

11. The liquid pharmaceutical formulation of claim 1, wherein the liquid pharmaceutical formulation is at pH 7.0 ± 0.5.

12. The liquid pharmaceutical formulation of claim 1, wherein the GLP-1 analogue comprises the amino acid sequence set forth in SEQ ID NO:3 at a concentration of from 50 μg/ml to 2 mg/ml, wherein the liquid pharmaceutical formulation comprises histidine-HCl at a concentration of about 10 mM, mannitol at a concentration of about 275 mM, methionine at a concentration of about 10 mM and polysorbate 20 at a concentration of about 0.02%.

13. The liquid pharmaceutical formulation of claim 1, wherein the GLP-1 analogue comprises the amino acid sequence set forth in SEQ ID NO:3 at a concentration of from 50 μg/ml to 2 mg/ml, wherein the liquid pharmaceutical formulation comprises histidine-HCl at a concentration of about 10 mM, sucrose at a concentration of about 235 mM, methionine at a concentration of about 10 mM and polysorbate 20 at a concentration of about 0.02%.

14. The liquid pharmaceutical formulation of claim 1, wherein the liquid pharmaceutical formulation is selected from the group consisting of:

    a. a liquid pharmaceutical formulation comprising a GLP-1 analogue having an amino acid sequence as set forth in SEQ ID NO:3, wherein the GLP-1 analogue is at a concentration of from 100 μg/ml to 1 mg/ml and wherein the liquid pharmaceutical formulation comprises histidine-HCl at a concentration of 10 mM, mannitol at a concentration of 275 mM, methionine at a concentration of 10 mM and polysorbate 20 at a concentration of 0.02%, and;

    b. a liquid pharmaceutical formulation comprising a GLP-1 analogue having an amino acid sequence as set forth in SEQ ID NO:3, wherein the GLP-1 analogue is at a concentration of from 100 μg/ml to 1 mg/ml and wherein the liquid pharmaceutical formulation comprises histidine-HCl at a concentration of 10 mM, sucrose at a concentration of 233 mM (8%), methionine at a concentration of 10 mM and polysorbate 20 at a concentration of 0.02%.

15. The liquid pharmaceutical formulation of claim 14, wherein the liquid pharmaceutical formulation is at pH 7.0 ± 0.5.

16. A single-dose or multiple-dose container comprising the liquid pharmaceutical formulation of claim 14.

17. A method of treating a disorder or condition in which administration of a GLP-1 or a GLP-1 analogue is indicated, the method comprising administering the liquid pharmaceutical formulation of claim 14.

18. The method of claim 17, wherein the disorder is irritable bowel syndrome (IBS), constipation predominant IBS (IBS-C), diarrhea predominant IBS (IBS-D) or diarrhea predominant IBS (IBS-D).

19. The method of claim 17, wherein the pharmaceutical formulation is administered subcutaneously.

20. The method of claim 18, wherein the pharmaceutical formulation is administered during acute pain associated with IBS, IBS-C, IBS-D or IBS-M.

21. The method of claim 17, wherein the disorder is diabetes, ischemia, reperfused tissue injury, dyslipidemia, diabetic cardiomyopathy, myocardial infarction, acute coronary syndrome, obesity, catabolic changes after surgery, hyperglycemia, stroke, neurodegenerative disorders, memory and learning disorders, islet cell transplant functional dyspepsia and/or a disorder requiring regenerative therapy.

22. The method of claim 17, wherein the GLP-1 analogue is administered at a dose of from 50 μg to 150 μg.

23. A method of treating a disorder or condition in which administration of a GLP-1 or a GLP-1 analogue is indicated, the method comprising administering the liquid pharmaceutical formulation of claim 1.

24. The method of claim 23, wherein the disorder is irritable bowel syndrome (IBS), constipation predominant IBS (IBS-C), diarrhea predominant IBS (IBS-D) or diarrhea predominant IBS (IBS-D).

25. The method of claim 23, wherein the pharmaceutical formulation is administered subcutaneously.

26. The method of claim 24, wherein the pharmaceutical formulation is administered during acute pain associated with IBS, IBS-C, IBS-D or IBS-M.

27. The method of claim 23, wherein the disorder is diabetes, ischemia, reperfused tissue injury, dyslipidemia, diabetic cardiomyopathy, myocardial infarction, acute coronary syndrome, obesity, catabolic changes after surgery, hyperglycemia, stroke, neurodegenerative disorders, memory and learning disorders, islet cell transplant functional dyspepsia and/or a disorder requiring regenerative therapy.

28. The method of claim 23, wherein the GLP-1 analogue is administered at a dose of from 50 μg to 150 μg.

29. A liquid pharmaceutical formulation comprising a GLP-1 analogue having an amino acid sequence as set forth in SEQ ID NO:3, wherein the GLP-1 analogue is at a concentration of from 50 μg/ml to 2 mg/ml and wherein the liquid pharmaceutical formulation is at a pH of between of 6.5 ± 0.5 and 7.5 ± 0.5 and comprises:

a. histidine-HCl at a concentration of about 10 mM ± 10%, mannitol at a concentration of from 100 mM to 350 mM, and polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v);

b. histidine-HCl at a concentration of about 10 mM ± 10%, mannitol at a concentration of 165 mM ± 10%, and polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v);

c. histidine-HCl at a concentration of 10 mM ± 10%, mannitol at a concentration of 275 mM ± 10%, and polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v);

d. histidine-HCl at a concentration of 10 mM ± 10%, mannitol at a concentration of 275 mM ± 10%, polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v) and methionine at a concentration of from 5 mM to 25 mM;

e. histidine-HCl at a concentration of 10 mM ± 10%, mannitol at a concentration of 165 mM ± 10%, polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v) and methionine at a concentration of from 5 mM to 25 mM;

f. histidine-HCl at a concentration of 10 mM ± 10%, mannitol at a concentration of 275 mM ± 10%, polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v) and proline at a concentration of from 25 mM to 75 mM;

g. histidine-HCl at a concentration of 10 mM ± 10%, mannitol at a concentration of 165 mM ± 10%, polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v) and proline at a concentration of from 25 mM to 75 mM;

h. histidine-HCl at a concentration of 10 mM ± 10%, sucrose at a concentration of from145 mM to 450 mM, and polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v);

i. histidine-HCl at a concentration of about 10 mM ± 10%, sucrose at a concentration of about 235 mM ± 10%, and polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v);

j. histidine-HCl at a concentration of about 10 mM ± 10%, sucrose at a concentration of about 290 mM ± 10%, and polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v);

k. histidine-HCl at a concentration of about 10 mM ± 10%, sucrose at a concentration of about 235 mM ± 10%, polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v) and methionine at a concentration of from 5 mM to 25 mM;

l. histidine-HCl at a concentration of about 10 mM ± 10%, sucrose at a concentration of about 290 mM ± 10%, polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v) and methionine at a concentration of from 5 mM to 25 mM;

m. histidine-HCl at a concentration of about 10 mM ± 10%, sucrose at a concentration of about 235 mM ± 10%, polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v) and proline at a concentration of from 25 mM to 75 mM, or;

n. histidine-HCl at a concentration of about 10 mM ± 10%, sucrose at a concentration of about 290 mM ± 10%, polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v) and proline at a concentration of from 25 mM to 75 mM.

30. A liquid pharmaceutical formulation comprising a GLP-1 analogue having the amino acid sequence set forth in SEQ ID NO:3, wherein the liquid pharmaceutical formulation is at a pH of between 6.5 ± 0.5 and 7.5 ± 0.5 and comprises histidine-HCl as buffering agent, sucrose or mannitol as tonicity agent, methionine or proline as an excipient and a surfactant.

CLAIMS:

1. A liquid pharmaceutical formulation comprising a GLP-1 analogue consisting of the amino acid sequence set forth in SEQ ID NO:3, wherein the GLP-1 analog is at a concentration of 50 μg/ml to 2 mg/ml, and wherein the liquid pharmaceutical formulation is at a pH of between 6.5±0.5 and 7.5±0.5 and comprises a) histidine HCl at a concentration of about 10 mM±10%, b) a sugar-based tonicity agent at a concentration of from 100 mM to 450 mM c) polysorbate 20 at a concentration of from 0.005 to 0.05% and d) an amino acid excipient at a concentration of from 5 mM to 75 mM.

2. The liquid pharmaceutical formulation of claim 1, wherein the sugar-based tonicity agent is mannitol at a concentration of from 150 mM to 350 mM.

3. The liquid pharmaceutical formulation of claim 1, wherein the sugar-based tonicity agent is sucrose at a concentration of from 145 mM to 440 mM.

4. The liquid pharmaceutical formulation of claim 1, wherein the amino acid excipient is methionine at a concentration of from 5 mM to 25 mM.

5. The liquid pharmaceutical formulation of claim 1, wherein the amino acid excipient is proline at a concentration of from 25 mM to 75 mM.

6. The liquid pharmaceutical formulation of claim 1, wherein the GLP-1 analogue is at a concentration of from 100 μg/ml to 1 mg/ml.

7. The liquid pharmaceutical formulation of claim 1, wherein the GLP-1 analogue is at a concentration of from 100 μg/ml to 500 μg/ml.

8. The liquid pharmaceutical formulation of claim 1, wherein the GLP-1 analogue is at a concentration of 300 μg/ml±20%.

9. The liquid pharmaceutical formulation of claim 1, wherein the liquid pharmaceutical formulation is at pH 7.0±0.5.

10. The liquid pharmaceutical formulation of claim 1, wherein the GLP-1 analogue consists of the amino acid sequence set forth in SEQ ID NO:3 at a concentration of from 50

μg/ml to 2 mg/ml, wherein the liquid pharmaceutical formulation comprises histidine-HCl at a concentration of about 10 mM, mannitol at a concentration of about 275 mM, methionine at a concentration of about 10 mM and polysorbate 20 at a concentration of about 0.02%.

11. The liquid pharmaceutical formulation of claim 1, wherein the GLP-1 analogue consists of the amino acid sequence set forth in SEQ ID NO:3 at a concentration of from 50 μg/ml to 2 mg/ml, wherein the liquid pharmaceutical formulation comprises histidine-HCl at a concentration of about 10 mM, sucrose at a concentration of about 235 mM, methionine at a concentration of about 10 mM and polysorbate 20 at a concentration of about 0.02%.

12. The liquid pharmaceutical formulation of claim 1, wherein the liquid pharmaceutical formulation is selected from the group consisting of:
a. a liquid pharmaceutical formulation comprising a GLP-1 analogue consisting of an amino acid sequence as set forth in SEQ ID NO:3, wherein the GLP-1 analogue is at a concentration of from 100 μg/ml to 1 mg/ml and wherein the liquid pharmaceutical formulation comprises histidine-HCl at a concentration of 10 mM, mannitol at a concentration of 275 mM, methionine at a concentration of 10 mM and polysorbate 20 at a concentration of 0.02%, and;
b. a liquid pharmaceutical formulation comprising a GLP-1 analogue consisting of an amino acid sequence as set forth in SEQ ID NO:3, wherein the GLP-1 analogue is at a concentration of from 100 μg/ml to 1 mg/ml and wherein the liquid pharmaceutical formulation comprises histidine-HCl at a concentration of 10 mM, sucrose at a concentration of 233 mM (8%), methionine at a concentration of 10 mM and polysorbate 20 at a concentration of 0.02%.

13. The liquid pharmaceutical formulation of claim 12, wherein the liquid pharmaceutical formulation is at pH 7.0±0.5.

14. A single-dose or multiple-dose container comprising the liquid pharmaceutical formulation of claim 12.

15. A liquid pharmaceutical formulation comprising a GLP-1 analogue consisting of an amino acid sequence as set forth in SEQ ID NO:3, wherein the GLP-1 analogue is at a

concentration of from 50 μg/ml to 2 mg/ml and wherein the liquid pharmaceutical formulation is at a pH of between of 6.5±0.5 and 7.5±0.5 and comprises:

a. histidine-HCl at a concentration of about 10 mM±10%, mannitol at a concentration of from 100 mM to 350 mM, and polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v);

b. histidine-HCl at a concentration of about 10 mM±10%, mannitol at a concentration of 165 mM±10%, and polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v);

c. histidine-HCl at a concentration of 10 mM±10%, mannitol at a concentration of 275 mM±10%, and polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v);

d. histidine-HCl at a concentration of 10 mM±10%, mannitol at a concentration of 275 mM±10%, polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v) and methionine at a concentration of from 5 mM to 25 mM;

e. histidine-HCl at a concentration of 10 mM±10%, mannitol at a concentration of 165 mM±10%, polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v) and methionine at a concentration of from 5 mM to 25 mM;

f. histidine-HCl at a concentration of 10 mM±10%, mannitol at a concentration of 275 mM±10%, polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v) and proline at a concentration of from 25 mM to 75 mM;

g. histidine-HCl at a concentration of 10 mM±10%, mannitol at a concentration of 165 mM±10%, polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v) and proline at a concentration of from 25 mM to 75 mM;

h. histidine-HCl at a concentration of 10 mM±10%, sucrose at a concentration of from 145 mM to 450 mM, and polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v);

i. histidine-HCl at a concentration of about 10 mM±10%, sucrose at a concentration of about 235 mM±10%, and polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v);

j. histidine-HCl at a concentration of about 10 mM±10%, sucrose at a concentration of about 290 mM±10%, and polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v);

k. histidine-HCl at a concentration of about 10 mM±10%, sucrose at a concentration of about 235 mM±10%, polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v) and methionine at a concentration of from 5 mM to 25 mM;

l. histidine-HCl at a concentration of about 10 mM±10%, sucrose at a concentration of about 290 mM±10%, polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v) and methionine at a concentration of from 5 mM to 25 mM;

m. histidine-HCl at a concentration of about 10 mM±10%, sucrose at a concentration of about 235 mM±10%, polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v) and proline at a concentration of from 25 mM to 75 mM, or;

n. histidine-HCl at a concentration of about 10 mM±10%, sucrose at a concentration of about 290 mM±10%, polysorbate 20 at a concentration of from 0.01 to 0.03% (w/v) and proline at a concentration of from 25 mM to 75 mM.