Claims

1. A liquid formulation of a long-lasting oxyntomodulin conjugate, comprising a pharmacologically active amount of a long-lasting oxyntomodulin conjugate wherein an oxyntomodulin, which is a physiologically active peptide, is linked to an immunoglobulin Fc region; and an albumin-free stabilizer, wherein the stabilizer contains a buffer, a sugar alcohol and a nonionic surfactant.

2. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 1, wherein the stabilizer further contains one or more selected from the group consisting of isotonic agents, sugars, polyhydric alcohols and amino acids.

3. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 1, wherein the oxyntomodulin is a peptide made from pre-glucagon, a precursor of glucagon, and has an amino acid sequence of SEQ ID NO: 1.

4. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 1, wherein the oxyntomodulin is native oxyntomodulin or a precursor, derivative, fragment or variant thereof.

5. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 4, wherein the derivative has any one amino acid sequence selected from the group consisting of SEQ ID NOS: 2 to 34.

6. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 4, wherein the oxyntomodulin derivative comprises the amino acid sequence of SEQ ID NO: 24.

7. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 4, wherein the oxyntomodulin derivative comprises the amino acid sequence of SEQ ID NO: 25.

8. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 7, wherein the amino acids at positions 16 and 20 of the amino acid sequence form a ring.

9. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 4, wherein the oxyntomodulin derivative comprises the amino acid sequence of SEQ ID NO: 26.

10. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 9, wherein the amino acids at positions 12 and 16 of the amino acid sequence

form a ring.

11. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 1, wherein the immunoglobulin Fc region is an Fc region derived from IgG, IgA, IgD, IgE or IgM.

12. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 11, wherein each domain of the immunoglobulin Fc region is a hybrid of domains originating from different immunoglobulins selected from the group consisting of IgG, IgA, IgD, IgE and IgM.

13. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 11, wherein the immunoglobulin Fc region is a dimer or multimer consisting of single-chain immunoglobulins composed of domains of the same origin.

14. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 11, wherein the immunoglobulin Fc region is an IgG4 Fc region.

15. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 14, wherein the immunoglobulin Fc region is a human aglycosylated IgG4 Fc region.

16. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 1, wherein the conjugate is prepared by using a non-peptidyl polymer or recombination technique.

17. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 16, wherein the non-peptidyl polymer is selected the group consisting of polypropylene glycol, an ethylene glycol/propylene glycol copolymer, polyoxyethylated polyol, polyvinyl alcohol, polysaccharides, dextran, polyvinyl ethyl ether, biodegradable polymers, including polylactic acid (PLA) and polylactic-glycolic acid (PLGA); lipid polymers; chitins; hyaluronic acid; and combinations thereof.

18. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 16, wherein the non-peptidyl polymer is polyethylene glycol.

19. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 1, wherein the sugar alcohol is one or more selected from the group consisting of mannitol, sorbitol and glycerol.

20. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 19, wherein the concentration of the sugar alcohol in the liquid formulation is 2-15% (w/v).

21. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 1, wherein the buffer is one or more selected from the group consisting of citrate, acetate, histidine and phosphate buffer.

22. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 1, wherein the buffer has a pH ranging from 4.5 to 7.0.

23. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 2, wherein the isotonic agent is sodium chloride.

24. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 1, wherein the nonionic surfactant is polysorbate or poloxamer.

25. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 24, wherein the concentration of the nonionic surfactant in the liquid formulation is 0.001-0.1% (w/v).

26. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 2, wherein the amino acid is methionine.

27. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 1, wherein the stabilizer contains a buffer having a pH ranging from 4.8 to 6.0, one or more sugar alcohols selected from the group consisting of mnnitol and sorbitol, and polysorbate 20.

28. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 1, further comprising one or more preservatives selected from the group consisting of m-cresol, phenol and benzyl alcohol.

29. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 28, wherein the concentration of the preservative in the liquid formulation is 0.001-1% (w/v).

30. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 28, wherein the preservative is m-cresol.

31. The liquid formulation of a long-lasting oxyntomodulin conjugate according to claim 28, wherein the formulation is for multiple-dosage administration.

32. A liquid formulation of a long-lasting oxyntomodulin conjugate, comprising a pharmacologically effective amount of a long-lasting oxyntomodulin conjugate wherein an oxyntomodulin, which is a physiologically active peptide, is linked to an

immunoglobulin Fc region; 5-50 mM histidine; 2-15% (w/v) of mannitol; 0.01-1 mg/mL of methionine; and 0.001-0.1% (w/v) of polysorbate 20.

33. The liquid formulation of claim 32, further comprising 0.001-1% (w/v) of m-cresol.

34. A method for preparing the liquid formulation of any one of claims 1 to 27 and 32, the method comprising the steps of:

a) preparing a long-lasting oxyntomodulin conjugate; and

b) mixing the long-lasting oxyntomodulin conjugate, prepared in step a), with a stabilizer containing a buffer, a sugar alcohol and a nonionic surfactant.

35. A method for preparing the liquid formulation of any one of claims 28 to 31 and 33, the method comprising the steps of:

a) preparing a long-lasting oxyntomodulin conjugate; and

b) mixing the long-lasting oxyntomodulin conjugate, prepared in step a), with a stabilizer, which contains a buffer, a sugar alcohol and a nonionic surfactant, and a preservative.

36. The method of claim 34 or 35, wherein the stabilizer further contains one or more selected from the group consisting of isotonic agents, sugars, polyhydric alcohols and amino acids.