CLAIMS

What is claimed is:

1. A method for identifying GIP secretagogues, compounds useful for preventing or treating a condition characterized by low bone mass, or compounds useful for increasing bone mass in an individual, comprising the steps of:

(a) contacting a test compound with a host cell or with membrane of a host cell comprising a G protein-coupled receptor, wherein the G protein-coupled receptor comprises an amino acid sequence selected from the group consisting of:

(i) amino acids 1-335 of SEQ ID NO:2;

(ii) amino acids 2-335 of SEQ ID NO:2;

(iii) amino acids 2-335 of SEQ ID NO:2, with the proviso that the receptor does not comprise the amino acid sequence of SEQ ID NO:2;

(iv) the amino acid sequence of a G protein-coupled receptor encoded by a polynucleotide that is amplifiable by polymerase chain reaction (PCR) on a human DNA sample using specific primers SEQ ID NO:3 and SEQ ID NO:4;

(v) the amino acid sequence of a G protein-coupled receptor encoded by a polynucleotide hybridizing under conditions of high stringency to the complement of SEQ ID NO:1;

(vi) the amino acid sequence selected from the group consisting of:

(a') the amino acid sequence of a G protein-coupled receptor having at least about 80% identity to SEQ ID NO: 2; and

(b') the amino acid sequence of a G protein-coupled receptor comprising at least 20 contiguous amino acids of SEQ ID NO: 2;

(vii) the amino acid sequence of a constitutively active version of a G protein-coupled receptor having SEQ ID NO: 2; and

(viii) a biologically active fragment of any one of (i) to (vii); and

(b) determining the ability of the test compound to stimulate functionality of the receptor;

wherein the ability of the test compound to stimulate functionality of the receptor is indicative of the test compound being a GIP secretagogue, a compound useful for treating or preventing a condition characterized by low bone mass, or a compound useful for increasing bone mass in an individual.

2. A method for identifying GIP secretagogues, compounds useful for preventing or treating a condition characterized by low bone mass, or compounds useful for increasing bone mass in an individual, comprising the steps of the method of claim 1, and further comprising:

(c) contacting a compound which stimulates functionality of the receptor in step (b) in vitro with a vertebrate enteroendocrine cell; and

(d) determining whether the compound stimulates GIP secretion from the vertebrate enteroendocrine cell;

wherein the ability of the test compound to stimulate GIP secretion from the vertebrate enteroendocrine cell is indicative of the test compound being a GIP secretagogue, a compound useful for treating or preventing a condition characterized by low bone mass, or a compound useful for increasing bone mass in an individual.

3. A method for identifying GIP secretagogues, compounds useful for preventing or treating a condition characterized by low bone mass, or compounds useful for increasing bone mass in an individual, comprising the steps of the method of claim 1, and further comprising:

determining whether the compound increases a GIP level in a sample, said sample having been obtained from a vertebrate previously administered with a compound which stimulates functionality of a receptor in step (b);

wherein the ability of the test compound to increase a GIP level in the vertebrate is indicative of the test compound being a GIP secretagogue, a compound useful for treating or preventing a condition characterized by low bone mass, or a compound useful for increasing bone mass in an individual.

4. A method in accordance with claim 3, wherein the vertebrate is a non-human vertebrate.

5. A method for identifying compounds useful for preventing or treating a condition characterized by low bone mass or compounds useful for increasing bone mass in an individual, comprising the steps of the method of claim 1, and further comprising:

(c) administering a compound which stimulates functionality of the receptor in step (b) to a vertebrate; and

(d) determining whether the compound increases a level of bone mass in the vertebrate;

wherein the ability of the test compound to increase a level of bone mass in the vertebrate is indicative of the test compound being a compound useful for treating or preventing a condition characterized by low bone mass or a compound useful for increasing bone mass in an individual.

6. The method of claim 5, wherein the vertebrate is a non-human vertebrate.

7. The method of any one of claims 1 to 6, wherein the receptor is recombinant.

8. The method of any one of claims 1 to 7, wherein the host cell comprises an expression vector, said expression vector comprising a polynucleotide encoding the G protein-coupled receptor.

9. The method of any one of claims 1 to 8, wherein said determining is through the measurement of the level of a second messenger.

10. The method of claim 9, wherein the second messenger is selected from the group consisting of cyclic AMP (cAMP), cyclic GMP (cGMP), inositol 1,4,5-triphosphate (IP_3), diacylglycerol (DAG), MAP kinase activity, MAPK/ERK kinase kinase-1 (MEKK1) activity, and Ca^{2+}.

11. The method of claim 10, wherein a level of cAMP is increased.

12. The method of any one of claims 1 to 8, wherein said determining is through the use of a Melanophore assay, through the measurement of GTPγS binding to a membrane comprising said GPCR, or through a reporter assay.

13. A method in accordance with any one of claims 1 to 12, wherein the host cell is a mammalian host cell.

14. A method in accordance with any one of claims 1 to 12, wherein the host cell is a yeast host cell.

15. A method in accordance with any one of claims 1 to 12, wherein the host cell is a melanophore host cell.

16. The method of any one of claims 1 to 15, wherein the test compound is a small molecule.

17. The method of any one of claims 1 to 16, wherein the receptor comprises the amino acid sequence of a G protein-coupled receptor having at least about 80% identity to SEQ ID NO: 2.

18. The method of any one of claims 1 to 17, wherein the receptor comprises the amino acid sequence of SEQ ID NO: 2.

19. A method for identifying GIP secretagogues, compounds useful for preventing or treating a condition characterized by low bone mass, or compounds useful for increasing bone mass in an individual, comprising the steps of:

(a) contacting a compound in vitro with a vertebrate enteroendocrine cell, said compound having been identified by a method according to claim 1; and

(b) determining whether the compound stimulates GIP secretion from the vertebrate enteroendocrine cell;

wherein the ability of the test compound to stimulate GIP secretion from the vertebrate enteroendocrine cell is further indicative of the test compound being a GIP secretagogue, a compound useful for treating or preventing a condition characterized by low bone mass, or a compound useful for increasing bone mass in an individual.

20. A method for identifying GIP secretagogues, compounds useful for preventing or treating a condition characterized by low bone mass, or compounds useful for increasing bone mass in an individual, comprising the steps of:

determining whether a compound indentified by a method according to claim 1 increases a GIP level in a sample, said sample having been obtained from a vertebrate previously administered with a compound;

wherein the ability of the test compound to increase a GIP level in the vertebrate is further indicative of the test compound being a GIP secretagogue, a compound useful for treating or preventing a condition characterized by low bone mass, or a compound useful for increasing bone mass in an individual.

21. A method in accordance with claim 20, wherein the vertebrate is a non-human vertebrate.

22. A method for identifying compounds useful for preventing or treating a condition characterized by low bone mass or compounds useful for increasing bone mass in an individual, comprising the steps of:

(a) administering a compound to a vertebrate, said compound having been identified by a method according to claim 1; and

(b) determining whether the compound increases a level of bone mass in the vertebrate;

wherein the ability of the test compound to increase a level of bone mass in the vertebrate is further indicative of the test compound being a compound useful for treating or preventing a condition characterized by low bone mass or a compound useful for increasing bone mass in an individual.

23. The method of claim 22, wherein the vertebrate is a non-human vertebrate.

24. A method according to any one of claims 19 to 23, wherein the test compound is a small molecule.

25. A method for identifying GIP secretagogues, compounds useful for preventing or treating a condition characterized by low bone mass, or compounds useful for increasing bone mass in an individual, comprising the steps of:

(a) contacting a GPR119 agonist in vitro with a vertebrate enteroendocrine cell; and

(b) determining whether the GPR119 agonist stimulates GIP secretion from the vertebrate enteroendocrine cell;

wherein the ability of the GPR119 agonist to stimulate GIP secretion from the vertebrate enteroendocrine cell is indicative of the GPR119 agonist being a GIP secretagogue, a compound useful for treating or preventing a condition characterized by low bone mass, or a compound useful for increasing bone mass in an individual.

26. A method for identifying GIP secretagogues, compounds useful for preventing or treating a condition characterized by low bone mass, or compounds useful for increasing bone mass in an individual, comprising the steps of:

determining whether the GPR119 agonist increases a GIP level in a sample, said sample having been obtained from a vertebrate previously administered with a GPR119 agonist;

wherein the ability of the GPR119 agonist to increase a GIP level in the vertebrate is indicative of the GPR119 agonist being a GIP secretagogue, a compound useful for treating or preventing a condition characterized by low bone mass, or a compound useful for increasing bone mass in an individual.

27. A method in accordance with claim 26, wherein the vertebrate is a non-human vertebrate.

28. A method for identifying compounds useful for preventing or treating a condition characterized by low bone mass or compounds useful for increasing bone mass in an individual, comprising the steps of:

(a) administering a GPR119 agonist to a vertebrate; and

(b) determining whether the GPR119 agonist increases a level of bone mass in the vertebrate;

wherein the ability of the GPR119 agonist to increase a level of bone mass in the vertebrate is indicative of the GPR119 agonist being a compound useful for treating or preventing a condition characterized by low bone mass or a compound useful for increasing bone mass in an individual.

29. The method of claim 28, wherein the vertebrate is a non-human vertebrate.

30. A method according to any one of claims 25 to 29, wherein the GPR119 agonist is an agonist of human GPR119.

31. A method according to any one of claims 25 to 30, wherein the GPR119 agonist is a selective GPR119 agonist.

32. A method according to any one of claims 25 to 31, wherein the GPR119 agonist has an EC_{50} of less than a value selected from the group consisting of 10 μM, 1 μM and 100 nM.

33. A method according to any one of claims 25 to 32, wherein the GPR119 agonist is a small molecule.

34. A method for identifying GIP secretagogues, compounds useful for preventing or treating a condition characterized by low bone mass, or compounds useful for increasing bone mass in an individual, comprising the steps of:

(a) contacting a G protein-coupled receptor with an optionally labeled known ligand to the receptor in the presence or absence of a test compound, wherein the G protein-coupled receptor comprises an amino acid sequence selected from the group consisting of:

(i) amino acids 1-335 of SEQ ID NO:2;

(ii) amino acids 2-335 of SEQ ID NO:2;

(iii) amino acids 2-335 of SEQ ID NO:2, with the proviso that the receptor does not comprise the amino acid sequence of SEQ ID NO:2;

(iv) the amino acid sequence of a G protein-coupled receptor encoded by a polynucleotide that is amplifiable by polymerase chain reaction (PCR) on a human DNA sample using specific primers SEQ ID NO:3 and SEQ ID NO:4;

(v) the amino acid sequence of a G protein-coupled receptor encoded by a polynucleotide hybridizing under conditions of high stringency to the complement of SEQ ID NO:1;

(vi) the amino acid sequence selected from the group consisting of:

(a') the amino acid sequence of a G protein-coupled receptor having at least about 80% identitiy to SEQ ID NO: 2; and

(b') the amino acid sequence of a G protein-coupled receptor comprising at least 20 contiguous amino acids of SEQ ID NO: 2;

(vii) the amino acid sequence of a constitutively active version of a G protein-coupled receptor having SEQ ID NO: 2; and

(viii) a biologically active fragment of any one of (i) to (vii); and

(b) detecting the complex between said known ligand and said receptor; and

(c) determining whether less of said complex is formed in the presence of the test compound than in the absence of the test compound;

wherein said determination is indicative of the test compound being a GIP secretagogue, a compound useful for treating or preventing a condition characterized by low bone mass, or a compound useful for increasing bone mass in an individual.

35. A method for identifying GIP secretagogues, compounds useful for preventing or treating a condition characterized by low bone mass, or compounds useful for increasing bone mass in an individual, comprising the steps of the method of claim 34, and further comprising:

(d) contacting a compound in the presence of which less of said complex is formed in step (c) in vitro with a vertebrate enteroendocrine cell; and

(e) determining whether the compound stimulates GIP secretion from the vertebrate enteroendocrine cell;

wherein the ability of the test compound to stimulate GIP secretion from the vertebrate enteroendocrine cell is indicative of the test compound being a GIP secretagogue, a compound useful for treating or preventing a condition characterized by low bone mass, or a compound useful for increasing bone mass in an individual.

36. A method for identifying GIP secretagogues, compounds useful for preventing or treating a condition characterized by low bone mass, or compounds useful for increasing bone mass in an individual, comprising the steps of the method of claim 34, and further comprising:

determining whether the compound increases a GIP level in a sample, said sample having been obtained from a vertebrate previously administered with a compound in the presence of which less of said complex is formed in step (c);

wherein the ability of the test compound to increase a GIP level in the vertebrate is indicative of the test compound being a GIP secretagogue, a compound useful for treating or preventing a condition characterized by low bone mass, or a compound useful for increasing bone mass in an individual.

37. A method in accordance with claim 36, wherein the vertebrate is a non-human vertebrate.

38. A method for identifying compounds useful for preventing or treating a condition characterized by low bone mass or compounds useful for increasing bone mass in an individual, comprising the steps of the method of claim 34, and further comprising:

(d) administering a compound in the presence of which less of said complex is formed in step (c) to a vertebrate; and

(e) determining whether the compound increases a level of bone mass in the vertebrate;

wherein the ability of the test compound to increase a level of bone mass in the vertebrate is indicative of the test compound being a compound useful for treating or preventing a condition characterized by low bone mass or a compound useful for increasing bone mass in an individual.

39. A method in accordance with claim 38, wherein the vertebrate is a non-human vertebrate.

40. The method of any one of claims 34 to 39, wherein the receptor is recombinant.

41. The method of any one of claims 34 to 40, wherein the host cell comprises an expression vector, said expression vector comprising a polynucleotide encoding the G protein-coupled receptor.

42. The method of any one of claims 34 to 41, wherein the known ligand is a GPR119 agonist.

43. The method of claim 42, wherein the GPR119 agonist is an agonist of human GPR119.

44. The method of claim 42 or claim 43, wherein the GPR119 agonist has an EC_{50} of less than a value selected from the group consisting of 10 μM, 1 μM and 100 nM.

45. The method of any one of claims 42 to 44, wherein the GPR119 agonist is a small molecule.

46. The method of any one of claims 34 to 45, wherein the test compound is a small molecule.

47. The method of any one of claims 34 to 46, wherein the receptor comprises the amino acid sequence of a G protein-coupled receptor having at least about 80% identity to SEQ ID NO: 2.

48. The method of any one of claims 34 to 47, wherein the receptor comprises the amino acid sequence of SEQ ID NO: 2.

49. A method of screening test compounds to identify a GIP secretagogue, a compound for treating or preventing a condition characterized by low bone mass, or a compound for increasing bone mass in an individual, which is characterized by using a G protein-coupled receptor comprising an amino acid sequence selected from the group consisting of:

(a) amino acids 1-335 of SEQ ID NO: 2;

(b) amino acids 2-335 of SEQ ID NO: 2;

(c) amino acids 2-335 of SEQ ID NO: 2, wherein the GPCR does not comprise the amino acid sequence of SEQ ID NO: 2;

(d) the amino acid sequence of a G protein-coupled receptor encoded by a polynucleotide that is amplifiable by polymerase chain reaction (PCR) on a human DNA sample using specific primers SEQ ID NO: 3 and SEQ ID NO: 4;

(e) the amino acid sequence of a G protein-coupled receptor encoded by a polynucleotide hybridizing under conditions of high stringency to the complement of SEQ ID NO: 1;

(f) the amino acid sequence selected from the group consisting of:

(i) the amino acid sequence of a G protein-coupled receptor having at least about 80% identity to SEQ ID NO: 2; and

(ii) the amino acid sequence of a G protein coupled receptor comprising at least 20 contiguous amino acids of SEQ ID NO: 2;

(g) the amino acid sequence of a constitutively active version of a G protein-coupled receptor having SEQ ID NO: 2; and

(h) a biologically active fragment of any one of any one of (a) to (g).

50. The method of claim 49, wherein the receptor comprises the amino acid sequence of a G protein-coupled receptor having at least about 80% identity to SEQ ID NO: 2.

51. The method of claim 49 or claim 50, wherein the receptor comprises the amino acid sequence of SEQ ID NO: 2.

52. Use of a G protein-coupled receptor to screen test compounds as GIP secretagogues, compounds for treating or preventing a condition characterized by low bone mass, or compounds for increasing bone mass in an individual, wherein the G protein-coupled receptor comprises an amino acid sequence selected from the group consisting of:

(a) amino acids 1-335 of SEQ ID NO: 2;

(b) amino acids 2-335 of SEQ ID NO: 2;

(c) amino acids 2-335 of SEQ ID NO: 2, wherein the GPCR does not comprise the amino acid sequence of SEQ ID NO: 2;

(d) the amino acid sequence of a G protein-coupled receptor encoded by a polynucleotide that is amplifiable by polymerase chain reaction (PCR) on a human DNA sample using specific primers SEQ ID NO: 3 and SEQ ID NO: 4;

(e) the amino acid sequence of a G protein-coupled receptor encoded by a polynucleotide hybridizing under conditions of high stringency to the complement of SEQ ID NO: 1;

(f) the amino acid sequence selected from the group consisting of:

(i) the amino acid sequence of a G protein-coupled receptor having at least about 80% identity to SEQ ID NO: 2; and

(ii) the amino acid sequence of a G protein-coupled receptor comprising at least 20 contiguous amino acids of SEQ ID NO: 2;

(g) the amino acid sequence of a constitutively active version of a G protein-coupled receptor having SEQ ID NO: 2; and

(h) a biologically active fragment of any one of any one of (a) to (g).

53. Use according to claim 52, wherein the test compound is a GPR119 agonist.

54. Use according to claim 53, wherein the GPR119 agonist is an agonist of human GPR119.

55. Use according to claim 53 or claim 54, wherein the GPR119 agonist has an EC_{50} of less than a value selected from the group consisting of 10 μM, 1 μM and 100 nM.

56. Use according to any one of claims 52 to 55, wherein the test compound is a small molecule.

57. Use according to any one of claims 52 to 56, wherein the receptor comprises the amino acid sequence of a G protein-coupled receptor having at least about 80% identity to SEQ ID NO: 2.

58. Use according to any one of claims 52 to 57, wherein the receptor comprises the amino acid sequence of SEQ ID NO: 2.

59. Use according to any one of claims 52 to 58, wherein the receptor is recombinant.

60. A method for identifying GIP secretagogues, compounds useful for treating or preventing a condition characterized by low bone mass, or compounds useful for increasing bone mass in an individual, comprising the steps of:

(a) contacting a compound which stimulates functionality of a G protein-coupled receptor, wherein said G protein-coupled receptor comprises an amino acid sequence selected from the group consisting of:

(i) amino acids 1-335 of SEQ ID NO:2;

(ii) amino acids 2-335 of SEQ ID NO:2;

(iii) amino acids 2-335 of SEQ ID NO:2, with the proviso that the G protein-coupled receptor does not comprise the amino acid sequence of SEQ ID NO:2;

(iv) the amino acid sequence of a G protein-coupled receptor encoded by a polynucleotide that is amplifiable by polymerase chain reaction (PCR) on a human DNA sample using specific primers SEQ ID NO:3 and SEQ ID NO:4;

(v) the amino acid sequence of a G protein-coupled receptor encoded by a polynucleotide hybridizing under conditions of high stringency to the complement of SEQ ID NO:1;

(vi) the amino acid sequence selected from the group consisting of:

(a') the amino acid sequence of a G protein-coupled receptor having at least about 80% identity to SEQ ID NO: 2; and

(b') an amino acid sequence of a G protein-coupled receptor comprising at least 20 contiguous amino acids of SEQ ID NO: 2;

(vii) the amino acid sequence of a constitutively active version of a G protein-coupled receptor having SEQ ID NO: 2; and

(viii) a biologically active fragment of any one of (i) to (vii); and

in vitro with a vertebrate enteroendocrine cell or with a cell capable of secreting GIP, said compound having been determined by a method according to claim 1; and

(b) determining whether the compound stimulates GIP secretion from the vertebrate enteroendocrine cell or from the cell capable of secreting GIP;

wherein the ability of the test compound to stimulate GIP secretion from the vertebrate enteroendocrine cell or from the cell capable of secreting GIP is further indicative of the test compound being a GIP secretagogue, a compound useful for treating or preventing a condition characterized by low bone mass, or a compound useful for increasing bone mass in an individual.

61. A method for identifying GIP secretagogues, compounds useful for treating or preventing a condition characterized by low bone mass, or compounds useful for increasing bone mass in an individual, comprising the steps of:

(a) determining whether a compound increases a GIP level in a sample, said sample having been obtained from a vertebrate previously administered with a compound which stimulates functionality of a G protein-coupled receptor, wherein said G protein-coupled receptor comprises an amino acid sequence selected from the group consisting of:

(i) amino acids 1-335 of SEQ ID NO:2;

(ii) amino acids 2-335 of SEQ ID NO:2;

(iii) amino acids 2-335 of SEQ ID NO:2, with the proviso that the G protein-coupled receptor does not comprise the amino acid sequence of SEQ ID NO:2;

(iv) the amino acid sequence of a G protein-coupled receptor encoded by a polynucleotide that is amplifiable by polymerase chain reaction (PCR) on a human DNA sample using specific primers SEQ ID NO:3 and SEQ ID NO:4;

(v) the amino acid sequence of a G protein-coupled receptor encoded by a polynucleotide hybridizing under conditions of high stringency to the complement of SEQ ID NO:1;

(vi) the amino acid sequence selected from the group consisting of:

(a') the amino acid sequence of a G protein-coupled receptor having at least about 80% identity to SEQ ID NO: 2; and

(b') an amino acid sequence of a G protein-coupled receptor comprising at least 20 contiguous amino acids of SEQ ID NO: 2;

(vii) the amino acid sequence of a constitutively active version of a G protein-coupled receptor having SEQ ID NO: 2; and

(viii) a biologically active fragment of any one of (i) to (vii);

said compound having been determined by a method according to claim 1; and

wherein the ability of the test compound to increase a GIP level in the vertebrate is further indicative of the test compound being a GIP secretagogue, a compound useful for treating or preventing a condition characterized by low bone mass, or a compound useful for increasing bone mass in an individual.

62. A method according to claim 61, wherein the vertebrate is a non-human vertebrate.

63. A method for identifying GIP secretagogues, compounds useful for treating or preventing a condition characterized by low bone mass, or compounds useful for increasing bone mass in an individual, comprising the steps of:

(a) administering to a vertebrate a compound which stimulates functionality of a G protein-coupled receptor, wherein said G protein-coupled receptor comprises an amino acid sequence selected from the group consisting of:

(i) amino acids 1-335 of SEQ ID NO:2;

(ii) ~~amino acids 2-335 of SEQ ID NO:2;~~

(iii) amino acids 2-335 of SEQ ID NO:2, with the proviso that the G protein-coupled receptor does not comprise the amino acid sequence of SEQ ID NO:2;

(iv) the amino acid sequence of a G protein-coupled receptor encoded by a polynucleotide that is amplifiable by polymerase chain reaction (PCR) on a human DNA sample using specific primers SEQ ID NO:3 and SEQ ID NO:4;

(v) the amino acid sequence of a G protein-coupled receptor encoded by a polynucleotide hybridizing under conditions of high stringency to the complement of SEQ ID NO:1;

(vi) the amino acid sequence selected from the group consisting of:

(a') the amino acid sequence of a G protein-coupled receptor having at least about 80% identity to SEQ ID NO: 2; and

(b') an amino acid sequence of a G protein-coupled receptor comprising at least 20 contiguous amino acids of SEQ ID NO: 2; .

(vii) the amino acid sequence of a constitutively active version of a G protein-coupled receptor having SEQ ID NO: 2; and

(viii) a biologically active fragment of any one of (i) to (vii);

said compound having been determined by a method according to claim 1; and

(b) determining whether the compound increases a level of bone mass in the vertebrate;

wherein the ability of the test compound to increase a level of bone mass in the vertebrate is further indicative of the test compound being a compound useful for treating or preventing a condition characterized by low bone mass or a compound useful for increasing bone mass in an individual.

64. A method according to claim 63, wherein the vertebrate is a non-human vertebrate.

65. A method according to any one of claims 60 to 64, wherein the test compound is a small molecule.

66. A method according to any one of claims 60 to 65, wherein the receptor comprises the amino acid sequence of a G protein-coupled receptor having at least about 80% identity to SEQ ID NO: 2.

67. A method according to any one of claims 60 to 66, wherein the receptor comprises the amino acid sequence of SEQ ID NO: 2.

68. A method for identifying GIP secretagogues, compounds useful for preventing or treating a condition characterized by low bone mass, or compounds useful for increasing bone mass in an individual, comprising the steps of:

(a) contacting a compound in vitro with a vertebrate enteroendocrine cell, said compound having been identified by a method according to claim 34; and

(b) determining whether the compound stimulates GIP secretion from the vertebrate enteroendocrine cell or from the cell capable of secreting GIP;

wherein the ability of the test compound to stimulate GIP secretion from the vertebrate enteroendocrine cell is further indicative of the test compound being a GIP secretagogue, a compound useful for treating or preventing a condition characterized by low bone mass, or a compound useful for increasing bone mass in an individual.

69. A method for identifying GIP secretagogues, compounds useful for preventing or treating a condition characterized by low bone mass, or compounds useful for increasing bone mass in an individual, comprising the steps of:

determining whether a compound identified by a method according to claim 34 increases a GIP level in a sample, said sample having been obtained from a vertebrate previously administered with said compound,

wherein the ability of the test compound to increase a GIP level in the vertebrate is further indicative of the test compound being a GIP secretagogue, a compound useful for treating or preventing a condition characterized by low bone mass, or a compound useful for increasing bone mass in an individual.

70. A method according to claim 69, wherein the vertebrate is a non-human vertebrate.

71. A method for identifying GIP secretagogues, compounds useful for preventing or treating a condition characterized by low bone mass, or compounds useful for increasing bone mass in an individual, comprising the steps of:

(a) administering a compound to a vertebrate, said compound having been identified by a method according to claim 34; and

(b) determining whether the compound increases a level of bone mass in the vertebrate;

wherein the ability of the test compound to increase a level of bone mass in the vertebrate is further indicative of the test compound being a GIP secretagogue, a compound useful for treating or preventing a condition characterized by low bone mass, or a compound useful for increasing bone mass in an individual.

72. A method according to claim 71, wherein the vertebrate is a non-human vertebrate.

73. A method according to any one of claims 68 to 72, wherein the test compound is a small molecule.

CLAIMS

1. A method of preparing a pharmaceutical composition comprising a G protein-coupled receptor 119 (GPR119) agonist having the effect of a glucose-dependent insulinotropic peptide (GIP) secretagogue, the method comprising:

(a) contacting, in vitro, the GPR119 agonist with a vertebrate enteroendocrine cell or with a cell capable of secreting GIP,

(b) determining whether the GPR119 agonist stimulates GIP secretion from the vertebrate enteroendocrine cell or from the cell capable of secreting GIP; wherein the ability of the GPR119 agonist to stimulate GIP secretion from the vertebrate enteroendocrine cell or from the cell capable of secreting GIP is indicative of the agonist being a GIP secretagogue; and

(c) formulating the GPR119 agonist having the effect of a GIP secretagogue with a pharmaceutically acceptable carrier.

2. The method of claim 1, wherein the GPR119 agonist is an agonist of human GPR119.

3. The method of claim 1, wherein the GPR119 agonist is orally active.

4. The method of claim 1, wherein the GPR119 agonist is a selective GPR119 agonist.

5. The method of claim 4, wherein the GPR119 agonist has a selectivity for GPR119 over corticotrophin releasing factor-1 (CRF-1) receptor.

6. The method of claim 1, wherein the enteroendocrine cell is a K cell.

7. The method of claim 1, wherein the enteroendocrine cell is a cell derived from a K-cell-rich region of the small intestine.

8. The method of claim 1, wherein the enteroendocrine cell is a cell derived from duodenum tissue.

9. The method of claim 1, wherein the enteroendocrine cell is a cell derived from jejunum tissue.

10. The method of claim 1, wherein the vertebrate enteroendocrine cell is a mammalian enteroendocrine cell.

11. The method of claim 1, wherein the enteroendocrine cell is from an enteroendocrine cell line.

12. The method of claim 1, wherein the cell capable of secreting GIP is a recombinant cell engineered to be capable of secreting GIP.

13. The method of claim 1, wherein the cell capable of secreting GIP is a pancreatic cell.

14. The method of claim 1, wherein the GPR119 agonist has an EC50 of less than 10 μM for elevating cAMP in GPR119-transfected cells.

15. The method of claim 1, wherein the GPR119 agonist has an EC50 of less than 1 μM for elevating cAMP in GPR119-transfected cells.

16. The method of claim 1, wherein the GPR119 agonist has an EC50 of less than 100 nM for elevating cAMP in GPR119-transfected cells.

17. The method of claim 1, wherein the GPR119 agonist is orally active and has an EC50 of less than 100 nM for elevating cAMP in GPR119-transfected cells.

18. The method of claim 1, wherein the pharmaceutical composition is in a dosage form.

19. A method of preparing a pharmaceutical composition comprising a GPR119 agonist having the effect of a GIP secretagogue, the GPR119 agonist having been contacted *in vitro* with a vertebrate enteroendocrine cell or with a cell capable of secreting GIP and determined to stimulate GIP secretion from the vertebrate enteroendocrine cell or from the cell capable of secreting GIP, wherein the ability of the GPR119 agonist to stimulate GIP secretion from the vertebrate enteroendocrine cell or from the cell capable of secreting GIP is indicative of the agonist being a GIP secretagogue, the method comprising formulating the GPR119 agonist having the effect of a GIP secretagogue with a pharmaceutically acceptable carrier.

20. The method of claim 19, wherein the GPR119 agonist is an agonist of human GPR119.

21. The method of claim 19, wherein the GPR119 agonist is orally active.

22. The method of claim 19, wherein the GPR119 agonist is a selective GPR119 agonist.

23. The method of claim 22, wherein the GPR119 agonist has a selectivity for GPR119 over CRF-1 receptor.

24. The method of claim 19, wherein the enteroendocrine cell is a K cell.

25. The method of claim 19, wherein the enteroendocrine cell is a cell derived from a K-cell-rich region of the small intestine.

26. The method of claim 19, wherein the enteroendocrine cell is a cell derived from duodenum tissue.

27. The method of claim 19, wherein the enteroendocrine cell is a cell derived from jejunum tissue.

28. The method of claim 19, wherein the vertebrate enteroendocrine cell is from a mammalian enteroendocrine cell.

29. The method of claim 19, wherein the enteroendocrine cell is from an enteroendocrine cell line.

30. The method of claim 19, wherein the cell capable of secreting GIP is a recombinant cell engineered to be capable of secreting GIP.

31. The method of claim 19, wherein the cell capable of secreting GIP is a pancreatic cell.

32. The method of claim 19, wherein the GPR119 agonist has an EC50 of less than 10 μM for elevating cAMP in GPR119-transfected cells.

33. The method of claim 19, wherein the GPR119 agonist has an EC50 of less than 1 μM for elevating cAMP in GPR119-transfected cells.

34. The method of claim 19, wherein the GPR119 agonist has an EC50 of less than 100 nM for elevating cAMP in GPR119-transfected cells.

35. The method of claim 19, wherein the GPR119 agonist is orally active and has an EC50 of less than 100 nM for elevating cAMP in GPR119-transfected cells.

36. The method of claim 19, wherein the pharmaceutical composition is in a dosage form.