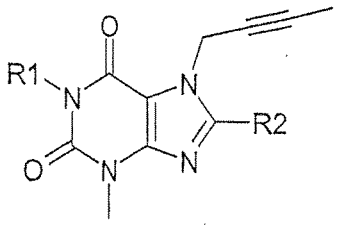
CLAIMS:

1. Use of a DPP IV inhibitor of formula (I)



(I)

or one of the salts thereof, characterised in that

R1 denotes ~~([1,5]naphthyridin-2-yl)methyl, (quinazolin-2-yl)methyl], (quinoxalin-6-yl)methyl,~~ (4-methyl-quinazolin-2-yl)methyl~~, 2-cyano-benzyl, (3-cyano-quinolin-2-yl)methyl, (3-cyano-pyridin-2-yl)methyl, (4-methyl-pyrimidin-2-yl)methyl, or (4,6-dimethyl-pyrimidin-2-yl)methyl~~ and

R2 denotes 3-(R)-amino-piperidin-1-yl, ~~(2-amino-2-methyl-propyl)-methylamino or (2-(S)-amino-propyl)-methylamino,~~

for preparing a medicament for the therapeutic treatment of a patient who has been diagnosed with a physiological functional disorder selected from among ~~hyperglycaemia, and~~ heart failure.

2. Use of a DPP-IV inhibitor selected from

- 1-[(4-methyl-quinazolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-(3-(*R*)-amino-piperidin-1-yl)-xanthine,
- 1-[([1,5]naphthyridin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,
- 1-[(Quinazolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,
- 2-((R)-3-Amino-piperidin-1-yl)-3-(but-2-yinyl)-5-(4-methyl-quinazolin-2-ylmethyl)-3,5-dihydro-imidazo[4,5-d]pyridazin-4-one,
- 1-[(4-Methyl-quinazolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-[(2-amino-2-methyl-propyl)-methylamino]-xanthine,
- 1-[(3-Cyano-quinolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,
- 1-(2-Cyano-benzyl)-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,
- 1-[(4-Methyl-quinazolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-[(*S*)-(2-amino-propyl)-methylamino]-xanthine,
- 1-[(3-Cyano-pyridin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,
- 1-[(4-Methyl-pyrimidin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,

- ~~1-[(4,6-Dimethyl-pyrimidin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine, and~~
- ~~1-[(Quinoxalin-6-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,~~

2. Use according to claim 1, characterized in that the medicament is used ~~or a therapeutically active salt thereof, for preparing a medicament~~ for the therapeutic treatment of heart failure associated with diabetes.

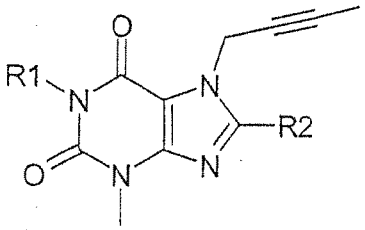
3. The use according to ~~any of the preceding~~ claims 1 or 2, wherein the DPP IV inhibitor is combined with an active substance selected from among the other antidiabetics; active substances that lower the blood sugar level; active substances that lower the lipid level in the blood; active substances that raise the HDL level in the blood; active substances that lower blood pressure; active substances that are indicated in the treatment of atherosclerosis or obesity; and active substances for the treatment of heart failure.

4. The use according to claim 3, wherein the DPP IV inhibitor is combined with another antidiabetic or a blood pressure-lowering active substance.

5. The use according to claim 4, wherein the DPP IV inhibitor is combined with / used in combination with / is administered in combination with metformin, a sulphonylurea, nateglinide, repaglinide, a thiazolidinedione, an alpha-glucosidase blocker, an insulin or insulin analogue, a GLP-1 or GLP-1 analogue, an ACE inhibitor, an angiotensin II receptor blocker (ARM), a beta blocker or a diureticpioglitazone, miglitol, atorvastatin, metoprolol, amlodipin, ramipril, valsartan or telmisartan.

6. The use according to claim 5, wherein the DPP IV inhibitor is combined with / used in combination with / is administered in combination with metformin, a sulphonylurea, or an insulin or insulin analogue.

67. Use of a DPP IV inhibitor of (I)



(I)

or one of the salts thereof, characterised in that

R1 denotes ([1,5]naphthyridin-2-yl)methyl, (quinazolin-2-yl)methyl, (quinoxalin-6-yl)methyl, (4-methyl-quinazolin-2-yl)methyl, 2-cyano-benzyl, (3-cyano-quinolin-2-yl)methyl, (3-cyano-pyridin-2-yl)methyl, (4-methyl-pyrimidin-2-yl)methyl, or (4,6-dimethyl-pyrimidin-2-yl)methyl and

R2 denotes 3-(*R*)-amino-piperidin-1-yl, (2-amino-2-methyl-propyl)-methylamino or (2-(S)-amino-propyl)-methylamino,

for preparing a medicament combination with an active substance selected from among the other antidiabetics; active substances that lower the blood sugar level; active substances that lower the lipid level in the blood; active substances that raise the HDL level in the blood; active substances that lower blood pressure; and active substances that are indicated in the treatment of atherosclerosis or obesity;

for the therapeutic treatment of a patient in whom a physiological functional disorder has been diagnosed, selected from among heart failure.

~~78~~78. Use according to claim ~~67~~67, characterised in that a medicament combination of a DPP IV inhibitors with another antidiabetic or a biood pressure-lowering active substance is prepared.

~~89~~89. Use according to claim ~~67~~67, characterised in that a medicament combination of a DPP IV inhibitor with metformin, pioglitazone, miglitol, atorvastatin, metoprolol, amlodipin, ramipril, valsartan or telmisartan is prepared.

~~9~~10. Use according to claim ~~6~~7, characterised in that a medicament combination of a DPP IV inhibitor with metformin, pioglitazone, miglitol, atorvastatin, valsartan or telmisartan is prepared.

11. Use according to claim 7, characterized in that the medicament combination is used for the therapeutic treatment of heart failure associated with diabetes.

10. Use according to any one of the preceding claims, wherein the DPP IV inhibitor is selected from

- 1-[(4-methyl-quinazolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-(3-(*R*)-amino-piperidin-1-yl)-xanthine,
- 1-[([1,5]naphthyridin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,

- 1-[(Quinazolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,
- 2-((R)-3-Amino-piperidin-1-yl)-3-(but-2-yinyl)-5-(4-methyl-quinazolin-2-ylmethyl)-3,5-dihydro-imidazo[4,5-d]pyridazin-4-one,
- 1-[(4-Methyl-quinazolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-[(2-amino-2-methyl-propyl)-methylamino]-xanthine,
- 1-[(3-Cyano-quinolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,
- 1-(2-Cyano-benzyl)-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,
- 1-[(4-Methyl-quinazolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-[(*S*)-(2-amino-propyl)-methylamino]-xanthine,
- 1-[(3-Cyano-pyridin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,
- 1-[(4-Methyl-pyrimidin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,
- 1-[(4,6-Dimethyl-pyrimidin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine, and
- 1-[(Quinoxalin-6-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,

or a therapeutically active salt thereof.

1112. Use of a DPP IV inhibitory which is 1-[(4-methyl-quinazolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-(3-(*R*)-amino-piperidin-1-yl)-xanthine (linagliptin), or a therapeutically active salt thereof; in a dosage of 2.5 mg to 10 mg for oral administration, in the manufacture of a medicament for treating a patient suffering from heart failure.

1213. Use of a DPP IV inhibitor selected fromwhich is

- 1-[(4-methyl-quinazolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-(3-(*R*)-amino-piperidin-1-yl)-xanthine,
- 1-[([1,5]naphthyridin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,
- 1-[(Quinazolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,
- 2-((R)-3-Amino-piperidin-1-yl)-3-(but-2-yinyl)-5-(4-methyl-quinazolin-2-ylmethyl)-3,5-dihydro-imidazo[4,5-d]pyridazin-4-one,

- 1-[(4-Methyl-quinazolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-[(2-amino-2-methyl-propyl)-methylamino]-xanthine,
- 1-[(3-Cyano-quinolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,
- 1-(2-Cyano-benzyl)-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,

- ~~1-[(4-Methyl-quinazolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-[(*S*)-(2-amino-propyl)-methylamino]-xanthine,~~
- ~~1-[(3-Cyano-pyridin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,~~
- ~~1-[(4-Methyl-pyrimidin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,~~
- ~~1-[(4,6-Dimethyl-pyrimidin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine, and~~
- ~~1-[(Quinoxalin-6-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,~~

or a therapeutically active salt thereof, for preparing a medicament for treating a patient with heart failure, wherein the DPP IV inhibitor may be combined with an ACE-inhibitor (e.g. 2.5 mg to 15 mg ramipril), AT1-receptor-antagonist (e.g. 20 mg to 160 mg telmisartan), beta-blocker (e.g. 50 mg to 200 mg metoprolol), combined alpha/beta blocker (e.g. 3.25 mg to 100 mg carvedilol), diuretic (e.g. 12.5 mg to 25 mg hydrochlorothiazide), mineralocorticoid receptor antagonist (e.g. 25 mg to 100 mg eplerenone; and/or B-type natriuretic peptide (BNP) (e.g. 2 µg/kg as a bolus followed by 0.01 µg/kg/min nesiritide), a BNP – derived peptide or a BNP-fusion product, either in a free combination or in a fixed combination in a tablet.

~~13~~14. Use of a DPP IV inhibitor ~~selected from~~ which is

- 1-[(4-methyl-quinazolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-(3-(*R*)-amino-piperidin-1-yl)-xanthine,
- ~~1-[([1,5]naphthyridin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,~~
- ~~1-[(Quinazolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,~~
- ~~2-((R)-3-Amino-piperidin-1-yl)-3-(but-2-yinyl)-5-(4-methyl-quinazolin-2-ylmethyl)-3,5-dihydro-imidazo[4,5-d]pyridazin-4-one,~~
- ~~1-[(4-Methyl-quinazolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-[(2-amino-2-methyl-propyl)-methylamino]-xanthine,~~
- ~~1-[(3-Cyano-quinolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,~~
- ~~1-(2-Cyano-benzyl)-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,~~
- ~~1-[(4-Methyl-quinazolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-[(*S*)-(2-amino-propyl)-methylamino]-xanthine,~~
- ~~1-[(3-Cyano-pyridin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,~~

- 1-[(4-Methyl-pyrimidin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,
- 1-[(4,6-Dimethyl-pyrimidin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine, and
- 1-[(Quinoxalin-6-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-((*R*)-3-amino-piperidin-1-yl)-xanthine,

or a therapeutically active salt thereof,

in a dosage of 02.5 mg to 10 mg (such as e.g. 0.5 mg, 1 mg, 2.5 mg, 5 mg or 10 mg) for oral administration, for preparing a medicament for use in the treatment of type 2 diabetes.

14. 15. The use according to claim 1314, wherein the DPP IV inhibitor is combined with / is used in combination with / is administered in combination with metformin.

1516. The use according to claim 1415, wherein the dose of metformin is from 300 mg to 1000 mg once or twice a day, or delayed-release metformin in a dose of 500 mg to 1000 mg once or twice a day or 500 mg to 2000 mg once a day.

1617. The use according to 1415, wherein the dose of metformin is 500 mg, 850 mg or 1000 mg metformin as a single dose with a total daily dose of metformin of 500-2850 mg, or 500 mg, 1000 mg, 1500 mg or 2000 mg metformin in delayed release form.

17. The use according to any one of the preceding claims, wherein the DPP IV inhibitor is used in a dosage of 0.5 mg to 10 mg (such as e.g. 0.5 mg, 1 mg, 2.5 mg, 5 mg or 10 mg) for oral administration.

18. The use according to claim 14, wherein the DPP IV inhibitor is combined with / is used in combination with / is administered in combination with metformin, a sulphonylurea, nateglinide, repaglinide, a thiazolidinedione, an alpha-glucosidase blocker, an insulin or insulin analogue, a GLP-1 or GLP-1 analogue, an ACE inhibitor, an angiotensin II receptor blocker (ARB), a beta blocker, or a diuretic.

19. The use according to claim 18, wherein the DPP IV inhibitor is combined with / is used in combination with / is administered in combination with metformin, a sulphonylurea, or an insulin or insulin analogue.

1820. The use according to any one of the preceding claims, wherein the DPP IV inhibitor is used in a dosage of 2.5 mg or 5 mg.

~~19~~21. The use according to any one of the preceding claims, wherein daily oral dose of the DPP IV inhibitor is 5 mg.

~~20~~22. The use according to any of the preceding claims, wherein the DPP-IV inhibitor is 1-[(4-methyl-quinazolin-2-yl)methyl]-3-methyl-7-(2-butyn-1-yl)-8-(3-(R)-amino-piperidin-1-yl)-xanthine.