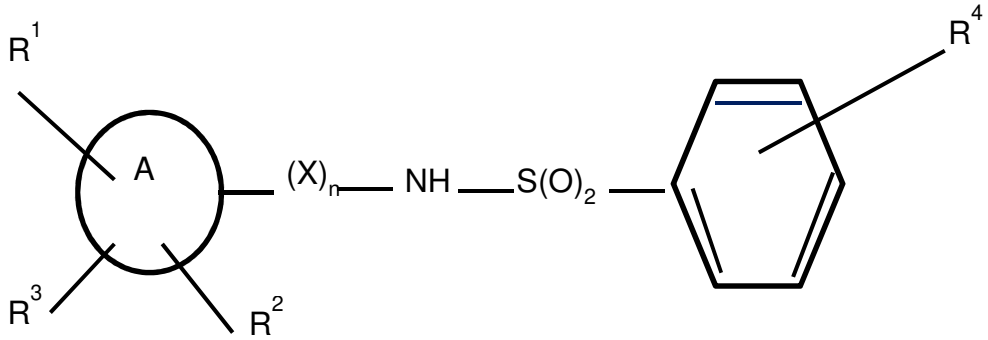
Claims

1. A compound of formula (I):



(I)

and pharmaceutically acceptable salts thereof,

wherein:

A is a mono or di-carbocyclic residue, optionally partially or totally unsaturated, comprising carbon atoms and optionally one or more heteroatoms selected from N, S or O;

R^1, R^2, R^3 are independently selected from the group comprising –H, -halogen, $-CF_3$, -CN, $-CH_2CN$, -OMe, $-OCF_3$, -OH, phenyl, -OPh, $-OCH_2Ph$, $-OCH_2OMe$, $-OCH_2CN$ $-NO_2$, -NR'R", linear or branched C_1-C_6 alkyl, $-O(CH_2)_p$-$S(O)_2Me$ and a five-membered ring heterocycle;

wherein R' and R" are independently –H or C_1-C_4 alkyl;

wherein phenyl and the five-membered ring heterocycle are independently unsubstituted or substituted with a group selected from the group comprising linear or branched C_1-C_4 alkyl, halogen, -OMe and –OH;

p is 1 to 4;

X is $–CH_2$ or –C(O);

n is 0, 1or 2;

R^4 is –Y–C(O)OH, wherein Y is a straight chain C_4-C_{18} hydrocarbon, saturated or unsaturated, preferably having from 6 to 10 carbon atoms;

R^4 is in position meta or para on the aromatic ring;

wherein when A is phenyl, n is 0, Y is a C_4 hydrocarbon, at least one of said R^1, R^2, R^3 is not hydrogen;

wherein when A is phenyl, n is 0, Y is a C_4 hydrocarbon, R^1 and R^2 are hydrogen, R^3 is not Cl in position para on the aromatic ring.

2. A compound according to claim 1, wherein A is phenyl, naphthyl, biphenyl or a saturated or unsaturated five-membered ring heterocycle having five ring atoms wherein 1, 2, 3 or 4 ring atoms are independently selected from N, O and S.

3. A compound according to claim 1 or 2, wherein the five-membered ring heterocycle is selected from the group comprising thienyl, furyl, pyrrolyl, imidazolyl, thiazolyl, oxazolyl, pyrazolyl, isothiazolyl, isoxazolyl, 1,2,3-triazolyl, tetrazolyl, 1,2,3-thiadiazolyl, 1,2,3-oxadiazolyl, 1,2,4-triazolyl, 1,2,4-thiadiazolyl, 1,2,4-oxadiazolyl, 1,3,4-triazolyl, 1,3,4-thiadiazolyl, 1,3,4-oxadiazolyl, and benzimidazole, optionally partially saturated.

4. A compound according to any one of claims 1 to 3, wherein R^1, R^2, R^3 are independently selected from the group comprising –H, -halogen, -CF_3, -OMe, -OH, phenyl, -OPh, -OCH_2Ph, -OCH_2OMe, -OCH_2CN -NO_2, -NH_2, -NMe_2, linear or branched C_1-C_6 alkyl and -$O(CH_2)_p$-$S(O)_2Me$.

5. A compound according to any one of claims 1 to 4, wherein n is 0 or 1.

6. A compound according to any one of claims 1 to 5, wherein R^4 is in position meta on the aromatic ring.

7. A compound according to any one of claims 1 to 6 selected from:

7-(3-(N-(4-fluoro-2,6-dimethylphenyl)sulfamoyl)phenyl)heptanoic acid (1);

7-(3-(N-(2,4,6-trimethylbenzyl)sulfamoyl)phenyl)heptanoic acid (2);

7-(3-(N-(4-isopropyl-2,6-dimethylphenyl)sulfamoyl)phenyl)heptanoic acid (3);

7-(3-(N-(4-chloro-2,6-dimethylphenyl)sulfamoyl)phenyl)heptanoic acid (4);

7-(3-(N-(4-(dimethylamino)-2,6-dimethylphenyl)sulfamoyl)phenyl)heptanoic acid (5);

7-(3-(N-(2,6-dimethyl-4-(trifluoromethyl)phenyl)sulfamoyl)phenyl)heptanoic acid (6);

7-(3-(N-(4-bromo-2,6-dimethylphenyl)sulfamoyl)phenyl)heptanoic acid (7);

7-(3-(N-(4-methoxy-2,6-dimethylphenyl)sulfamoyl)phenyl)heptanoic acid (8);

7-(3-(N-(6-fluoro-4-methyl-[1,1'-biphenyl]-3-yl)sulfamoyl)phenyl)heptanoic acid (9);

7-(3-(N-(5-fluoro-3-methyl-[1,1'-biphenyl]-2-yl)sulfamoyl)phenyl)heptanoic acid (10);

6-{3-[(2,4,6-trimethylphenyl)sulfamoyl]phenyl}hexanoic acid (11);

7-(3-(N-(3,5-dimethyl-1H-pyrazol-4-yl)sulfamoyl)phenyl)heptanoic acid (12);

7-(3-(N-(2,4-dimethylthiazol-5-yl)sulfamoyl)phenyl)heptanoic acid (13);

7-(3-(N-(4,5-dimethylthiazol-2-yl)sulfamoyl)phenyl)heptanoic acid (14);

7-(3-(N-(4,5-dimethyloxazol-2-yl)sulfamoyl)phenyl)heptanoic acid (15);

7-(3-(N-(5-phenyl-1,2,4-thiadiazol-3-yl)sulfamoyl)phenyl)heptanoic acid (16);

7-(3-(N-(3-methyl-1,2,4-thiadiazol-5-yl)sulfamoyl)phenyl)heptanoic acid (17);

7-(3-(N-(5-methyl-1,3,4-thiadiazol-2-yl)sulfamoyl)phenyl)heptanoic acid (18);

7-(3-(N-(3,5-dimethylisoxazol-4-yl)sulfamoyl)phenyl)heptanoic acid (19);

7-(3-(N-(5-methyl-4H-1,2,4-triazol-3-yl)sulfamoyl)phenyl)heptanoic acid (20);

7-(3-(N-(3,5-dimethyl-4H-1,2,4-triazol-4-yl)sulfamoyl)phenyl)heptanoic acid (21);

7-(3-(N-(3-phenylisothiazol-5-yl)sulfamoyl)phenyl)heptanoic acid (22);

7-{3-[(5-hydroxynaphthalen-1-yl)sulfamoyl]phenyl}heptanoic acid (23);

7-{3-[(4-fluoro-2,6-dimethylbenzoyl)sulfamoyl]phenyl}heptanoic acid (24);

7-{4-[(4-fluoro-2,6-dimethylphenyl)sulfamoyl]phenyl}heptanoic acid (25);

7-(3-(N-(2-ethyl-2H-1,2,3-triazol-4-yl)sulfamoyl)phenyl)heptanoic acid (26);

7-(3-(N-(2-methyl-2H-tetrazol-5-yl)sulfamoyl)phenyl)heptanoic acid (27);

7-(3-(N-(4-methyl-4,5-dihydrooxazol-2-yl)sulfamoyl)phenyl)heptanoic acid (28);

7-(3-(N-(3a,4,5,6,7,7a-hexahydro-1H-benzo[d]imidazol-2yl)sulfamoyl)phenyl) heptanoic acid (29);

7-(3-(N-(3-phenylisothiazol-4-yl)sulfamoyl)phenyl)heptanoic acid (30);

7-(3-(N-(4-hydroxy-2,6-dimethylphenyl)sulfamoyl)phenyl)heptanoic acid (31);

7-(3-(N-(3,5-dimethyl-[1,1'-biphenyl]-4-yl)sulfamoyl)phenyl)heptanoic acid (32);

7-(3-(N-(2,6-dimethyl-4-phenoxyphenyl)sulfamoyl)phenyl)heptanoic acid (33);

7-(3-(N-(4-(benzyloxy)-2,6-dimethylphenyl)sulfamoyl)phenyl)heptanoic acid (34);

7-(3-(N-(2,6-dimethyl-4-(3(methylsulfonyl)propoxy)phenyl)sulfamoyl)phenyl)heptanoic acid (35).

8. A compound according to claim 7 selected from:

7-(3-(N-(4-fluoro-2,6-dimethylphenyl)sulfamoyl)phenyl)heptanoic acid (1);

7-(3-(N-(2,4,6-trimethylbenzyl)sulfamoyl)phenyl)heptanoic acid (2);

7-(3-(N-(4-isopropyl-2,6-dimethylphenyl)sulfamoyl)phenyl)heptanoic acid (3);

7-(3-(N-(4-chloro-2,6-dimethylphenyl)sulfamoyl)phenyl)heptanoic acid (4);

7-(3-(N-(2,6-dimethyl-4-(trifluoromethyl)phenyl)sulfamoyl)phenyl)heptanoic acid (6);

7-(3-(N-(4-bromo-2,6-dimethylphenyl)sulfamoyl)phenyl)heptanoic acid (7);

7-(3-(N-(6-fluoro-4-methyl-[1,1'-biphenyl]-3-yl)sulfamoyl)phenyl)heptanoic acid (9);

7-(3-(N-(5-fluoro-3-methyl-[1,1'-biphenyl]-2-yl)sulfamoyl)phenyl)heptanoic acid (10);

6-{3-[(2,4,6-trimethylphenyl)sulfamoyl]phenyl}hexanoic acid (11);

7-(3-(N-(2,6-dimethyl-4-phenoxyphenyl)sulfamoyl)phenyl)heptanoic acid (33).

9. A compound according to any one of claims 1 to 8, for use as a medicament.

10. Use of the compound according to claim 9, in the manufacture of a medicament for the prevention and/or treatment of a disease or disorder selected from diabetes, preferably type 2 diabetes, impaired oral glucose tolerance, insulin resistance, obesity, obesity related disorders, metabolic syndrome, dyslipidemia, elevated LDL, elevated triglycerides, obesity induced inflammation, osteoporosis and obesity related cardiovascular disorders.

11. A pharmaceutical composition comprising as the active ingredient at least one compound according to any one of claims 1 to 8 in combination with physiologically acceptable excipients.

12. A pharmaceutical composition according to claim 11, suitable to be administered by intravenous, intraperitoneal, inhalation, topical or oral route.

13. A pharmaceutical composition according to claim 11 or 12, in the form of a liquid or a solid, preferably in the form of capsules, tablets, coated tablets, syrup, powders, granules, creams, lotions, sprays or ointments.

14. Use of the compound of formula (I), wherein A is phenyl R^1, R^2 and R^3 are hydrogen, n is 0, and R^4 is $–(CH_2)_4–C(O)OH$ in the manufacture of a medicament for the prevention and/or treatment of a disease or disorder selected from diabetes (particularly type 2 diabetes), impaired oral glucose tolerance, insulin resistance, obesity, obesity related disorders, metabolic syndrome, dyslipidemia, elevated LDL, elevated triglycerides, obesity induced inflammation, osteoporosis and obesity related cardiovascular disorders.

15. Use of the compound of formula (I), wherein A is phenyl R^1 and R^2 are hydrogen, R^3 is Cl in position para on the aromatic ring, n is 0, and R^4 is $–(CH_2)_4–C(O)OH$ in the manufacture of a medicament for the prevention and/or treatment of a disease or disorder selected from diabetes (particularly type 2 diabetes), impaired

oral glucose tolerance, insulin resistance, obesity, obesity related disorders, metabolic syndrome, dyslipidemia, elevated LDL, elevated triglycerides, obesity induced inflammation, osteoporosis and obesity related cardiovascular disorders.