Claims

1. A peptidic compound having the formula (I):

R^1 - Z - R^2 (I)

wherein Z is a peptide moiety having the formula (II)

$X0_m$-X1-X2-X3-Gly-Thr-Phe-Thr-Ser-Asp-Leu-Ser-Lys-Gln-X14-X15-X16-X17-X18-X19-X20-X21-Phe-Ile-Glu-Trp-Leu-Lys-X28-X29-Gly-Pro-Ser-Ser-Gly-X35-Pro-Pro-Pro-X39-$X40_n$ (II)

X0 is absent or represents an amino acid residue selected from Gly,
X1 represents an amino acid residue selected from His, D-His, and Des-amino-His,
X2 represents an amino acid residue selected from Gly, Ser or functionalized-Ser, e.g. Ser (OCH_3), D-Ser or functionalized D-Ser, e.g. D-Ser (OCH_3) Aib, Ala, or D-Ala, wherein Ser may be functionalized in that the H of the OH side chain group is substituted by C_{1-4} alkyl, e.g. methyl,
X3 represents an amino acid residue selected from Glu, Gln, His and α-amino-functionalized Gln, e.g. Gln ($NHCH_3$), wherein Gln may be functionalized in that an H of the α-NH_2 group is substituted by C_{1-4} alkyl, e.g. methyl,
X14 represents an amino acid residue selected from Met, Phe, Aib, Nle, or Cycloalkyl-Ala, e.g. Cyclohexyl (Chx)-Ala, Cyclopentyl (Cp)-Ala or Cyclobutyl (Cb)-Ala, wherein Ala may be functionalized in that one of the CH_3 side-chain group is substituted by C_{3-8} cyclo alkyl,
X15 represents an amino acid residue selected from Glu or Asp,
X16 represents an amino acid residue selected from Ser, Glu and Lys,
X17 represents an amino acid residue selected from Arg, Glu, Gln, Aib and Lys,
X18 represents an amino acid residue selected from Arg, Ala and Lys,

X19 represents an amino acid residue selected from Ala and Val,
X20 represents an amino acid residue selected from Gln, Arg, Lys, His and Aib,
X21 represents an amino acid residue selected from Asp, Leu and Glu,
X28 represents an amino acid residue selected from Asn, Arg, Lys, Aib, Ser, Glu and Ala,
X29 represents an amino acid residue selected from Gly, Ala, D-Ala or Thr, and
X35 represents an amino acid residue selected from Ala, Glu, Arg and Lys,
X39 represents an amino acid residue selected from Ser,
an amino acid residue having a side chain with an $-NH_2$ group, particularly Lys, Orn, Dab or Dap, wherein the $-NH_2$ side chain group is optionally functionalized and
an amino acid residue having a side chain with an -SH group, particularly Cys, wherein the -SH side chain group is optionally functionalized, and
X40 represents an amino acid residue selected from an amino acid residue having a side chain with an $-NH_2$ group, particularly Lys, Orn, Dab or Dap, wherein the $-NH_2$ side chain group is optionally functionalized and
an amino acid residue having a side chain with an -SH group, particularly Cys, wherein the -SH side chain group is optionally functionalized,
R^1 represents the N-terminal group of the peptidic compound and is selected from NH_2 or mono- or bisfunctionalized NH_2,
R^2 represents the C-terminal group of the peptidic compound and is selected from
(i) OH or functionalized OH and
(ii) NH_2 or mono- or bisfunctionalized NH_2,

m and n are in each case independently selected from 0 or 1,
or a salt or solvate thereof
with the proviso that Exendin-4 (SEQ ID NO: 1) is not encompassed..

2. The compound of claim 1,

wherein

R^1 is NH_2,

R^2 is NH_2 or

R^1 and R^2 are NH_2.

3. The compound of claim 1 or 2,

wherein

X0 is absent.

4. The compound of any one of claims 1-3,

wherein

X40 is absent, particularly wherein X40 is absent and X39 represents Lys or functionalized Lys.

5. The compound of any one of claims 1-3,

wherein

X40 is present, particularly wherein X40 is present and X39 represents Ser, or X40 is present and represents Lys or functionalized Lys.

6. The compound of any one of claims 1-5,

wherein

the functionalized Lys is functionalized at its ε-amino group with

$-C(O)-R^5$, $S(O)_2-R^5$ or $-R^5$

wherein R^5 is

(i) a moiety comprising up to 100 carbon atoms and optionally heteroatoms selected from N, O, S and/or P, or

(ii) an organic polymer.

7. The compound of claim 6, wherein

$-C(O)-R^5$ is (S)-4-carboxy-4-hexadecanoyl-amino-butyryl, (S)-4-carboxy-4-octadecanoylamino-butyryl, hexadecanoyl or octadecanoyl.

8. The compound of any one of claims 1-7, wherein
X14 represents Met or Nle, preferably Met.

9. The compound of any one of claims 1-8, wherein
X3 represents Gln,
X16 represents Ser,
X17 represents Arg,
X18 represents Arg,
X19 represents Ala,
X20 represents Gln and
X21 represents Asp or Glu.

10. The compound of any one of claims 1-9,
wherein
X2 represents Ser, D-Ser or Aib, preferably D-Ser or Aib and more preferably D-Ser.

11. The compound of any one of claims 1-10,
wherein
(i) X2 represents D-Ser or Aib and X40 is functionalized Lys,
(ii) X2 represents Ser, D-Ser or Aib, X39 is functionalized Lys and X40 is absent,
(iii) X2 represents Ser, D-Ser or Aib and X40 is absent, or
(iv) X2 represents Ser, D-Ser or Aib and X40 is functionalized Cys.

12. The compound of any one of claims 1-11,
wherein
X15 represents Glu.

13. The compound of any one of claims 1-12,
wherein
X16 represents Lys or Ser.

14. The compound of any one of claims 1-13, wherein

X19 represents Ala.

15. The compound of any one of claims 1-14, wherein

X20 represents Lys or Gln.

16. The compound of any one of claims 1-15,wherein

X21 represents Leu or Glu.

17. The compound of any one of claims 1-16, wherein

X15 represents Glu,

X16 represents Lys or Ser,

X19 represents Ala,

X20 represents Lys or Gln and

X21 represents Leu or Glu.

18. The compound of any one of claims 1-17, wherein

1, 2, 3, 4, 5 or 6, particularly 5 or 6 amino acid residues selected from X15, X16, X17, X18, X19, X20 and X21 are amino acid residues which differ from the corresponding amino acid residues in Exendin-4 (SEQ ID NO: 1).

19. The compound of any one of claims 1-18, wherein

(a) X2 = D-Ser;

X3 = Gln;

X14 = Met;

X15 = Asp or Glu;

X16 = Ser;

X17 = Arg;

X18 = Arg or Ala;
X19 = Ala;
X20 = Gln or Arg; particularly Gln;
X21 = Asp or Leu;
X28 = Asn, Ala, Ser, Lys, Aib or Arg;
X29 = Gly or D-Ala;
X35 = Ala; and
(i) X39 = Ser and
X40 = Lys, Orn, Dab or Dap which are functionalized at the amino side chain group, particularly by (S)-4-carboxy-4-hexadecanoylamino-butyryl, (S)-4-carboxy-4-octadecanoylamino-butyryl, octadecanoyl, or hexadecanoyl, or
(ii) X39 = Lys which is functionalized at the amino side chain group, particularly by (S)-4-Carboxy-4-hexadecanoylamino-butyryl, (S)-4-carboxy-4-octadecanoylamino-butyryl, octadecanoyl, or hexadecanoyl, and
X40 = absent,

(b) X2 = D-Ser or Aib;
X3 = Gln;
X14 = Met;
X15 = Asp or Glu;
X16 = Ser, Glu or Lys;
X17 = Arg;
X18 = Arg;
X19 = Ala;
X20 = Gln or Lys;
X21 = Asp;
X28 = Asn, Ser, Lys or Aib;
X29 = Gly, Thr, Ala or D-Ala;
X35 = Ala;
X39 = Ser and

(i) X40 = Lys which is functionalized at the amino side chain group, particularly by (S)-4-carboxy-4-hexadecanoylamino-butyryl, (S)-4-carboxy-4-octadecanoylamino-butyryl, octadecanoyl, or hexadecanoyl, or
(ii) X39 = Lys which is functionalized at the amino side chain group, particularly by (S)-4-carboxy-4-hexadecanoylamino-butyryl, (S)-4-carboxy-4-octadecanoylamino-butyryl, octadecanoyl, or hexadecanoyl, and
X40 is absent,

(c) X2 = D-Ser;
X3 = Gln;
X14 = Nle, Chx-Ala, Cp-Ala or Cb-Ala;
X15 = Asp or Glu;
X16 = Ser;
X17 = Arg;
X18 = Arg or Ala;
X19 = Ala;
X20 = Gln or Lys;
X21 = Asp, Glu or Leu;
X28 =Ala or Ser;
X29 = Gly;
X35 = Ala and
(i) X39 = Ser and
X40 = Lys, Orn, Dab or Dap which are functionalized at the amino side chain group, particularly by (S)-4-Carboxy-4-hexadecanoylamino-butyryl-, (S)-4-Carboxy-4-octadecanoylamino-butyryl, octadecanoyl or hexadecanoyl,
(ii) X39 = Lys which is functionalized at the amino side chain group, particularly by (S)-4-Carboxy-4-hexadecanoylamino-butyryl, (S)-4-Carboxy-4-octadecanoylamino-butyryl, octadecanoyl or hexadecanoyl and
X40 = absent,

(d) X2 = Ser or D-Ser;
X3 = Gln;

X14 = Met;
X15 = Asp or Glu;
X16 = Ser;
X17 = Arg;
X18 = Arg;
X19 = Ala;
X20 = Gln;
X21 = Asp;
X28 = Asn;
X29 = Gly;
X35 = Ala; and
(i) X39 = Ser and
X40 = Lys which is functionalized at the amino side chain group, particularly by (S)-4-carboxy-4-(hexadecanoylamino)-butyryl or (S)-4-carboxy-4-octadecanoylamino-butyryl, octadecanoyl, or hexadecanoyl, or
(ii) X39 = Lys which is functionalized at the amino side chain group, particularly by (S)-4-carboxy-4-hexadecanoylamino-butyryl, (S)-4-carboxy-4-octadecanoylamino-butyryl, octadecanoyl, or hexadecanoyl, and
X40 is absent,

(e) X2 = Ser or D-Ser;
X3 = Gln;
X14 = Met or Nle;
X15 = Asp or Glu;
X16 = Ser, Glu or Lys;
X17 = Arg or Glu;
X18 = Arg or Ala;
X19 = Ala;
X20 = Gln, Arg or Lys;
X21 = Asp, Glu or Leu;
X28 = Asn;
X29 = Gly;

X35 = Ala;
X39 = Ser and
X40 = absent, or

(f) X2 = Aib or D-Ser;
X3 = Gln;
X14 = Met or Nle;
X15 = Asp or Glu;
X16 = Ser, Glu or Lys;
X17 = Arg, Lys or Gln;
X18 = Arg or Ala;
X19 = Ala;
X20 = Gln or Lys;
X21 = Asp;
X28 = Asn, Ala, Aib, Lys, Arg or Ser;
X29 = Gly, Ala, D-Ala or Thr;
X35 = Ala;
X39 = Ser and
X40 = absent or Lys.

20. The compound of any one of claims 1-19, selected from the compounds of SEQ ID NO. 7-238, or a salt or solvate thereof.

21. The compound of any one of claims 1-20 for use in medicine, particularly in *human medicine*.

22. The compound for use according to claim 21 which is present as an active agent in a pharmaceutical composition together with at least one pharmaceutically acceptable carrier.

23. The compound for use according to claim 21 or 22 together with at least one additional therapeutically active agent, wherein the additional therapeutically

active agent particularly is a GLP-1 compound and/or an insulinic compound and/or a gastrointestinal peptide.

24. The compound for use according to any one of claims 21-23 for the treatment or prevention of hyperglycemia, type 2 diabetes, impaired glucose tolerance, type 1 diabetes, obesity, metabolic syndrome and neurodegenerative disorders, particularly for delaying or preventing disease progression in type 2 diabetes, treating metabolic syndrome, treating obesity or preventing overweight, for decreasing food intake, increase energy expenditure, reducing body weight, delaying the progression from impaired glucose tolerance (IGT) to type 2 diabetes; delaying the progression from type 2 diabetes to insulin-requiring diabetes;
regulating appetite; inducing satiety; preventing weight regain after successful weight loss; treating a disease or state related to overweight or obesity; treating bulimia; treating binge eating;
treating atherosclerosis, hypertension, type 2 diabetes, IGT, dyslipidemia, coronary heart disease, hepatic steatosis, treatment of beta-blocker poisoning, use for inhibition of the motility of the gastro-intestinal tract, useful in connection with investigations of the gastro-intestinal tract using techniques such as X-ray, CT- and NMR-scanning, or
. for the treatment or prevention of hypoglycemia, insulin induced hypoglycemia, reactive hypoglycemia, diabetic hypoglycemia, non-diabetic hypoglycemia, fasting,
hypoglycemia, drug-induced hypoglycemia, gastric by-pass induced hypoglycemia,
hypoglycemia in pregnancy, alcohol induced hypoglycemia, insulinomaand Von Girkes disease.

Claims

1. A peptidic compound having the formula (I):

R^1 - Z - R^2 (I)

wherein Z is a peptide moiety having the formula (II)

$X0_m$-X1-X2-X3-Gly-Thr-Phe-Thr-Ser-Asp-Leu-Ser-Lys-Gln-X14-X15-X16-X17-X18-X19-X20-X21 -Phe-Ile-Glu-Trp-Leu-Lys-X28-X29-Gly-Pro-Ser-Ser- Gly-X35-Pro-Pro-Pro-X39-X40n (II)

X0 is absent or is Gly,
X1 is an amino acid residue selected from His, D-His, and Des-amino-His,
X2 is an amino acid residue selected from Gly, Ser, functionalized-Ser, D-Ser or functionalized D-Ser, Aib, Ala, or D-Ala, wherein functionalized Ser or functionalized D-Ser is functionalized in that the H of the OH side chain group is substituted by C_{1-4} alkyl,
X3 is an amino acid residue selected from Gln, His, and α-amino-functionalized Gln, wherein α-amino-functionalized Gln is functionalized in that an H of the α-NH2 group is substituted by C_{1-4} alkyl,
X14 is an amino acid residue selected from Met, Phe, Aib, Nle, or functionalized Ala, wherein Ala is functionalized in that one hydrogen of the CH_3 side-chain group is substituted by C_{3-8} cycloalkyl,
X15 is an amino acid residue selected from Glu or Asp,
X16 is an amino acid residue selected from Ser, Glu, or Lys,
X17 is an amino acid residue selected from Arg, Glu, Gln, Aib, or Lys,
X18 is an amino acid residue selected from Arg, Ala, or Lys,
X19 is an amino acid residue selected from Ala or Val,
X20 is an amino acid residue selected from Gln, Arg, Lys, His, or Aib,
X21 is an amino acid residue selected from Asp, Leu, or Glu,
X28 is an amino acid residue selected from Asn, Arg, Lys, Aib, Ser, Glu, or Ala,
X29 is an amino acid residue selected from Gly, Ala, D-Ala, or Thr,
X35 is an amino acid residue selected from Ala, Glu, Arg, or Lys,
X39 is an amino acid residue selected from Ser, or

an amino acid residue having a side chain with an —NH_2 group, wherein the —NH_2 side chain group is optionally modified or functionalized or
an amino acid residue having a side chain with an —SH group, wherein the —SH side chain group is optionally modified or functionalized, and
X40 is absent or is an amino acid residue selected from
an amino acid residue having a side chain with an —NH2 group, wherein the —NH2 side chain group is optionally modified or functionalized or
an amino acid residue having a side chain with an —SH group, wherein the —SH side chain group is optionally modified or functionalized,
R1 is the N-terminal group of the peptidic compound and is selected from NH_2 or mono- or bisfunctionalized NH_2,
wherein the mono- or bisfunctionalized NH_2 is functionalized at one or more H atom with
(i) a moiety comprising up to 30 carbon atoms and optionally heteroatoms selected from F, Cl, Br, I, N, O, S, and/or P, or
(ii) an organic polymer, wherein the organic polymer is optionally (CH_2—CH_2—O)q, wherein q is 1-2000
R2 is the C-terminal group of the peptidic compound and is selected from
(i) OH or functionalized OH, or
(ii) NH_2 or mono- or bisfunctionalized NH_2,
wherein the functionalized OH or mono- or bisfunctionalized NH_2 is functionalized at one or more H atom with
(i) a moiety comprising up to 40 carbon atoms and optionally heteroatoms selected from F, Cl, Br, I, N, O, S, and/or P, or
(ii) an organic polymer, wherein the organic polymer is optionally of the formula R3-R4,
wherein R3 is an organic polymer optionally comprising a (CH_2—CH_2—O)q, wherein q is 1-2000, and wherein R4 is selected from H, NH_2, NH(C_{1-4} alkyl), N(C_1-C_4 alkyl), N(C_{1-4} alkyl)2, OH, O(C_{1-4} alkyl), or SH, S(C_{1-4} alkyl),
wherein m and n are in each case independently selected from 0 or 1,
wherein when X39 or X40 or both comprise an amino acid residue having a side chain with a modified or functionalized —NH_2 group, the —NH_2 side chain group is modified or functionalized at its ε-amino group with
—C(O)—R5, —S(O)2—R5 or —R5, wherein R5 is
(i) a moiety comprising up to 100 carbon atoms and optionally heteroatoms selected from N, O, S, and/or P, or

(ii) an organic polymer, wherein the organic polymer optionally comprises polymers comprising a (CH_2—CH_2—O)q R6 group, wherein q is 1-2000 and R6 is H or C_{1-4} alkyl, or

wherein when X39 or X40 or both comprise an amino acid residue having a side chain with a modified or functionalized —SH group, the —SH side chain group is modified or functionalized at its H atom with

—Y—R7, wherein Y is a bond or a thiol linker group, and R7 is

(i) a moiety comprising up to 100 carbon atoms and optionally heteroatoms selected from N, O, S, and/or P, or

(ii) an organic polymer, wherein the organic polymer optionally comprises polymers comprising a (CH_2—CH_2—O)q R6 group, wherein q is 1-2000 and R6 is H or C_{1-4} alkyl, or a salt or solvate thereof.

2. The compound, or salt or solvate thereof, of claim 1, wherein said functionalized Ser is Ser(OCH_3).

3. The compound, or salt or solvate thereof, of claim 1, wherein said functionalized D-Ser is D-Ser(OCH_3).

4. The compound, or salt or solvate thereof, of claim 1, wherein said C_{1-4} alkyl is methyl.

5. The compound, or salt or solvate thereof, of claim 1, wherein said α-amino-functionalized Gln is Gln ($NHCH_3$).

6. The compound, or salt or solvate thereof, of claim 1, wherein said Cycloalkyl-Ala is Cyclohexyl (Chx)-Ala.

7. The compound, or salt or solvate thereof, of claim 1, wherein said amino acid residue having a side chain with an NH_2 group of X39 or X40 is Lys, Orn, Dab or Dap.

8. The compound, or salt or solvate thereof, of claim 1, wherein said amino acid residue having a side chain with an —SH group of X39 or X40 is Cys.

9. The compound, or salt or solvate thereof, of claim 1, wherein

R1 is NH_2,
R2 is NH_2, or
R1 and R2 are NH_2.

10. The compound, or salt or solvate thereof, of claim 1, wherein

m is 0 and X0 is absent.

11. The compound, or salt or solvate thereof, of claim 1, wherein

n is 0 and X40 is absent.

12. The compound, or salt or solvate thereof, of claim 11, wherein X39 is Lys or functionalized Lys.

13. The compound, or salt or solvate thereof, of claim 1, wherein

n is 1 and X40 is present.

14. The compound, or salt or solvate thereof, of claim 13, wherein X39 is Ser.

15. The compound, or salt or solvate thereof, of claim 13, wherein X40 is Lys or functionalized Lys.

16. The compound, or salt or solvate thereof, of claim 1, wherein X39 or X40 or both are functionalized Lys, and wherein

the functionalized Lys is functionalized at its ε-amino group with

—C(O)—R5, —S(O)2—R5, or —R5

wherein —R5 is
(i) a moiety comprising up to 100 carbon atoms and optionally heteroatoms selected from N, O, S and/or P, or

(ii) an organic polymer.

17. The compound, or salt or solvate thereof, of claim 16, wherein —C(O)R5 is (S)-4-carboxy-4-hexadecanoyl-amino-butyryl, (S)-4-carboxy-4-octadecanoylamino-butyryl, hexadecanoyl or octadecanoyl.

18. The compound, or salt or solvate thereof, of claim 1, wherein X14 is Met or Nle.

19. The compound, or salt or solvate thereof, of claim 1, wherein

X3 is Gln,
X16 is Ser,
X17 is Arg,
X18 is Arg,
X19 is Ala,
X20 is Gln and
X21 is Asp or Glu.

20. The compound, or salt or solvate thereof, of claim 1, wherein

X2 is Ser, D-Ser or Aib.

21. The compound, or salt or solvate thereof, of claim 1, wherein

(i) X2 is D-Ser or Aib and X40 is present and is functionalized Lys,
(ii) X2 is Ser, D-Ser or Aib, X39 is functionalized Lys and X40 is absent,
(iii) X2 is Ser, D-Ser or Aib and X40 is absent, or
(iv) X2 is Ser, D-Ser or Aib and X40 is present and is functionalized Cys.

22. The compound, or salt or solvate thereof, of claim 1, wherein

X15 is Glu.

23. The compound, or salt or solvate thereof, of claim 1, wherein

X16 is Lys or Ser.

24. The compound, or salt or solvate thereof, of claim 1, wherein

X19 is Ala.

25. The compound, or salt or solvate thereof, of claim 1, wherein

X20 is Lys or Gln.

26. The compound, or salt or solvate thereof, of claim 1, wherein

X21 is Leu or Glu.

27. The compound, or salt or solvate thereof, of claim 1, wherein

X15 is Glu,
X16 is Lys or Ser,
X19 is Ala,
X20 is Lys or Gln and
X21 is Leu or Glu.

28. The compound, or salt or solvate thereof, of claim 1, wherein

1, 2, 3, 4, 5 or 6 amino acid residues selected from X15, X16, X17, X18, X19, X20, or X21 are amino acid residues which differ from the corresponding amino acid residues in Exendin-4 (SEQ ID NO: 1); wherein X15 is Glu or Asp, X16 is Ser, Glu, or Lys, X17 is Arg, Glu, Gln, Aib, or Lys, X18 is Arg, Ala, or Lys, X19 is Ala or Val, X20 is Gln, Arg, Lys, His, or Aib, and X21 is Asp, Leu, or Glu.

29. The compound, or salt or solvate thereof, claim 1, wherein

(a) X2 is D-Ser;
X3 is Gln;
X14 is Met;
X15 is Asp or Glu;
X16 is Ser;
X17 is Arg;
X18 is Arg or Ala;
X19 is Ala;
X20 is Gln or Arg;
X21 is Asp or Leu;
X28 is Asn, Ala, Ser, Lys, Aib, or Arg;
X29 is Gly or D-Ala;
X35 is Ala; and
(i) X39 is Ser and
X40 is present and is Lys, Orn, Dab, or Dap which are functionalized at the amino side chain group,
or
(ii) X39 is Lys which is functionalized at the amino side chain group, and
n is 0 and X40 is absent,

(b) X2 is D-Ser or Aib;
X3 is Gln;
X14 is Met;
X15 is Asp or Glu;
X16 is Ser, Glu, or Lys;
X17 is Arg;
X18 is Arg;
X19 is Ala;
X20 is Gln or Lys;
X21 is Asp;
X28 is Asn, Ser, Lys, or Aib;
X29 is Gly, Thr, Ala, or D-Ala;
X35 is Ala;
X39 is Ser and

(i) X40 is present and is Lys which is functionalized at the amino side chain group, or
(ii) X39 is Lys which is functionalized at the amino side chain group, and
n is 0 and X40 is absent,

(c) X2 is D-Ser;
X3 is Gln;
X14 is Nle, Chx-Ala, Cp-Ala, or Cb-Ala;
X15 is Asp or Glu;
X16 is Ser;
X17 is Arg;
X18 is Arg or Ala;
X19 is Ala;
X20 is Gln or Lys;
X21 is Asp, Glu, or Leu;
X28 is Ala or Ser;
X29 is Gly;
X35 is Ala and
(i) X39 is Ser and
X40 is present and is Lys, Orn, Dab, or Dap which are functionalized at the amino side chain group, or
(ii) X39 is Lys which is functionalized at the amino side chain group, and
n is 0 and X40 is absent,

(d) X2 is Ser or D-Ser;
X3 is Gln;
X14 is Met;
X15 is Asp or Glu;
X16 is Ser;
X17 is Arg;
X18 is Arg;
X19 is Ala;
X20 is Gln;
X21 is Asp;
X28 is Asn;

X29 is Gly;
X35 is Ala; and
(i) X39 is Ser and
X40 is present and is Lys which is functionalized at the amino side chain group, or
(ii) X39 is Lys which is functionalized at the amino side chain group, and
n is 0 and X40 is absent,

(e) X2 is Ser or D-Ser;
X3 is Gln;
X14 is Met or Nle;
X15 is Asp or Glu;
X16 is Ser, Glu, or Lys;
X17 is Arg or Glu;
X18 is Arg or Ala;
X19 is Ala;
X20 is Gln, Arg, or Lys;
X21 is Asp, Glu, or Leu;
X28 is Asn;
X29 is Gly;
X35 is Ala;
X39 is Ser and
n is 0 and X40 is absent, or

(f) X2 is Aib or D-Ser;
X3 is Gln;
X14 is Met or Nle;
X15 is Asp or Glu;
X16 is Ser, Glu, or Lys;
X17 is Arg, Lys, or Gln;
X18 is Arg or Ala;
X19 is Ala;
X20 is Gln or Lys;
X21 is Asp;
X28 is Asn, Ala, Aib, Lys, Arg, or Ser;

X29 is Gly, Ala, D-Ala, or Thr;
X35 is Ala;
X39 is Ser and
X40 is Lys or n is 0 and X40 is absent.

30. The compound, or salt or solvate thereof, of claim 29, wherein X40 or X39 is functionalized at the amino side chain group by (S)-4-carboxy-4-hexadecanoylamino-butyryl, (S)-4-carboxy-4-octadecanoylamino-butyryl, octadecanoyl, or hexadecanoyl.

31. The compound of claim 1, selected from the compounds of SEQ ID NOs: 7-238, or a salt or solvate thereof.

32. A pharmaceutical composition comprising the compound, or salt or solvate thereof, of claim 1, together with at least one pharmaceutically acceptable carrier.

33. The pharmaceutical composition of claim 32, further comprising at least one additional therapeutically active agent.

34. The compound, or salt or solvate thereof, of claim 29, wherein X20 of (a) is Gln.

35. The composition, or salt or solvate thereof, of claim 33, wherein the additional therapeutically active agent is a GLP-1 compound, an insulinic compound, a gastrointestinal peptide or combinations thereof.

36. A compound, salt, or hydrate of claim 1.

37. A compound or salt of claim 1.

38. The compound, or salt or solvate thereof, of claim 1, wherein the compound is a dual GLP-1 and glucagon receptor agonist.

39. The compound, or salt or solvate thereof, of claim 1, wherein —C(O)—R5 is selected from the group consisting of:
(S)-4-carboxy-4-hexadecanoylamino-butyryl;

(S)-4-carboxy-4-octadecanoylamino-butyryl;
octadecanoyl;
hexadecanoyl;
(S)-4-carboxy-4-{3-[(R)-2,5,7,8-tetramethyl-2-((4R,8R)-4,8,12-trimethyl-tridecyl)-chroman-6-yloxycarbonyl]-propionylamino}-butyryl;
(S)-4-carboxy-4-(15-carboxy-pentadecanoylamino)-butyryl;
(S)-4-carboxy-4-((S)-4-carboxy-4-hexadecanoylamino-butyrylamino)-butyryl;
(S)-4-carboxy-4-octadecanoylamino-butyryl;
3-(3-hexadecanoylamino-propionylamino)-propionyl;
3-hexadecanoylamino-propionyl;
6-[(4,4-diphenyl-cyclohexyloxy)-hydroxy-phosphoryloxy]-hexanoyl;
(S)-4-carboxy-4-[(R)-4-((3R,5S,7R,8R,9R,10S,12S,13R,14R,17R)-3,7,12-trihydroxy-8,10,13-trimethyl-hexadecahydro-cyclopenta[a]phenanthren-17-yl)-pentanoylamino)-butyryl;
(S)-4-carboxy-4-[(R)-4-(3R,5R,8R,9S,10S,13R,14S,17R)-3-hydroxy-10,13-dimethyl-hexadecahydro-cyclopenta[a]phenanthren-17-yl)-pentanoylamino]-butyryl;
(S)-4-carboxy-4-(9S,10R)-9,10,16-trihydroxy-hexadecanoylamino)-butyryl;
(S)-4-carboxy-4-{3-[(R)-2,5,7,8-tetramethyl-2-((4R,8R)-4,8,12-trimethyl-tridecyl)-chroman-6-yloxycarbonyl]-propionylamino}-butyryl;
(S)-4-carboxy-4-(9Z,12Z)-octadeca-9,12-dienoylamino)-butyryl;
(S)-4-carboxy-4-(4-dodecyloxy-benzoylamino)-butyryl;
(S)-4-carboxy-4-henicosanoylamino-butyryl;
(S)-4-carboxy-4-docosanoylamino-butyryl;
(S)-4-carboxy-4-((Z)-nonadec-10-enoylamino)-butyryl;
(S)-4-carboxy-4-(4-decyloxy-benzoylamino)-butyryl;
(S)-4-carboxy-4-[(4′-octyloxy-biphenyl-4-carbonyl)-amino]-butyryl;
(S)-4-carboxy-4-(12-phenyl-dodecanoylamino)-butyryl;
acetyl;
4-hexadecanoylamino-butyryl;
(S)-4-carboxy-4-isobutyrylamino-butyryl;
(S)-4-carboxy-4-tetradecanoylamino-butyryl;
tetradecanoyl;
11-carboxy-undecanoyl;
11-benzyloxycarbonyl-undecanoyl;

(S)-4-carboxy-4-((S)-4-carboxy-4-tetradecanoylamino-butyrylamino)-butyryl;
(S)-4-carboxy-4-((S)-4-carboxy-4-octadecanoylamino-butyrylamino)-butyryl;
3-aminopropionyl;
3-(3-amino-propionylamino)-propionyl;
3-[3-(3-amino-propionylamino)-propionylamino]-propionyl;
3-{3-[3-(3-amino-propionylamino)-propionylamino]-propionylamino}-propionyl;
3-(3-{3-[(R)-2,5,7,8-tetramethyl-2-((4R,8R)-4,8,12-trimethyl-tridecyl)-chroman-6-yloxycarbonyl]-propionylamino}-propionylamino)-propionyl;
6-amino-hexanoyl;
6-(6-amino-hexanoylamino)-hexanoyl;
(2S,3R,4S,5R)-5-Carboxy-2,3,4,5-tetrahydroxy-pentanoyl;
8-amino-octanoyl;
3-{2-[2-(2-methoxy-ethoxy)-ethoxy]-ethoxy}-propionyl;
3-[2-(2-{2-[2-[2-(2-{2-[2-(2-{2-[2-(2-methoxy-ethoxy)-ethoxy]-ethoxy}-ethoxy)-ethoxy]-ethoxy}-ethoxy)-ethoxy}ethoxy)-ethoxy]-ethoxy]propionyl;
8-hexadecanoylamino-octanoyl;
6-[hydroxy-(naphthalen-2-yloxy)-phosphoryloxy]-hexanoyl;
6-[hydroxy-(5-phenyl-pentyloxy)-phosphoryloxy]-hexanoyl;
7[-4-(1-carboxy-ethyl)-phenylcarbamoyl]-heptanoyl;
4-(naphthalene-2-sulfonylamino)-4-oxo-butyryl;
4-(biphenyl-4-sulfonylamino)-4-oxo-butyryl;
(S)-4-carboxy-4-{(S)-4-carboxy-4-[2-(2-{2-[2-(2-{2-[(S)-4-carboxy-4-(17-carboxy-heptadecanoylamino)-butyrylamino]-ethoxy}-ethoxy)-acetylamino]-ethoxy}-ethoxy)-acetylamino]-butyrylamino)-butyryl;
(S)-4-carboxy-4-[(2-(2-{2-[2-(2-{2-[(S)-4-carboxy-4-(17-carboxy-heptadecanoylamino)-butyrylamino]-ethoxy}-ethoxy)-acetylamino]-ethoxy}-ethoxy)-acetylamino]-butyryl;
(S)-4-carboxy-2-{(S)-4-carboxy-2-[2-(2-{2-[2-(2-{2-[(S)-4-carboxy-4-(17-carboxy-heptadecanoylamino)-butyrylamino]-ethoxy}-ethoxy)-acetylamino]-ethoxy}-ethoxy)-acetylamino]-butyrylamino}-butyryl;
(S)-4-carboxy-2-[2-(2-{2-[2-(2-{2-[(S)-4-carboxy-4-(17-carboxy-heptadecanoylamino)-butyrylamino]-ethoxy}-ethoxy)-acetylamino]-ethoxy}-ethoxy)-acetylamino]-butyryl;
(S)-4-carboxy-4-{(S)-4-carboxy-4-[2-(2-{2-[(S)-4-carboxy-4-(17-carboxy-heptadecanoylamino)-butyrylamino]-ethoxy}-ethoxy)-acetylamino]-butyrylamino}-

butyryl;
(S)-4-carboxy-4-[2-(2-{2-[(S)-4-carboxy-4-(17-carboxy-heptadecanoylamino)-butyrylamino]-ethoxy}-ethoxy)-acetylamino)-butyryl;
(S)-4-carboxy-2-{(S)-4-carboxy-2-[2-(2-{2-[(S)-4-carboxy-4-(17-carboxy-heptadecanoylamino)-butyrylamino]-ethoxy}-ethoxy)-acetylamino)-butyrylamino}-butyryl;
(S)-4-carboxy-2-[2-(2-{2-[(S)-4-carboxy-4-(17-carboxy-heptadecanoylamino)-butyrylamino]-ethoxy}-ethoxy)-acetylamino]-butyryl;
2-(2-{2-[2-(2-[2-[(S)-4-carboxy-4-(17-carboxy-heptadecanoylamino)-butyrylamino]-ethoxy}-ethoxy)-acetylamino]-ethoxy}-ethoxy)-acetyl;
2-(2-{2-[(S)-4-carboxy-4-(17-carboxy-heptadecanoylamino)-butyrylamino]-ethoxy}-ethoxy)-acetyl;
(S)-4-carboxy-4-((S)-4-carboxy-4-{(S)-4-carboxy-4-[(S)-4-carboxy-4-(19-carboxy-nonadecanoylamino)-butyrylamino]-butyrylamino}-butyrylamino)-butyryl;
2-(2-{2-[2-(2-{2-[(S)-4-carboxy-4-(16-1H-tetrazol-5-yl-hexadecanoylamino)-butyrylamino]-ethoxy}-ethoxy)-acetylamino]-ethoxy}-ethoxy)-acetyl;
2-(2-{2-[2-(2-{2-[(S)-4-carboxy-4-(16-carboxy-hexadecanoylamino)-butyrylamino]-ethoxy}-ethoxy)-acetylamino]-ethoxy}-ethoxy)-acetyl;
(S)-4-carboxy-4-{(S)-4-carboxy-4-[(S)-4-carboxy-4-(17-carboxy-heptadecanoylamino)-butyrylamino]-butyrylamino}-butyryl;
(S)-4-carboxy-4-((S)-4-carboxy-4-{2-[2-(2-{2-[2-(2-{(S)-4-carboxy-4-[10-(4-carboxy-phenoxy)-decanoylamino]-butyrylamino}-ethoxy)-ethoxy]-acetylamino}-ethoxy)-ethoxy]-acetylamino}-butyryl;
(S)-4-carboxy-4-((S)-4-carboxy-4-[2-(2-{2-[2-(2-{2-[(S)-4-carboxy-4-(7-carboxy-heptanoylamino)-butyrylamino]-ethoxy}-ethoxy)-acetylamino]-ethoxy}-ethoxy)-acetylamino]-butyrylamino}-butyryl;
(S)-4-carboxy-4-{(S)-4-carboxy-4-[2-(2-{2-[2-(2-{2-[(S)-4-carboxy-4-(11-carboxy-undecanoylamino)-butyrylamino]-ethoxy}-ethoxy)-acetylamino]-ethoxy}-ethoxy)-acetylamino]-butyrylamino}-butyryl;
(S)-4-carboxy-4-{(S)-4-carboxy-4-[2-(2-{2-[2-(2-{2-[(S)-4-carboxy-4-(13-carboxy-tridecanoylamino)-butyrylamino]-ethoxy}-ethoxy)-acetylamino]-ethoxy}-ethoxy)-acetylamino]-butyrylamino)-butyryl;
(S)-4-carboxy-4-{(S)-4-carboxy-4-[2-(2-{2-[2-(2-{2-[(S)-4-carboxy-4-(15-carboxy-pentadecanoylamino)-butyrylamino]-ethoxy}-ethoxy)-acetylamino]-ethoxy}-ethoxy)-

acetylamino]-butyrylamino}-butyryl;
(S)-4-carboxy-4-≡(S)-4-carboxy-4-[2-(2-{2-[2-(2-{2-[(S)-4-carboxy-4-(19-carboxy-nonadecanoylamino)-butyrylamino]-ethoxyyethoxy)-acetylamino]-ethoxy}-ethoxy)-acetylamino]-butyrylamino}-butyryl; and
2-(2-[2-{2-(2-[2-[{(3S,8S,9S,10R,13R,14S,17R)-10,13-dimethyl-17-((R)-1,5-dimethyl-hexyl)-2,3,4,7,8,9,10,11,12,13,14,15,16,17-tetradecahydro-1H-cyclopenta[a]phenanthren-3-yloxycarbonyl}-ethoxy]-ethoxy)-ethoxy}-ethoxy]-ethylcarbamoyl)-methyl.

40. The compound, or salt or solvate thereof, of claim 1, wherein R1 is selected from mono- or bisfunctionalized NH_2, wherein the mono- or bisfunctionalized NH_2 is functionalized at one or more H atom with a functional group selected from methyl, ethyl, formyl, acetyl, trifluoroacetyl, or benzoyl.

41. The compound, or salt or solvate thereof, of claim 1, wherein R2 is selected from
(i) OH or functionalized OH, or
(ii) NH2 or mono- or bisfunctionalized NH_2, and
wherein the functionalized OH or mono- or bisfunctionalized NH_2 is functionalized at one or more H atom with a functional group selected from 2-mercapto-ethyl, 2-tert-butyl sulfanyl-ethyl, 5-hydroxy-pentyl, 4-amino-butyl, 5-amino-pentyl, or 3-{2-[2-(5-amino-pentyloxy)-ethoxy]-ethoxy}-propyl.