

NEW BENZAMIDE DERIVATIVES AS BRADYKININ ANTAGONISTS

FIELD OF THE INVENTION

5 The present invention relates to new phenylsulfamoyl benzamide derivatives of formula (I) and optical antipodes or racemates and/or salts and/or hydrates and/or solvates thereof which are useful in the treatment or prevention of painful and inflammatory processes. The present invention also relates to the processes for producing compounds of formula (I) and to pharmacological compositions containing
10 the same.

BACKGROUND OF THE INVENTION

 Kinins are endogenous peptides formed in plasma and peripheral tissues in
15 response to tissue injury or infection following catalytic cleavage of kininogens by kallikrein enzymes. Kinins play an important role in the pathophysiological processes accompanying pain and inflammation. Their biological actions are mediated by two G-protein coupled membrane receptors, denoted B1 and B2. Both B1 and B2 receptors have been cloned [*Biochem. Biophys. Res. Commun.*, **184** (1992) 260-268 and
20 *J.Biol.Chem.*, **269** (1994) 21583-21586] and the mechanisms regulating their expression, self-maintenance and signalling function is under intensive investigations [*Mol. Pharmacol.*, **56** (1999) 325-333 and *J. Cell. Physiol.* **193** (2002) 275-286].

 The first set of kinins, bradykinin (BK) and kallidin (LysBK) preferentially act through stimulation of constitutively expressed and rapidly desensitising B2 receptors,
25 which are widely distributed in many tissues. On the other hand, their active carboxypeptidase metabolites, the second set of kinins, desArg⁹BK (DABK) and LysdesArg⁹BK (LysDABK) activate inducible and non-desensitising B1 receptors, which are rarely expressed under non-pathological conditions. Generally B1 receptors rapidly appear after injuries of various natures (tissue trauma, infections, *etc.*). Thus the
30 B1 receptor up-regulation appears to be part of a generalized response that includes the

local co-expression (eventually up-regulation) of enzymes, receptors, autacoids, cytokines and chemokines that notoriously play key roles in the early and late responses of tissues to various types of injury.

In animal models it has been demonstrated that there is a switch in dominance of function from B2 to B1 in chronic inflammatory states. While the B2 receptor is implicated in the acute phase of the inflammatory and pain response, the B1 receptor is involved in the chronic phase of this response. The involvement of kinin receptors in inflammation and pain transduction has been supported by the results of studies on mice lacking bradykinin B1 receptors. B1 receptor deficient mice are different from wild-type mice in sensory functions, exhibiting increased analgesic thresholds to noxious chemical and heat stimuli, and drastic reduction in the accumulation of polymorphonuclear leukocytes at sites of inflammation [*PNAS*, **97** (2000) 8140-8145 and *Neuropharmacology* **41** (2001) 1006-1012]. Furthermore the most original finding in B1 receptor deficient mice was the direct evidence for a role of central kinin receptors in nociception suggesting that the hypoalgesia seen in B1-receptor knockout mice is partly due to reduced central sensitisation in the spinal cord. However, apart from the above changes B1 knockout mice were apparently normal without any apparent pathological changes.

Apart from the evidence of basal expression of B1 receptors on the periphery recently more and more evidence shows that B1 receptors are constitutively expressed 'centrally' in some neuronal elements, including the spinal cord and some higher structures as well. The function of these receptors is unclear but they have been implicated in pain transmission and hyperalgesia. Therefore, B1 receptor antagonists are believed to be useful in alleviating pain not only via peripheral sites but also to have possibly broader spectrum of analgesic effects if they block central B1 receptors as well [*NeuroReport* **11** (2000) 4003-4005; *NeuroReport*, **12** (2001) 2311-2313; *Neuroscience* **107** (2001) 665-673 and *Neuroscience Letters* **294** (2000) 175-178].

On the basis of scientific data bradykinin receptors are involved in mediation of pain and hyperalgesia in several ways. B1 receptor antagonists may have diverse modes of action. They have (1) indirect ('peripheral') effects on the nociceptors via inhibition of release of other algogenic mediators. N.B. B1 receptors appear upon inflammatory induction on cells adjacent to sensory neurones (macrophages, fibroblasts or endothelial

cells) are involved in releasing mediators (prostaglandins, cytokines and nitric oxide) that sensitize or activate the nociceptors. (2) direct ('peripheral') effects on nociceptors expressing B1 receptors (constitutively) or upon induction and (3) 'central' effects on pain processing in the superficial dorsal horn of spinal cord.

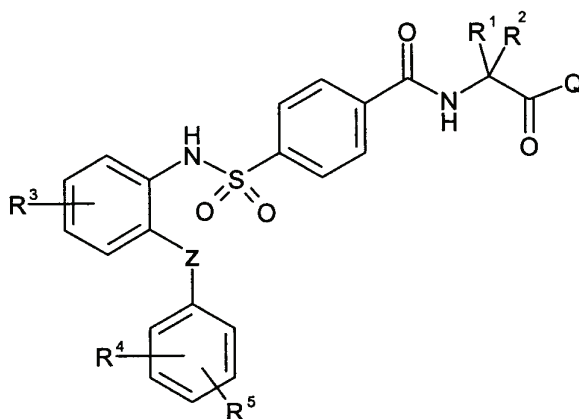
5 Therefore, an orally active non-peptide bradykinin B1 receptor antagonist could be a potential therapeutic agent in the treatment of chronic inflammatory pain.

Several patents and patent applications describe bradykinin B1 receptor antagonists which have different chemical structures. Such documents are for instance the following international patent applications: WO200075107, WO02076964,
10 WO04054584, WO02099388, WO05004810.

SUMMARY OF THE INVENTION

15 We have found a class of benzamide derivatives which have high affinity for bradykinin B1 receptors and selectivity over bradykinin B2 receptors. The selectivity is particularly important as the undesired side effects of the compounds are much less pronounced.

The present invention relates to new phenylsulfamoyl benzamide derivatives of
20 formula (I)



(I)

wherein

R^1 is hydrogen atom or C_1 - C_4 alkyl group;

R^2 is selected from (1) hydrogen atom; (2) C_1 - C_6 straight or branched alkyl group; (3) $-(CH_2)_n-NH_2$; (4) $-(CH_2)_n-OH$; (5) $-(CH_2)_n-CO-NH_2$; (6) $-(CH_2)_n-COOR^c$; (7) benzyl optionally substituted with one or more hydroxy group or halogen atom; or

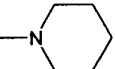
5 R^1 , R^2 and the carbon atom to which they are both attached together form a 3-7 membered cycloalkyl ring;

R^3 , R^4 and R^5 are independently of each other hydrogen atom; halogen atom; cyano; nitro; amino; or amino substituted with one or more C_1 - C_4 alkyl group; trifluoromethyl; C_1 - C_4 alkyl; C_1 - C_4 alkoxy; trifluoromethoxy; C_1 - C_4 alkoxy carbonyl; $-C(=O)-NH_2$ or hydroxy group;

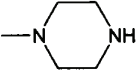
Z is selected from (1) single bond; (2) oxygen atom; (3) CH_2 group; (4) CO group; (5) NR^c group; (6) S atom; (7) SO_2 group;

Q is selected from

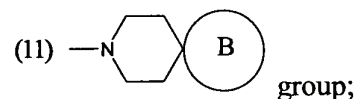
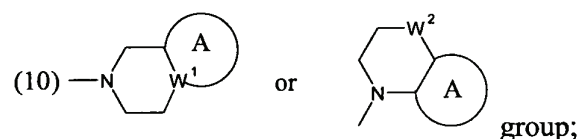
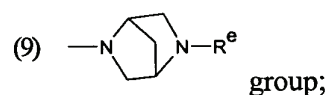
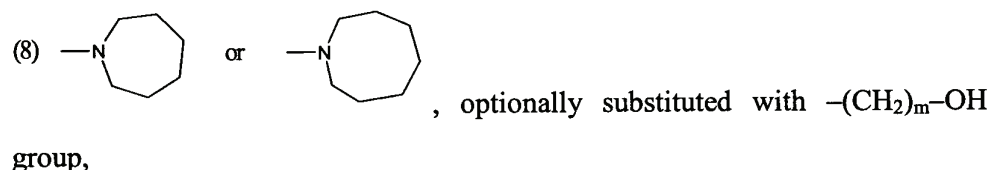
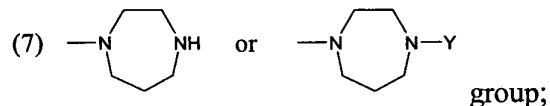
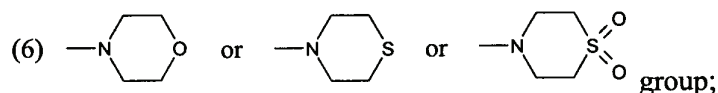
(1) , optionally substituted with $-(CH_2)_m-OH$ group, or $-(CH_2)_n-X-P$ group;

(2) , optionally substituted with one or more C_1 - C_4 alkyl group, one or more halogen atom, $-(CH_2)_m-OH$ group, $-(CH_2)_m-NH_2$ group, $-(CH_2)_m-CO-NH_2$ group, trifluoromethyl group, oxo group, $-(CH_2)_m-CN$ group; $-NH-CO-(C_1-C_4 \text{ alkyl})$ group, $-NH-SO_2-(C_1-C_4 \text{ alkyl})$ group, $-(CH_2)_m-COOR^c$ group, $-CO-NR^cR^d$ group, $-(C_1-C_4 \text{ alkoxy})$ group, $-NH-CO-(CH_2)_m-CF_3$ group, $-NH-SO_2-CH_2-CF_3$ group;

(3)  group;

(4) , optionally substituted with oxo group, $-SO_2-(C_1-C_4 \text{ alkyl})$ group, C_1 - C_4 alkyl group, $-CO-(C_1-C_4 \text{ alkyl})$ group, $-(CH_2)_m-O-(CH_2)_m-OH$ group, $-(CH_2)_m-OH$ group, $-SO_2-NR^cR^d$ group, $-CO-NR^cR^d$ group;

(5)  group;



- Y is selected from (1) $-(CH_2)_n-NR^aR^b$; (2) $-(CH_2)_n-X-P$ group;
- n is an integer from 0 to 6;
- 10 m is an integer from 0 to 3;
- X is selected from (1) single bond; (2) oxygen atom; (3) $-CO-NR^c$ group; (4) CO or SO_2 group;
- P is selected from (1) phenyl group, optionally substituted with one or more halogen atom, hydroxy, cyano, amino or C_1-C_4 alkyl group; (2) a saturated, partially unsaturated or aromatic 4-7 membered ring containing 1-3 heteroatom selected from O, S, SO_2 and N; wherein said ring is optionally substituted with one or more halogen atom, oxo, hydroxy, cyano, amino or C_1-C_4 alkyl group; (3) C_5-C_8 cycloalkyl group;
- 15 R^a and R^b are (1) hydrogen atom, with the proviso that R^a and R^b can not be simultaneously hydrogen atom; (2) straight or branched C_1-C_6 alkyl group; (3) R^a , R^b and the nitrogen atom to which they are both attached together form a saturated, partially unsaturated or aromatic 4-7 membered ring containing 0-3 heteroatom (in addition to the nitrogen atom to which R^a and R^b attached)
- 20

selected from O, S, SO₂ and N; wherein said ring is optionally substituted with one or more halogen atom, oxo, cyano, hydroxy or C₁-C₄ alkyl group;

R^c is hydrogen atom or C₁-C₄ alkyl group;

R^d is hydrogen atom, C₁-C₄ alkyl group, C₁-C₄ hydroxyalkyl group, C₃-C₈ cycloalkyl group;

R^e is hydrogen atom, C₁-C₄ alkyl group, benzyl group;

A is (1) a C₄-C₇ cycloalkyl ring; (2) a saturated, partially unsaturated or aromatic 5-7 membered ring containing 0-4 heteroatom including W¹ selected from O, S, SO₂ and N; wherein said ring is optionally substituted with one or more halogen atom, oxo, cyano, hydroxy, amino, phenyl or C₁-C₄ alkyl group;

B is a saturated, partially unsaturated or aromatic 4-7 membered ring containing 1-3 heteroatom selected from O, S, SO₂ and N; wherein said ring is optionally substituted with one or more halogen atom, oxo, cyano, hydroxy, amino, phenyl or C₁-C₄ alkyl group;

W¹ is carbon atom, nitrogen atom, or CH group;

W² is oxygen atom, sulfur atom, NH, CH₂ or SO₂ group;

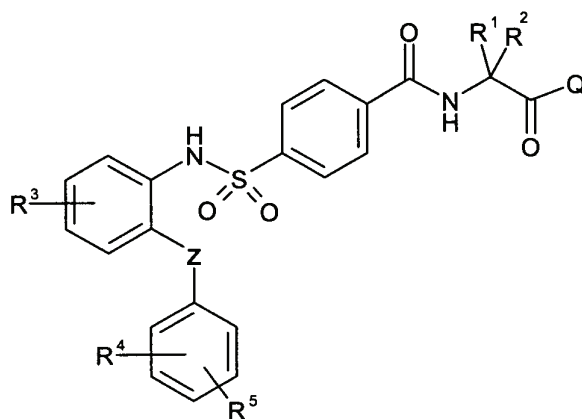
and optical antipodes or racemates and/or salts and/or hydrates and/or solvates thereof.

The invention also relates to the pharmaceutical compositions containing the compounds of formula (I) or optical antipodes or racemates or salts or hydrates or solvates thereof as active ingredient.

Furthermore objects of the present invention are the synthesis of compounds of formula (I), and the chemical and pharmaceutical manufacture of medicaments containing these compounds, as well as the methods of treatment with these compounds, which means administering to a mammal to be treated - including human - effective amount/amounts of compounds of formula (I) of the present invention as such or as medicament.

DETAILED DESCRIPTION OF THE INVENTION

The present invention relates to new bradykinin B1 receptor antagonist phenylsulfamoyl benzamide derivatives of formula (I)



(I)

wherein

R^1 is hydrogen atom or C_1 - C_4 alkyl group;

5 R^2 is selected from (1) hydrogen atom; (2) C_1 - C_6 straight or branched alkyl group; (3) $-(CH_2)_n-NH_2$; (4) $-(CH_2)_n-OH$; (5) $-(CH_2)_n-CO-NH_2$; (6) $-(CH_2)_n-COOR^c$; (7) benzyl optionally substituted with one or more hydroxy group or halogen atom; or

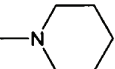
10 R^1 , R^2 and the carbon atom to which they are both attached together form a 3-7 membered cycloalkyl ring;

R^3 , R^4 and R^5 are independently of each other hydrogen atom; halogen atom; cyano; nitro; amino; or amino substituted with one or more C_1 - C_4 alkyl group; trifluoromethyl; C_1 - C_4 alkyl; C_1 - C_4 alkoxy; trifluoromethoxy; C_1 - C_4 alkoxy carbonyl; $-C(=O)-NH_2$ or hydroxy group;

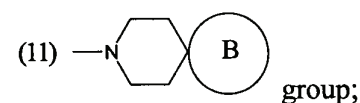
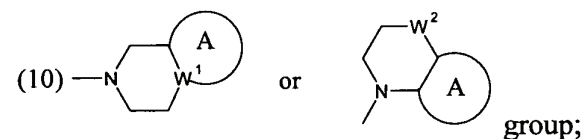
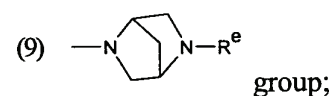
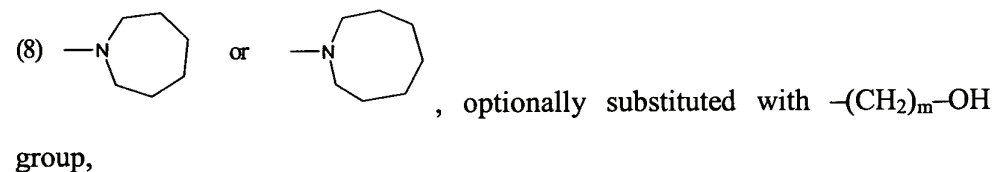
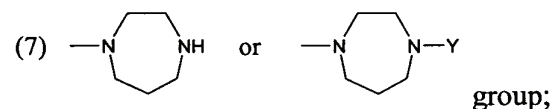
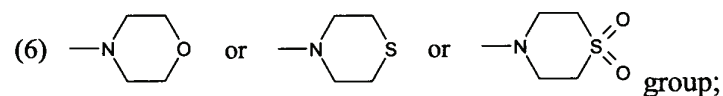
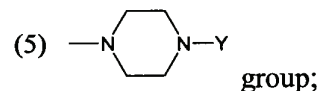
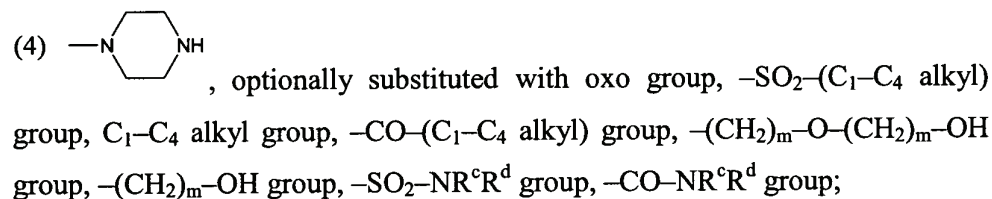
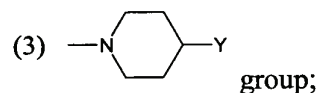
15 Z is selected from (1) single bond; (2) oxygen atom; (3) CH_2 group; (4) CO group; (5) NR^c group; (6) S atom; (7) SO_2 group;

Q is selected from

(1) , optionally substituted with $-(CH_2)_m-OH$ group, or $-(CH_2)_n-X-P$ group;

20 (2) , optionally substituted with one or more C_1 - C_4 alkyl group, one or more halogen atom, $-(CH_2)_m-OH$ group, $-(CH_2)_m-NH_2$ group, $-(CH_2)_m-CO-NH_2$ group, trifluoromethyl group, oxo group, $-(CH_2)_m-CN$ group; $-NH-CO-$

(C₁-C₄ alkyl) group, -NH-SO₂-(C₁-C₄ alkyl) group, -(CH₂)_m-COOR^c group, -CO-NR^cR^d group, -(C₁-C₄ alkoxy) group, -NH-CO-(CH₂)_m-CF₃ group, -NH-SO₂-CH₂-CF₃ group;



Y is selected from (1) -(CH₂)_n-NR^aR^b; (2) -(CH₂)_n-X-P group;

n is an integer from 0 to 6;

m is an integer from 0 to 3;

- X is selected from (1) single bond; (2) oxygen atom; (3) $-\text{CO}-\text{NR}^c$ group; (4) CO or SO_2 group;
- P is selected from (1) phenyl group, optionally substituted with one or more halogen atom, hydroxy, cyano, amino or $\text{C}_1\text{-C}_4$ alkyl group; (2) a saturated, partially unsaturated or aromatic 4-7 membered ring containing 1-3 heteroatom selected from O, S, SO_2 and N; wherein said ring is optionally substituted with one or more halogen atom, oxo, hydroxy, cyano, amino or $\text{C}_1\text{-C}_4$ alkyl group; (3) $\text{C}_5\text{-C}_8$ cycloalkyl group;
- R^a and R^b are (1) hydrogen atom, with the proviso that R^a and R^b can not be simultaneously hydrogen atom; (2) straight or branched $\text{C}_1\text{-C}_6$ alkyl group; (3) R^a , R^b and the nitrogen atom to which they are both attached together form a saturated, partially unsaturated or aromatic 4-7 membered ring containing 0-3 heteroatom (in addition to the nitrogen atom to which R^a and R^b attached) selected from O, S, SO_2 and N; wherein said ring is optionally substituted with one or more halogen atom, oxo, cyano, hydroxy or $\text{C}_1\text{-C}_4$ alkyl group;
- R^c is hydrogen atom or $\text{C}_1\text{-C}_4$ alkyl group;
- R^d is hydrogen atom, $\text{C}_1\text{-C}_4$ alkyl group, $\text{C}_1\text{-C}_4$ hydroxyalkyl group, $\text{C}_3\text{-C}_8$ cycloalkyl group;
- R^e is hydrogen atom, $\text{C}_1\text{-C}_4$ alkyl group, benzyl group;
- A is (1) a $\text{C}_4\text{-C}_7$ cycloalkyl ring; (2) a saturated, partially unsaturated or aromatic 5-7 membered ring containing 0-4 heteroatom including W^1 selected from O, S, SO_2 and N; wherein said ring is optionally substituted with one or more halogen atom, oxo, cyano, hydroxy, amino, phenyl or $\text{C}_1\text{-C}_4$ alkyl group;
- B is a saturated, partially unsaturated or aromatic 4-7 membered ring containing 1-3 heteroatom selected from O, S, SO_2 and N; wherein said ring is optionally substituted with one or more halogen atom, oxo, cyano, hydroxy, amino, phenyl or $\text{C}_1\text{-C}_4$ alkyl group;
- W^1 is carbon atom, nitrogen atom, or CH group;
- W^2 is oxygen atom, sulfur atom, NH, CH_2 or SO_2 group;
- and optical antipodes or racemates and/or salts and/or hydrates and/or solvates thereof.

The invention also relates to the pharmaceutical compositions containing the compounds of formula (I) or optical antipodes or racemates or salts or hydrates or solvates thereof as active ingredient.

Furthermore objects of the present invention are the synthesis of compounds of formula (I), and the chemical and pharmaceutical manufacture of medicaments containing these compounds, as well as the methods of treatment with these compounds, which means administering to a mammal to be treated - including human - effective amount/amounts of compounds of formula (I) of the present invention as such or as medicament.

The term "halogen" substituent denotes fluorine, chlorine, bromine or iodine atoms. The term C₁-C₄ alkyl group used in the present description denotes methyl, ethyl, normal- and isopropyl and different butyl groups. These C₁-C₄ alkyl groups can be in the C₁-C₄ alkoxy groups and C₁-C₄ hydroxyalkyl groups.

The 4-7 membered heterocyclic ring in the meaning of R^a and R^b can be *e.g.* piperidine, pyrrolidine, piperazine, homopiperazine, morpholine, thiomorpholine and the like.

The 4-7 membered heterocyclic ring in the meaning of P and B can be *e.g.* imidazole, triazole, oxazol, tiazole, tetrazole, furan, tetrahydrofuran, pyrimidine, pyridine, piperidine, pyrrolidine, pyrazine, piperazine, homopiperazine, morpholine, thiomorpholine and the like.

The saturated, partially unsaturated or aromatic 5-7 membered ring in the meaning of A can be *e.g.* imidazole, triazole, oxazol, tiazole, tetrazole, pyrimidine, pyridine, piperidine, pyrrolidine, pyrazine, piperazine, homopiperazine, morpholine, thiomorpholine and the like.

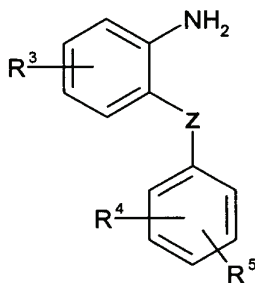
The invention relates also to the salts of compounds of formula (I) formed with acids or bases.

Both organic and inorganic acids can be used for the formation of acid addition salts. Suitable inorganic acids can be *e.g.* hydrochloric acid, sulfuric acid and phosphoric acid. Representatives of monovalent organic acids can be *e.g.* formic acid, acetic acid, trifluoroacetic acid, propionic acid, and different butyric acids, valeric acids and capric acids. Representatives of bivalent organic acids can be *e.g.* oxalic acid, malonic acid, maleic acid, fumaric acid and succinic acid. Other organic acids can also

be used, such as hydroxy acids *e.g.* citric acid, tartaric acid, or aromatic carboxylic acids *e.g.* benzoic acid or salicylic acid, as well as aliphatic and aromatic sulfonic acids *e.g.* methanesulfonic acid and *p*-toluenesulfonic acid. Especially valuable group of the acid addition salts is in which the acid component itself does not have therapeutical effect in the applied dose or it does not have unfavorable influence on the effect of the active ingredient. These acid addition salts are pharmaceutically acceptable acid addition salts. The reason why acid addition salts, which do not belong to the pharmaceutically acceptable acid addition salts belong to the present invention is, that in given case they can be advantageous in the purification and isolation of the desired compounds.

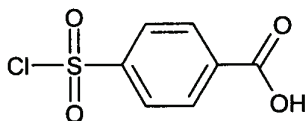
Among the salts formed with bases especially important are the salts formed with alkali metals, *e.g.* sodium, potassium, alkaline-earth metals, *e.g.* calcium and magnesium, as well as with ammonia or organic amines. The latter bases can have further substituents, *e.g.* hydroxy or amino groups, which can influence *e.g.* the solubility and the handling of the product. The salts formed with bases are pharmaceutically acceptable base addition salts.

According to the invention the compounds of formula (I) can be synthesized by reacting an amine derivative of formula (II)



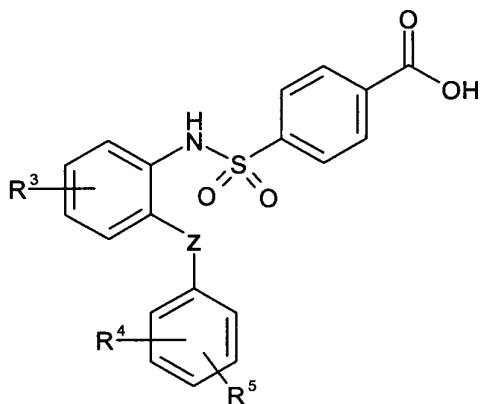
(II)

- wherein the meaning of R^3 , R^4 and R^5 is as described above for the formula (I) – with sulfonyl chloride of formula (III)



(III)

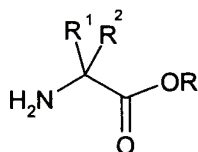
then the so obtained phenylsulfamoyl benzoic acid derivative of formula (IV)



(IV)

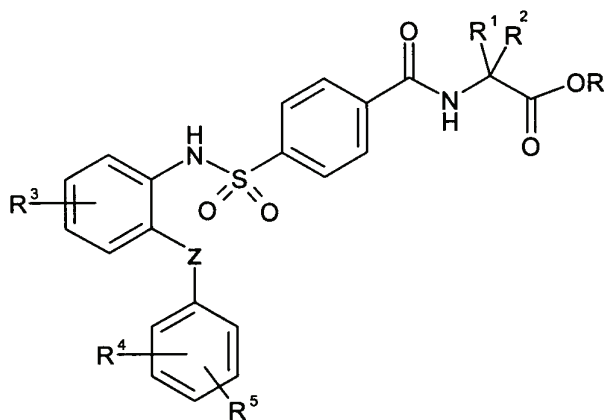
- wherein the meaning of R^3 , R^4 and R^5 is as described above for the formula (I) – is reacted with an amino acid of formula (V)

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(V)

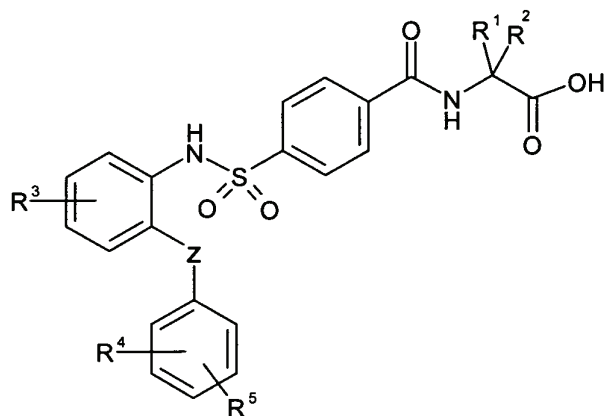
- wherein the meaning of R^1 and R^2 is as described above for the formula (I) and R is C_1 - C_4 alkyl – and the so obtained compound of formula (VI)



(VI)

- wherein the meaning of R^1 , R^2 , R^3 , R^4 , R^5 and R is as defined above – is hydrolyzed to furnish a carboxylic acid derivative of formula (VII)

10



(VII)

- wherein the meaning of R^1 , R^2 , R^3 , R^4 and R^5 is as defined above – finally the latter is
 5 reacted with an amine derivative Q and the obtained phenylsulfamoyl benzamide derivative of formula (I) in given case can be transformed into an other compound of formula (I) by introducing new substituents and/or modifying or removing the existing ones, and/or salt formation and/or liberating the compound from salts.

The sulfonylation reaction is preferably carried out in a proper solvent,
 10 preferably in the presence of a base. The reactions are followed by thin layer chromatography. The necessary reaction time is 6-20 h. The work-up of the reaction mixture can be carried out by different methods.

a) The reaction mixture is concentrated and the product is isolated by crystallization or extraction. If the crude product is not pure enough, then column
 15 chromatography can be used for the purification of it. The column chromatography is carried out either on normal phase using Kieselgel 60 as adsorbent and different solvent systems, *e.g.* n-hexane/ethyl acetate, chloroform/methanol, dichloromethane/ethyl acetate or chloroform/acetone as eluents, or on reversed phase using YMC-Pack ODS-AQ type packings (produced by YMC) and acetonitrile/water/trifluoroacetic acid or
 20 acetonitrile/water/acetic acid as eluent.

b) The reaction mixture is poured into ice-water and the product is isolated by filtration or extraction. The crude product is crystallized or purified by column chromatography as described above. The structures of the products are determined by IR, NMR and mass spectrometry.

Hydrolysis of a compound of formula (VI) can be carried out with a base, *e.g.* alkali metal hydroxide, preferably sodium or lithium hydroxide, or with an acid, *e.g.* organic acid, preferably trifluoroacetic acid.

The amide bond formations are preferably carried out by preparing an active
5 derivative from a carboxylic acid of formula (IV) or (VII) which is reacted with an amino acid of formula (V) or an amine Q, respectively, preferably in the presence of a base.

The transformation of a carboxylic acid into an active derivative can be carried out *in situ* during the amide bond formation in a proper solvent (*e.g.*
10 dimethylformamide, acetonitrile, chlorinated hydrocarbons or hydrocarbons or the mixture thereof). The active derivatives can be acid chlorides (*e.g.* prepared from carboxylic acid with thionyl chloride), mixed anhydrides (*e.g.* prepared from carboxylic acid with isobutyl chloroformate in the presence of a base, *e.g.* triethylamine), active esters (*e.g.* prepared from carboxylic acid with hydroxybenzotriazol (HOBt) and
15 dicyclohexyl-carbodiimide (DCC) or O-benzotriazol-1-yl-N,N',N'-tetramethyluronium hexafluorophosphate (HBTU) in the presence of a base *e.g.* triethylamine). The active derivatives can be prepared at a temperature in the range of 0 °C to room temperature. A proper amino acid of formula (V) or an amine Q is added as a base or as a salt formed with inorganic acid to the so obtained solution or suspension
20 in the presence of a base, *e.g.* triethylamine, needed for the liberation of the amine. The condensation reactions are followed by thin layer chromatography. The necessary reaction time is 6-20 h. The work-up of the reaction mixture can be carried out by different methods.

a) The reaction mixture is concentrated, and the residue is crystallized or
25 extracted with a proper organic solvent and in given case purified by column chromatography. The column chromatography is carried out on normal phase using Kieselgel 60 as adsorbent and different solvent systems, *e.g.* toluene/methanol, chloroform/methanol or toluene/acetone, as eluents or on reversed phase using YMC-Pack ODS-AQ type packings (produced by YMC) and acetonitrile/water/trifluoroacetic
30 acid or acetonitrile/water/acetic acid as eluent.

b) The reaction mixture is directly purified by column chromatography as described above to yield the pure product.

The structures of the products are determined by IR, NMR and mass spectrometry.

The obtained benzamide derivatives of formula (I) – independently from the method of preparation – in given case can be transformed into another compound of formula (I) by introducing further substituents and/or modifying and/or removing the existing ones, and/or formation of salts with acids and/or liberating the benzamide derivative of formula (I) from the obtained acid addition salts by treatment with a base and/or the free sulfonamide derivative of formula (I) can be transformed into a salt by treatment with a base.

For instance cleaving the benzyl group from N-benzyl group, which stands for R^c , can be carried out *e.g.* with catalytic hydrogenation or with chloroethyl chloroformate in a proper solvent. The compounds of formula (I) containing free hydroxy group can be transformed into acyloxy or sulfoxy derivatives with different acylating or sulfonylating agents. The reactions can be carried out for example in chlorinated hydrocarbons using acid chloride or acid anhydride as acylating agent in the presence of a base (*e.g.* triethylamine or sodium carbonate). The sulfonamide derivatives of formula (I) containing a nitro group can be transformed into amines by reduction and the amines can be further reacted to give acid amides as described for the acylation of hydroxy groups or carbamate derivatives can be synthesized. Ester groups can be hydrolyzed and the obtained free carboxylic acids can be transformed into amides by reacting with proper amine derivatives. N-(*tert*-Butoxycarbonyl) group can be cleaved by organic or inorganic acids (*e.g.* trifluoroacetic acid or hydrogen chloride). Cyano groups can be transformed into amide, N-hydroxy-amidine or different N-containing heterocyclic groups.

Most of the amino acids of formula (V) and amines Q are either commercially available or can be synthesized by different known methods. The syntheses of some new amines Q are described in the Examples. Following these procedures the other amines Q can also be prepared.

The compounds of the present invention as well as their pharmaceutically acceptable salts or hydrates or solvates can be used as such or suitably in the form of pharmaceutical compositions. These compositions (drugs) can be in solid, liquid or

semiliquid form and pharmaceutical adjuvant and auxiliary materials can be added, which are commonly used in practice, such as carriers, excipients, diluents, stabilizers, wetting or emulsifying agents, pH- and osmotic pressure-influencing, flavoring or aromatizing, as well as formulation-promoting or formulation-providing additives.

5 The dosage required to exert the therapeutical effect can vary within wide limits and will be fitted to the individual requirements in each of the particular case, depending on the stage of the disease, the condition and the bodyweight of the patient to be treated, as well as the sensitivity of the patient against the active ingredient, route of administration and number of daily treatments. The actual dose of the active ingredient
10 to be used can safely be determined by the attending physician skilled in the art in the knowledge of the patient to be treated.

 The pharmaceutical compositions containing the active ingredient according to the present invention usually contain 0.01 to 100 mg of active ingredient in a single dosage unit. It is, of course possible that the amount of the active ingredient in some
15 compositions exceeds the upper or lower limits defined above.

 The solid forms of the pharmaceutical compositions can be *e.g.* tablets, dragées, capsules, pills or lyophilized powder ampoules useful for the preparation of injections. Liquid compositions are the injectable and infusable compositions, fluid medicines, packing fluids and drops. Semiliquid compositions can be ointments, balsams, creams,
20 shaking mixtures and suppositories.

 For the sake of a simple administration it is suitable if the pharmaceutical compositions comprise dosage units containing the amount of the active ingredient to be administered once, or a few multiples or a half, third or fourth part thereof. Such dosage units are *e.g.* tablets, which can be powdered with grooves promoting the halving or
25 quartering of the tablet in order to exactly administer the required amount of the active ingredient.

 Tablets can be coated with an acid-soluble layer in order to assure the release of the active ingredient content after leaving the stomach. Such tablets are enteric-coated. A similar effect can be achieved also by encapsulating the active ingredient.

30 The pharmaceutical compositions for oral administration can contain *e.g.* lactose or starch as excipients, sodium carboxymethylcellulose, methylcellulose, polyvinyl pyrrolidone or starch paste as binders or granulating agents. Potato starch or

microcrystalline cellulose is added as disintegration agents, but ultraamylopectin or formaldehyde casein can also be used. Talcum, colloidal silicic acid, stearin, calcium or magnesium stearate can be used as antiadhesive and lubricants.

The tablets can be manufactured *e.g.* by wet granulation, followed by pressing.

5 The mixed active ingredients and excipients, as well as in given case part of the disintegrants are granulated with an aqueous, alcoholic or aqueous alcoholic solution of the binders in an appropriate equipment, then the granulate is dried. The other disintegrants, lubricants and antiadhesive agents are added to the dried granulate, and the mixture is pressed to a tablet. In given case the tablets are made with halving groove

10 to ease the administration.

The tablets can be made directly from the mixture of the active ingredient and the proper auxiliaries by pressing. In given case, the tablets can be coated by using additives commonly used in the pharmaceutical practice, *e.g.* stabilizers, flavoring, coloring agents, such as sugar, cellulose derivatives (methyl- or ethylcellulose, sodium

15 carboxymethylcellulose, etc), polyvinyl pyrrolidone, calcium phosphate, calcium carbonate, food coloring agents, food laces, aroma agents, iron oxide pigments, etc. In the case of capsules the mixture of the active ingredient and the auxiliaries is filled into capsules.

Liquid oral compositions, *e.g.* suspensions, syrups, elixirs can be made by using

20 water, glycols, oils, alcohols, coloring and flavoring agents.

For rectal administration the composition is formulated in suppositories or clysters. The suppository can contain beside the active ingredient a carrier, so called adeps pro suppository. Carriers can be vegetable oils, such as hydrogenated vegetable oils, triglycerides of C₁₂-C₁₈ fatty acids (preferably the carriers under the trade name

25 Witexsol). The active ingredient is homogeneously mixed with the melted adeps pro suppository and the suppositories are moulded.

For parenteral administration the composition is formulated as injection solution. For manufacturing the injection solution the active ingredients are dissolved in distilled water and/or in different organic solvents, such as glycolethers, in given case in the

30 presence of solubilizers, *e.g.* polioxyethylensorbitane-monolaurate, -monooleate, or monostearate (Tween 20, Tween 60, Tween 80). The injection solution can also contain different auxiliaries, such as conserving agents, *e.g.* ethylenediamine tetraacetate, as well

as pH adjusting agents and buffers and in given case local anaesthetic, *e.g.* lidocain. The injection solution containing the active ingredient of the invention is filtered before it is filled into ampoules, and it is sterilized after filling.

If the active ingredient is hygroscopic, then it can be stabilized by liophylization.

5

Utilities

The compounds of the present invention are bradykinin receptor antagonists, in particular selective bradykinin B1 receptor antagonists, consequently are useful in the treatment or prevention of painful and inflammatory processes. The compounds would be effective in the treatment of pain including, *e.g.*, chronic pain, particularly inflammatory pain, hyperalgesia, bone and joint pain (osteoarthritis), repetitive motion pain, myofascial pain (muscular injury, fibromyalgia), visceral pain (ulcerative colitis, pancreatitis, cystitis, uveitis), perioperative pain (general surgery, gynecological), postoperative pain (postsurgical pain syndrome), posttraumatic pain (*e.g.* sprains or fracture), neuropathic pain (postherpetic neuralgia, nerve injury, phantom limb pain, mononeuropathy, polyneuropathy) dental pain, and cancer pain. Furthermore for the treatment of pain associated with angina, menstruation, diabetic vasculopathy, post capillary resistance or diabetic symptoms associated with insulinitis (*e.g.* hyperglycemia, diuresis, proteinurea and increased nitrite and kallikrein urinary excretion), diabethic hyperalgeisa. Moreover the compounds may be used for the treatment angioedema, atherosclerosis, septic shock *e.g.* as anti-hypovolemic and/or anti-hypotensive agents, and sepsis. They may be used as smooth muscle relaxants for the treatment of spasm of the gastrointestinal tract or uterus. Further, the compounds of this invention can additionally be used to treat inflammatory skin disorders, such as psoriasis and eczema, and skin injuries including burning and sunburning (UV-erythema and pain). The compounds may be used to treat inflammatory pain of varied origins (*e.g.* rheumatoid arthritis, rheumatic disease, tenosynovitis, liver disease, irritable bowel syndrome, inflammatory bowel disease, Crohn's disease, nephritis, allergic rhinitis, vasomotor rhinitis, uveitis, gingivitis), allergies. Such compounds may be used therapeutically to treat inflammatory airways disease *e.g.* chronic obstructive pulmonary disease, adult

respiratory distress syndrome, bronchitis, pneumonia, asthma. They may be used to control, restrict or reverse airways hyperreactivity in asthma, to treat intrinsic and extrinsic asthma including allergic asthma (atopic or non-atopic), occupational asthma, viral or bacterial exacerbated asthma, other non-allergic asthmas, “wheezy-infant syndrome”, as well as exercise-induced bronchoconstriction. They may be effective against pneumoconiosis, including aluminosis, anthracosis, asbestosis, chalicosis, ptilosis, siderosis, silicosis, tabacosis and byssinosis. Additionally, they may be effective in some neurological disorders, *e.g.* against multiple sclerosis, Alzheimer’s disease, epilepsy, cerebral edema, headache including cluster headache, migraine including prophylactic and acute use, as well as closed head trauma.

Biological evaluation

Functional assay:

- 5 **Assessment of antagonist potency at B1 and B2 receptors *in vitro* by measurement of cytosolic calcium ion concentration with a plate reader fluorimeter in cells expressing recombinant human B1 or B2 receptors**

Cell culture

- 10 Chinese hamster ovary (CHO) cells stably expressing recombinant human B1 (CHO-B1, Euroscreen) or B2 (CHO-B2, Perkin-Elmer) receptors were cultured in Dulbecco's Modified Eagle's Medium (DMEM) containing 10% Fetal Calf Serum (FCS), 100 U/ml penicillin, 0.1 mg/ml streptomycin, 0.25 µg/ml amphotericin B, 1% Minimum Essential Medium Eagle (MEM), non essential amino acid solution, 600
15 µg/ml G418, 1% pyruvate (for the B2 cell line). Cells were kept at 37°C in a humidified incubator in an atmosphere of 5% CO₂/95% air and were passaged 1:4 three times a week. Cells were plated at $1.5\text{--}2.5 \times 10^4$ cell/well on standard 96-well microplates, measurements of cytosolic calcium ion concentration ($[\text{Ca}^{2+}]_i$) were carried out 1-2 days after cell plating.

20

Fluorimetric measurement of cytosolic calcium concentration

- Measurements of $[\text{Ca}^{2+}]_i$ were carried out on CHO-B1 and CHO-B2 cells stably expressing human B1 and B2 receptors, respectively. Cells were grown in standard 96-
25 well microplates and before the measurement were loaded with a fluorescent Ca^{2+} -sensitive dye, fluo-4/AM (2 µM): after removing the culture medium the dye was added to the cells (dissolved in assay buffer: 145 mM NaCl, 5 mM KCl, 2 mM MgCl₂, 2 mM CaCl₂, 10 mM HEPES, 20 mM D-glucose, 2 mM probenecid, 100 µl/well) and cells were incubated at 37°C in a humidified incubator in an atmosphere of 5% CO₂/95% air
30 for 40-120 min. To stop dye loading cells were washed twice with assay buffer. After washing, various concentrations of the test compounds (diluted in extracellular medium

from a DMSO stock solution, final DMSO concentration was <0.1%) or buffer were added to each well depending on the experimental setup. After incubation at 37°C for 20-25 min. baseline and agonist-evoked changes of $[Ca^{2+}]_i$ were measured column by column with a plate reader fluorimeter (Fluoroskan Ascent, Labsystems). Excitation and detection of emission was carried out from the bottom of the plate. Filters used for Fluo-4: excitation filter – 485 nm, emission filter – 538 nm. The whole measurement process was performed at 37°C and was controlled by custom software. Inhibitory potency of the test compounds was assessed by measuring the reduction in the agonist-evoked $[Ca^{2+}]_i$ -elevation in the presence of different concentrations of the compounds. The agonists were LysDABK for CHO-B1, and bradykinin for CHO-B2 cells. Agonists were applied at an EC_{80} concentration, the EC_{80} -values were derived from daily determined dose-response curves. Fluorescence data were expressed as $\Delta F/F$ (fluorescence change normalized to baseline). All treatments on a single plate were measured in multiple wells. Data from all wells with the same treatment were averaged and the average values were used for analysis. Inhibitory potency of a compound at a single concentration point was expressed as percent inhibition of the control agonist response. Sigmoidal concentration-inhibition curves were fitted to the data (derived from at least three independent experiments) and IC_{50} -values were determined as the concentration that produces half of the maximal inhibition caused by the compound.

The examined reference compounds measured in functional and binding tests are the following:

- 1) 4-{2-[(2,2-diphenyl-ethyl)-amino]-5-{4-[4-[(4-methyl-1-piperazinyl)-carbonyl]-1-piperidinyl]-sulfonyl}-benzoyl}-morpholine (NVP-SAA164, Br. J. Pharmacol. **144** (2005) 889-899); K_i 8 nM; IC_{50} : 33 nM;
- 2) (R)-N-[2,3-dihydro-2-oxo-5-(2-phenyl-ethyl)-1-propyl-1H-1,4-benzodiazepin-3-yl]-N'-{4-[4-(4-pyridinyl)-1-piperazinyl]-phenyl}-urea (J. Med. Chem. **46** (2003) 1803-1806); K_i 0.59 nM; IC_{50} 1.9 nM;
- 3) N-[4-(4'-bipiperidin)-1'-ylphenyl]-N'-[(3R)-2,3-dihydro-5-(4-methyl-phenyl)-2-oxo-1-propyl-1H-1,4-benzodiazepin-3-yl]-urea (J. Med. Chem. **46** (2003) 1803-1806); K_i 13.4 nM; IC_{50} 64.5 nM

The K_i and IC_{50} data measured by us for the reference compounds are in good agreement with the data given in the literature.

In Table I the most effective compounds of this invention measured in functional assay are listed.

5

Table I

Number of example	B1 func.	Number of example	B1 func.
1.1	++++	2.34	++++
1.2	++++	3.1	++++
1.3	++++	3.2	++++
1.4	++++	3.3	++++
1.5	++++	3.4	++++
1.6	++++	3.5	++++
1.7	++++	3.6	++++
1.8	++++	3.7	++++
1.9	++++	3.8	++++
1.10	++++	3.9	++++
1.11	++++	3.10	++++
1.12	++++	3.13	++++
1.13	++++	3.14	++++
1.21	++++	3.15	++++
1.22	++++	3.16	++++
2.2	++++	3.17	++++
2.3	++++	11.1	++++
2.4	++++	11.2	++++
2.5	++++	11.3	++++
2.6	++++	11.4	++++
2.7	++++	11.5	++++
2.10	+++	11.6	++++
2.15	+++	11.7	++++
2.22	++++		

+	IC ₅₀ > 0.5 µM	+++	IC ₅₀ is between 20 and 100 nM
++	IC ₅₀ is between 0.1 and 0.5 µM	++++	IC ₅₀ < 20 nM

5 **Receptor binding assays**

1. Human recombinant bradykinin B1 receptor binding

Binding assays were carried out on human recombinant bradykinin1 receptors
10 (expressed in CHO cells) according to the Euroscreen Technical Data Sheet
(Cat.No.:ES-091). 20µg protein/tube was incubated with [3,4-prolyl-3,4-³H(N)]-[Des-
Arg¹⁰] Kallidin as radioligand. Non specific binding was determined in the presence of
10 µM Lys-des-Arg⁹-Bradykinin. The final incubation volume was 250 µl. Samples
15 were incubated for 15 min. at 25 °C then were rapidly vacuum filtered through GF/B
filters presoaked for at least 1 h in 0.5 % PEI. Radioactivity was determined by liquid
scintillation spectroscopy.

In Table II the most effective compounds of this invention measured in binding
assay are listed.

Table II

Number of example	B1 binding	Number of example	B1 binding
1.1	++++	2.34	++++
1.2	++++	3.1	++++
1.3	++++	3.2	++++
1.4	++++	3.3	++++
1.5	++++	3.4	++++
1.6	++++	3.5	++++
1.7	++++	3.6	++++
1.8	++++	3.7	++++
1.9	++++	3.8	++++
1.10	++++	3.9	++++
1.11	++++	3.10	++++
1.12	++++	3.13	++++
1.13	++++	3.14	++++
1.21	++++	3.15	++++
1.22	++++	3.16	++++
2.2	++++	3.17	++++
2.3	++++	11.1	+++
2.4	++++	11.2	+++
2.5	++++	11.3	++++
2.6	++++	11.4	++++
2.7	++++	11.5	++++
2.10	+++	11.6	++++
2.15	+++	11.7	++++
2.22	++++		

+ $K_i > 0.5 \mu\text{M}$ +++ K_i is between 20 and 100 nM++ K_i is between 0.1 and 0.5 μM ++++ $K_i < 20$ nM

2. Human recombinant bradykinin B2 receptor binding

Binding assays were carried out on human recombinant bradykinin₂ receptors (expressed in CHO cells) according to the Receptor Biology Technical Data Sheet (Cat.No.:RBHB2M) with minor modifications. 8.4 µg protein/tube was incubated with
5 [2,3,-prolyl-3,4-³H(N)]-Bradykinin as radioligand. Non specific binding was determined in the presence of 5 µM bradykinin. The final incubation volume was 200 µl. Samples were incubated for 90 min. at +4 °C then were rapidly vacuum filtered through GF/B filters presoaked for at least 1 h in 0.5 % PEI. Radioactivity was determined by liquid
10 scintillation spectroscopy.

The compounds exhibited high affinity and selectivity (>50 fold) for the human B1 receptor over the human B2 receptor according to both functional and binding assays.

The synthesis of compounds and pharmaceutical compositions according to the
15 invention is illustrated by the following not limiting Examples.

Reference Example 1**(4-Methyl-piperazin-1-yl)-piperidin-4-yl-methanone hydrochloride****a) 4-(4-Methyl-piperazine-1-carbonyl)-piperidine-1-carboxylic acid *tert*-butyl ester**

The solution of 1-(*tert*-butoxycarbonyl)-4-piperidinecarboxylic acid (Aldrich) (21.88 g, 95.4 mmol), triethylamine (13.3 mL, 95.4 mmol) and HBTU [O-benzotriazol-1-yl-N,N,N',N'-tetramethyluronium hexafluorophosphate (Advanced Chem. Tech.)] (38.36 g, 101.0 mmol) in dry dimethylformamide (100 mL) was stirred at room temperature for five minutes before N-methyl-piperazine (10.6 mL, 95.5 mmol) was added. The pH of the reaction mixture was adjusted to 8 by the addition of triethylamine, the so obtained mixture was stirred at room temperature overnight, then concentrated *in vacuo*. The residue was treated with saturated sodium hydrogencarbonate solution (350 mL), extracted with ethyl acetate (3x250 mL), the combined organic layers were washed with saturated sodium hydrogencarbonate solution, water and brine, dried over sodium sulfate, filtered and concentrated. The residue was submitted to column chromatography using Kieselgel 60 (0.040-0.063 mm) (Merck) as adsorbent, and chloroform:methanol = 9:1 as eluent to yield 25.8 g (87 %) of the title compound as an oil.

b) (4-Methyl-piperazin-1-yl)-piperidin-4-yl-methanone hydrochloride

A mixture of 4-(4-methyl-piperazine-1-carbonyl)-piperidine-1-carboxylic acid *tert*-butyl ester (25.8 g, 82.8 mmol), dry dioxane (500 mL) and 6.5 N hydrogen chloride in dioxane (275 mL) was stirred at room temperature overnight, then diluted with diethyl ether and stirred at 0 °C for 1 h. The precipitated crystals were filtered off, washed with diethyl ether and dried to yield 12.44 g (54 %) of the title compound. Mp: 305-307 °C (decomposition).

Example 1.1**4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]-N-{2-oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperazin-1-yl]-ethyl}-benzamide****a) 2,4-Dichloro-1-(2-nitro-phenoxy)-benzene**

A mixture of 1-fluoro-2-nitrobenzene (4.8 mL, 45.42 mmol), potassium carbonate (13.8 g, 0.1 mol) and 2,4-dichloro-phenol (8.16 g, 50.06 mmol) in dry

dimethylformamide (70 mL) was stirred at 100 °C for 2 h. Solids were filtered off, and the filtrate was concentrated in vacuo. The residue was partitioned between diethyl ether and 1N sodium hydroxide, the organic layer was washed with 1N sodium hydroxide, water and brine, dried over sodium sulfate, filtered and concentrated *in vacuo* to yield 5 11.69 g (91 %) of the title compound as a yellowish oil, which solidifies on standing. Mp: 58-59 °C. MS (EI) 285.2 (MH⁺). Lit. [*Chem. Heterocycl. Compd. (Engl. Transl.)* 11 (1975) 1356-1358] Mp: 57-58 °C.

b) 2-(2,4-Dichloro-phenoxy)-phenylamine [*Chem. Abstr.* **84** (1976) 164313q]

10 To a stirred solution of 2,4-dichloro-1-(2-nitro-phenoxy)-benzene (3.5 g, 12.32 mmol) in ethyl acetate (60 mL) stannous chloride dihydrate (13.89 g, 61.6 mmol) was added and the mixture was refluxed for 2 h before it was quenched with saturated sodium hydrogencarbonate solution (192 mL). The organic phase was separated and the aqueous phase was washed several times with ethyl acetate. The combined extracts 15 were dried over sodium sulfate, filtered and concentrated in vacuo to yield 3.1 g (99 %) of the title compound as a yellowish oil: MS (EI) 255.2 (MH⁺).

c) 4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]-benzoic acid

Under an atmosphere of argon to an ice cooled solution of 2-(2,4-dichloro-phenoxy)-phenylamine (0.5 g, 1.97 mmol) in dry pyridine (5 mL) 4-chlorosulfonyl 20 benzoic acid (0.45 g, 1.97 mmol) was added portion-wise. The reaction mixture was stirred at room temperature overnight. The mixture was evaporated *in vacuo*, the residue was treated with 1N hydrochloric acid (20 mL), and extracted with ethyl acetate (3x50 mL). The combined organic layers were washed with 1N hydrochloric acid, water and 25 brine, dried over sodium sulfate, filtered and concentrated in vacuo. The residue was submitted to flash column chromatography using Kieselgel 60 (0.015-0.040 mm) as adsorbent (Merck) and chloroform:methanol:acetic acid = 294:6:1 as eluent to yield 0.6 g (70 %) of the title compound as a light pink solid, which was crystallized from diethyl ether-petroleum ether. MS (EI) 439.3 (MH⁺).

30

d) {4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid ethyl ester

The solution of 4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-benzoic acid (8.207 g, 18.7 mmol), triethylamine (5.2 mL, 37.4 mmol) and HBTU (8.24 g, 21.7 mmol) in dry dimethyl formamide (150 mL) was stirred at room temperature for five minutes before glycine ethyl ester hydrochloride (Aldrich) (2.614 g, 18.7 mmol) was added. The pH of the reaction mixture was adjusted to 8 by the addition of triethylamine, the so obtained mixture was stirred at room temperature overnight, then concentrated *in vacuo*. The residue was treated with saturated sodium hydrogencarbonate solution (300 mL), the precipitated crystals were filtered off, washed with water and dried. The crude product was purified by column chromatography using Kieselgel 60 (0.040-0.063 mm) (Merck) as adsorbent, and n-hexane:ethyl acetate = 2:1 as eluent to yield 7.68 g (78 %) of the title compound. MS (EI) 524 (MH⁺).

e) {4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid

To a stirred solution of {4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid ethyl ester (7.68 g, 14.67 mmol) in a mixture of tetrahydrofuran (36 mL), water (18 mL) and methanol (18 mL) lithium hydroxide monohydrate (3.09 g, 73.64 mmol) was added and the reaction mixture was stirred at room temperature for 2 h. The mixture was concentrated, the residue was dissolved in water, acidified with 1M hydrochloric acid, the precipitated solid was filtered off, washed with water and dried to yield 6.76 g (93 %) of the title compound as a yellowish solid. MS (EI) 496.2 (MH⁺).

f) 4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]-N-{2-oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperazin-1-yl]-ethyl}-benzamide

To a stirred solution of {4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid (42 mg, 0.085 mmol) in a mixture of dichloromethane (2 mL) and dimethylformamide (0.2 mL) 1-(2-pyrrolidin-1-yl-ethyl)-piperazine (EMKA-Chemie) (18 mg, 0.1 mmol), HBTU (46 mg, 0.12 mmol) and triethylamine (60 µL, 0.4 mmol) were added. The mixture was stirred at room temperature for 24 h, then purified by column chromatography using Kieselgel 60 (0.015-0.040 mm) as adsorbent (Merck) and gradient elution starting with 100% A eluent and processing to a mixture of 70% A and 30% B eluent over a period of 15 minutes (eluent A: chloroform; eluent B:

methanol containing 5% of ammonium hydroxide) to yield 45.8 mg (82 %) of the title compound. MS (EI) 661.2 (MH⁺).

Compounds of Table 1 were prepared from {4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid (Example 1.1/e) according to the method described in Example 1.1/f.

Table 1

Example	Name	MS (EI) (MH ⁺)
1.2	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-[4-(2-dimethylamino-ethyl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide	635.2
1.3	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-[4-(2-diethylamino-ethyl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide	663.2
1.4	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-oxo-2-[4-(3-pyrrolidin-1-yl-propyl)-piperazin-1-yl]-ethyl}-benzamide	675.2
1.5	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-[4-(1-methyl-piperidin-3-ylmethyl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide	675.2
1.6	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperidin-1-yl]-ethyl}-benzamide	660.2
1.7	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -[2-oxo-2-(4-pyrimidin-2-yl-piperazin-1-yl)-ethyl]-benzamide	642.1
1.8	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-[4-(3-morpholin-4-yl-propyl)-[1,4]diazepan-1-yl]-2-oxo-ethyl}-benzamide	705.2
1.9	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-oxo-2-[4-(3-piperidin-1-yl-propyl)-piperazin-1-yl]-ethyl}-benzamide	689.2

1.10	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-[4-(3-dimethylamino-propyl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide	649.2
1.11	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-oxo-2-[4-(3-pyrrolidin-1-yl-propyl)-[1,4]diazepan-1-yl]-ethyl}-benzamide	689.2
1.12	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-[4-(3-morpholin-4-yl-propyl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide	691.2
1.13	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-oxo-2-[4-(2-piperidin-1-yl-ethyl)-piperazin-1-yl]-ethyl}-benzamide	675.2
1.14	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-oxo-2-[4-(2-oxo-2-pyrrolidin-1-yl-ethyl)-piperazin-1-yl]-ethyl}-benzamide	675.2
1.15	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-[4-(2-morpholin-4-yl-ethyl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide	677.2
1.16	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-oxo-2-[4-(2-oxo-2-piperidin-1-yl-ethyl)-piperazin-1-yl]-ethyl}-benzamide	689.2
1.17	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -(2-{4-[(methyl-phenyl-carbamoyl)-methyl]-piperazin-1-yl}-2-oxo-ethyl)-benzamide	711.2
1.18	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-[4-(2-morpholin-4-yl-2-oxo-ethyl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide	691.2
1.19	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -[2-oxo-2-(2,3,5,6-tetrahydro-[1,2']bipyrazinyl-4-yl)-ethyl]-benzamide	642.2
1.20	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-[4-(4-	689.2

	methyl-piperazine-1-carbonyl)-piperidin-1-yl]-2-oxo-ethyl}-benzamide	
1.21	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -[2-oxo-2-(4-pyrrolidin-1-yl-piperidin-1-yl)-ethyl]-benzamide	632.2
1.22	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -[2-(4-hydroxy-piperidin-1-yl)-2-oxo-ethyl]-benzamide	579.2
1.23	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -(2-{4-[2-(2-hydroxy-ethoxy)-ethyl]-piperazin-1-yl}-2-oxo-ethyl)-benzamide	652.2
1.24	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -[2-oxo-2-(4-phenyl-piperazin-1-yl)-ethyl]-benzamide	640.2
1.25	<i>N</i> -(2-[1,4']Bipiperidinyl-1'-yl-2-oxo-ethyl)-4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-benzamide	646.2
1.26	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -(2-oxo-2-piperidin-1-yl-ethyl)-benzamide	563.2
1.27	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -[2-oxo-2-(4-oxo-piperidin-1-yl)-ethyl]-benzamide	577.1
1.28	<i>N</i> -(2-Azepan-1-yl-2-oxo-ethyl)-4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-benzamide	577.1
1.29	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -(2-oxo-2-pyrrolidin-1-yl-ethyl)-benzamide	549.1
1.30	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -(2-morpholin-4-yl-2-oxo-ethyl)-benzamide	565.1
1.31	<i>N</i> -[2-(4-Cyano-piperidin-1-yl)-2-oxo-ethyl]-4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-benzamide	588.1
1.32	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -[2-oxo-2-(4-trifluoromethyl-piperidin-1-yl)-ethyl]-benzamide	631.1

1.33	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -(2-oxo-2-thiomorpholin-4-yl-ethyl)-benzamide	581.1
1.34	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -[2-(4-methyl-piperidin-1-yl)-2-oxo-ethyl]-benzamide	577.1
1.35	<i>N</i> -[2-(4-Benzoyl-piperazin-1-yl)-2-oxo-ethyl]-4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-benzamide	668.1
1.36	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-[4-(furan-2-carbonyl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide	658.1
1.37	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -[2-(4-ethanesulfonyl-piperazin-1-yl)-2-oxo-ethyl]-benzamide	656.1
1.38	1-(2-{4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetyl)-piperidine-4-carboxylic acid amide	606.1
1.39	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -[2-(3-hydroxymethyl-piperidin-1-yl)-2-oxo-ethyl]-benzamide	593.2
1.40	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -[2-oxo-2-(3-oxo-piperazin-1-yl)-ethyl]-benzamide	578.1
1.41	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -[2-(4-hydroxymethyl-piperidin-1-yl)-2-oxo-ethyl]-benzamide	593.1
1.42	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-[4-(2-hydroxy-ethyl)-piperidin-1-yl]-2-oxo-ethyl}-benzamide	607.1
1.43	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -[2-(3-hydroxy-pyrrolidin-1-yl)-2-oxo-ethyl]-benzamide	565.1
1.44	<i>N</i> -[2-(4-Acetyl-piperazin-1-yl)-2-oxo-ethyl]-4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-benzamide	606.1
1.45	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-oxo-2-[4-(tetrahydro-furan-2-carbonyl)-piperazin-1-yl]-ethyl}-benzamide	662.1

1.46	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-[4-(3-hydroxy-phenyl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide	656.1
1.47	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -[2-(1,1-dioxo-1 λ^6 -thiomorpholin-4-yl)-2-oxo-ethyl]-benzamide	613
1.48	<i>N</i> -[2-(4-Cyclopropylmethyl-piperazin-1-yl)-2-oxo-ethyl]-4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-benzamide	618.2
1.49	4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]- <i>N</i> -[2-(4-ethyl-piperazin-1-yl)-2-oxo-ethyl]-benzamide	592.1

Example 2.1***N*-{2-Oxo-2-[(*S*)-2-(piperazine-1-carbonyl)-pyrrolidin-1-yl]-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide hydrochloride**5 **a) 4-(2-Phenoxy-phenylsulfamoyl)-benzoic acid**

The title compound was prepared from 2-phenoxy-phenylamine (Aldrich) according to the method described in Example 1.1/c. MS (EI) 370.2 (MH⁺).

b) **[4-(2-Phenoxy-phenylsulfamoyl)-benzoylamino]-acetic acid ethyl ester**

10 The title compound was prepared from 4-(2-phenoxy-phenylsulfamoyl)-benzoic acid and glycine ethyl ester hydrochloride (Aldrich) according to the method described in Example 1.1/d. MS (EI) 455.2 (MH⁺).

c) **[4-(2-Phenoxy-phenylsulfamoyl)-benzoylamino]-acetic acid**

15 The title compound was prepared from [4-(2-phenoxy-phenylsulfamoyl)-benzoylamino]-acetic acid ethyl ester according to the method described in Example 1.1/e. MS (EI) 427.2 (MH⁺).

20 **d) (*S*)-1-{2-[4-(2-Phenoxy-phenylsulfamoyl)-benzoylamino]-acetyl}-pyrrolidine-2-carboxylic acid benzyl ester**

The title compound was prepared from [4-(2-phenoxy-phenylsulfamoyl)-benzoylamino]-acetic acid and L-proline benzyl ester hydrochloride according to the method described in Example 1.1/d. MS (EI) 614.3 (MH⁺).

5 e) (S)-1-{2-[4-(2-Phenoxy-phenylsulfamoyl)-benzoylamino]-acetyl}-pyrrolidine-2-carboxylic acid

The title compound was prepared from (S)-1-{2-[4-(2-phenoxy-phenylsulfamoyl)-benzoylamino]-acetyl}-pyrrolidine-2-carboxylic acid benzyl ester according to the method described in Example 1.1/e. MS (EI) 524.2 (MH⁺).

10

f) 4-((S)-1-{2-[4-(2-Phenoxy-phenylsulfamoyl)-benzoylamino]-acetyl}-pyrrolidine-2-carbonyl)-piperazine-1-carboxylic acid *tert*-butyl ester

The title compound was prepared from (S)-1-{2-[4-(2-phenoxy-phenylsulfamoyl)-benzoylamino]-acetyl}-pyrrolidine-2-carboxylic acid and piperazine-15 1-carboxylic acid *tert*-butyl ester according to the method described in Example 1.1/d. MS (EI) 714.3 (M+Na⁺).

g) N-{2-Oxo-2-[(S)-2-(piperazine-1-carbonyl)-pyrrolidin-1-yl]-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide hydrochloride

20 To a stirred solution of 4-((S)-1-{2-[4-(2-phenoxy-phenylsulfamoyl)-benzoylamino]-acetyl}-pyrrolidine-2-carbonyl)-piperazine-1-carboxylic acid *tert*-butyl ester (0.115 g, 0.166 mmol) in dichloromethane (2 mL) 9 M hydrogen chloride in ethanol (0.2 mL) was added. The reaction mixture was stirred at room temperature for 2 h, then diethyl ether (20 mL) was added, the precipitated crystals were filtered, washed 25 with diethyl ether and dried to yield 0.089 g (89 %) of the title compound. MS (EI) 592.2 (MH⁺).

Compounds of Table 2 were prepared from [4-(2-phenoxy-phenylsulfamoyl)-benzoylamino]-acetic acid (Example 2.1/c) according to the method described in 30 Example 1.1/f.

Table 2

Example	Name	MS (EI) (MH ⁺)
2.2	<i>N</i> -{2-Oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperazin-1-yl]-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide	592.2
2.3	<i>N</i> -{2-[4-(2-Dimethylamino-ethyl)-piperazin-1-yl]-2-oxo-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide	566.2
2.4	<i>N</i> -{2-[4-(2-Diethylamino-ethyl)-piperazin-1-yl]-2-oxo-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide	594.2
2.5	<i>N</i> -{2-Oxo-2-[4-(3-pyrrolidin-1-yl-propyl)-piperazin-1-yl]-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide	606.2
2.6	<i>N</i> -{2-[4-(3-Dimethylamino-propyl)-piperazin-1-yl]-2-oxo-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide	580.2
2.7	<i>N</i> -{2-Oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperidin-1-yl]-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide	591.2
2.8	<i>N</i> -(2-[1,4']Bipiperidinyl-1'-yl-2-oxo-ethyl)-4-(2-phenoxy-phenylsulfamoyl)-benzamide	577.2
2.9	<i>N</i> -[2-Oxo-2-(4-pyrrolidin-1-yl-piperidin-1-yl)-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	563.2
2.10	<i>N</i> -[2-(4-Hydroxy-piperidin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	510.2
2.11	<i>N</i> -(2-{4-[2-(2-Hydroxy-ethoxy)-ethyl]-piperazin-1-yl}-2-oxo-ethyl)-4-(2-phenoxy-phenylsulfamoyl)-benzamide	583.2
2.12	<i>N</i> -[2-Oxo-2-(4-phenyl-piperazin-1-yl)-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	571.2
2.13	<i>N</i> -(2-Oxo-2-piperidin-1-yl-ethyl)-4-(2-phenoxy-phenylsulfamoyl)-benzamide	494.2

2.14	<i>N</i> -{2-[4-(4-Methyl-piperazine-1-carbonyl)-piperidin-1-yl]-2-oxo-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide	620.2
2.15	1-{2-[4-(2-Phenoxy-phenylsulfamoyl)-benzoylamino]-acetyl}-piperidine-4-carboxylic acid amide	537.2
2.16	<i>N</i> -[2-(2-Hydroxymethyl-piperidin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	524.2
2.17	<i>N</i> -[2-(3-Hydroxy-piperidin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	510.2
2.18	<i>N</i> -{2-[2-(2-Hydroxy-ethyl)-piperidin-1-yl]-2-oxo-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide	538.2
2.19	<i>N</i> -[2-Oxo-2-(4-oxo-piperidin-1-yl)-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	508.2
2.20	<i>N</i> -[2-(3-Hydroxymethyl-piperidin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	524.2
2.21	<i>N</i> -[2-Oxo-2-(3-oxo-piperazin-1-yl)-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	509.2
2.22	<i>N</i> -[2-(4-Hydroxymethyl-piperidin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	524.2
2.23	<i>N</i> -{2-[4-(2-Hydroxy-ethyl)-piperidin-1-yl]-2-oxo-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide	538.2
2.24	<i>N</i> -(2-Azepan-1-yl-2-oxo-ethyl)-4-(2-phenoxy-phenylsulfamoyl)-benzamide	508.2
2.25	<i>N</i> -(2-Oxo-2-pyrrolidin-1-yl-ethyl)-4-(2-phenoxy-phenylsulfamoyl)-benzamide	480.2
2.26	<i>N</i> -[2-(3-Hydroxy-pyrrolidin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	496.2
2.27	<i>N</i> -(2-Oxo-2-thiomorpholin-4-yl-ethyl)-4-(2-phenoxy-	512.2

	phenylsulfamoyl)-benzamide	
2.28	<i>N</i> -[2-(1,1-Dioxo-1 λ ⁶ -thiomorpholin-4-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	544.1
2.29	<i>N</i> -[2-(4-Cyano-piperidin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	519.2
2.30	<i>N</i> -[2-(4-Acetyl-piperazin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	537.2
2.31	<i>N</i> -{2-Oxo-2-[4-(tetrahydro-furan-2-carbonyl)-piperazin-1-yl]-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide	593.2
2.32	<i>N</i> -{2-[4-(3-Hydroxy-phenyl)-piperazin-1-yl]-2-oxo-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide	587.2
2.33	<i>N</i> -{2-[4-(4-Hydroxy-phenyl)-piperazin-1-yl]-2-oxo-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide	587.2
2.34	<i>N</i> -{2-[4-(1-Methyl-piperidin-4-yl)-piperazin-1-yl]-2-oxo-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide	592.1
2.35	<i>N</i> -[2-(4-Morpholin-4-yl-piperidin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	579.2
2.36	<i>N</i> -[2-(4-Ethyl-piperazin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	523.2
2.37	<i>N</i> -[2-Oxo-2-(4-phenyl-piperidin-1-yl)-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	570.2
2.38	<i>N</i> -[2-(4-Benzoyl-piperazin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	599.2
2.39	<i>N</i> -{2-[4-(Furan-2-carbonyl)-piperazin-1-yl]-2-oxo-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide	589.2
2.40	<i>N</i> -{2-[4-(2-Fluoro-phenyl)-piperazin-1-yl]-2-oxo-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide	589.2

2.41	<i>N</i> -{2-[4-(4-Fluoro-phenyl)-piperazin-1-yl]-2-oxo-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide	589.2
2.42	<i>N</i> -[2-Oxo-2-(4-phenethyl-piperazin-1-yl)-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	599.2
2.43	<i>N</i> -[2-(4-Cyclopropylmethyl-piperazin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	549.2
2.44	<i>N</i> -{2-Oxo-2-[4-(tetrahydro-furan-2-ylmethyl)-piperazin-1-yl]-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide	579.2
2.45	<i>N</i> -[2-(4-Cyclohexyl-piperazin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	577.2
2.46	<i>N</i> -{2-[4-(4-Cyano-phenyl)-piperazin-1-yl]-2-oxo-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide	596.2
2.47	<i>N</i> -[2-(4-Ethanesulfonyl-piperazin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	587.2
2.48	<i>N</i> -{2-[4-(2-Cyano-phenyl)-piperazin-1-yl]-2-oxo-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide	596.2
2.49	<i>N</i> -[2-(4-Cyclohexylmethyl-piperazin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	591.2
2.50	<i>N</i> -[2-(Octahydro-isoquinolin-2-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	548.2
2.51	(1-{2-[4-(2-Phenoxy-phenylsulfamoyl)-benzoylamino]-acetyl}-piperidin-4-yl)-acetic acid methyl ester	566.2
2.52	<i>N</i> -{2-Oxo-2-[4-(3-piperidin-4-yl-propyl)-piperidin-1-yl]-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide	619.3
2.53	<i>N</i> -[2-(4-Cyanomethyl-piperidin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	533.2
2.54	<i>N</i> -(2-Morpholin-4-yl-2-oxo-ethyl)-4-(2-phenoxy-	496.1

	phenylsulfamoyl)-benzamide	
2.55	<i>N</i> -[2-(4,4-Difluoro-piperidin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	530.2
2.56	<i>N</i> -[2-(4-Methyl-piperidin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	508.2
2.57	1-{2-[4-(2-Phenoxy-phenylsulfamoyl)-benzoylamino]-acetyl}-piperidine-4-carboxylic acid (2-hydroxy-ethyl)-amide	581.2
2.58	<i>N</i> -[2-(4-Acetylamino-piperidin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	551.2
2.59	<i>N</i> -[2-(4-Methanesulfonylamino-piperidin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	587.2
2.60	1-{2-[4-(2-Phenoxy-phenylsulfamoyl)-benzoylamino]-acetyl}-piperidine-4-carboxylic acid cycloheptylamide	633.2
2.61	<i>N</i> -[2-((<i>S</i>)-5-Benzyl-2,5-diaza-bicyclo[2.2.1]hept-2-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	597.2
2.62	1-{2-[4-(2-Phenoxy-phenylsulfamoyl)-benzoylamino]-acetyl}-piperidine-4-carboxylic acid dimethylamid	565.4
2.63	<i>N</i> -[2-(4-Methoxy-piperidin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide	524.4
2.64	1-{2-[4-(2-Phenoxy-phenylsulfamoyl)-benzoylamino]-acetyl}-piperidine-4-carboxylic acid tert-butylamide	593.4
2.65	<i>N</i> -(2-Azocan-1-yl-2-oxo-ethyl)-4-(2-phenoxy-phenylsulfamoyl)-benzamide	522.4

Example 3.1**4-(2-Benzoyl-phenylsulfamoyl)-*N*-{2-oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperazin-1-yl]-ethyl}-benzamide**

- 5 a) 4-(2-Benzoyl-phenylsulfamoyl)-benzoic acid

The title compound was prepared from 2-amino-benzophenone according to the method described in Example 1.1/c. MS (EI) 382.2 (MH^+).

b) [4-(2-Benzoyl-phenylsulfamoyl)-benzoylamino]-acetic acid ethyl ester

5 The title compound was prepared from 4-(2-benzoyl-phenylsulfamoyl)-benzoic acid and glycine ethyl ester hydrochloride (Aldrich) according to the method described in Example 1.1/d. MS (EI) 867.2 (MH^+).

c) [4-(2-Benzoyl-phenylsulfamoyl)-benzoylamino]-acetic acid

10 The title compound was prepared from [4-(2-benzoyl-phenylsulfamoyl)-benzoylamino]-acetic acid ethyl ester according to the method described in Example 1.1/e. MS (EI) 439.2 (MH^+).

d) 4-(2-Benzoyl-phenylsulfamoyl)-N-{2-oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperazin-1-yl]-ethyl}-benzamide

15 The title compound was prepared from [4-(2-benzoyl-phenylsulfamoyl)-benzoylamino]-acetic acid and 1-(2-pyrrolidin-1-yl-ethyl)-piperazine (EMKA-Chemie) according to the method described in Example 1.1/f. MS (EI) 604.2 (MH^+).

20 Compounds of Table 3 were prepared from [4-(2-benzoyl-phenylsulfamoyl)-benzoylamino]-acetic acid (Example 3.1/c) according to the method described in Example 1.1/f.

Table 3

25

Example	Name	MS (EI) (MH^+)
3.2	4-(2-Benzoyl-phenylsulfamoyl)-N-{2-[4-(2-dimethylamino-ethyl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide	578.2
3.3	4-(2-Benzoyl-phenylsulfamoyl)-N-(2-oxo-2-piperidin-1-yl-ethyl)-benzamide	506.2

3.4	<i>N</i> -(2-Azepan-1-yl-2-oxo-ethyl)-4-(2-benzoyl-phenylsulfamoyl)-benzamide	520.2
3.5	4-(2-Benzoyl-phenylsulfamoyl)- <i>N</i> -[2-(4-cyano-piperidin-1-yl)-2-oxo-ethyl]-benzamide	531.2
3.6	4-(2-Benzoyl-phenylsulfamoyl)- <i>N</i> -[2-oxo-2-(4-trifluoromethyl-piperidin-1-yl)-ethyl]-benzamide	574.2
3.7	4-(2-Benzoyl-phenylsulfamoyl)- <i>N</i> -[2-(4-methyl-piperidin-1-yl)-2-oxo-ethyl]-benzamide	520.2
3.8	4-(2-Benzoyl-phenylsulfamoyl)- <i>N</i> -{2-[4-(1-methyl-piperidin-3-ylmethyl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide	618.2
3.9	4-(2-Benzoyl-phenylsulfamoyl)- <i>N</i> -[2-(4-hydroxymethyl-piperidin-1-yl)-2-oxo-ethyl]-benzamide	536.2
3.10	4-(2-Benzoyl-phenylsulfamoyl)- <i>N</i> -{2-[4-(2-hydroxy-ethyl)-piperidin-1-yl]-2-oxo-ethyl}-benzamide	550.2
3.11	4-(2-Benzoyl-phenylsulfamoyl)- <i>N</i> -(2-oxo-2-pyrrolidin-1-yl-ethyl)-benzamide	492.2
3.12	4-(2-Benzoyl-phenylsulfamoyl)- <i>N</i> -[2-(3-hydroxy-pyrrolidin-1-yl)-2-oxo-ethyl]-benzamide	508.2
3.13	4-(2-Benzoyl-phenylsulfamoyl)- <i>N</i> -{2-oxo-2-[4-(3-pyrrolidin-1-yl-propyl)-piperazin-1-yl]-ethyl}-benzamide	618.2
3.14	4-(2-Benzoyl-phenylsulfamoyl)- <i>N</i> -{2-[4-(3-dimethylamino-propyl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide	592.2
3.15	4-(2-Benzoyl-phenylsulfamoyl)- <i>N</i> -{2-oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperidin-1-yl]-ethyl}-benzamide	603.2
3.16	4-(2-Benzoyl-phenylsulfamoyl)- <i>N</i> -[2-(4-hydroxy-piperidin-1-yl)-2-oxo-ethyl]-benzamide	522.2
3.17	1-{2-[4-(2-Benzoyl-phenylsulfamoyl)-benzoylamino]-acetyl}-	549.2

	piperidine-4-carboxylic acid amide	
3.18	4-(2-Benzoyl-phenylsulfamoyl)- <i>N</i> -(2-morpholin-4-yl-2-oxo-ethyl)-benzamide	508.2
3.19	4-(2-Benzoyl-phenylsulfamoyl)- <i>N</i> -[2-oxo-2-(3-oxo-piperazin-1-yl)-ethyl]-benzamide	521.2
3.20	4-(2-Benzoyl-phenylsulfamoyl)- <i>N</i> -(2-oxo-2-thiomorpholin-4-yl-ethyl)-benzamide	524.2
3.21	4-(2-Benzoyl-phenylsulfamoyl)- <i>N</i> -[2-(1,1-dioxo-1 λ^6 -thiomorpholin-4-yl)-2-oxo-ethyl]-benzamide	556.1
3.22	4-(2-Benzoyl-phenylsulfamoyl)- <i>N</i> -[2-(3-hydroxymethyl-piperidin-1-yl)-2-oxo-ethyl]-benzamide	536.2
3.23	4-(2-Benzoyl-phenylsulfamoyl)- <i>N</i> -{2-oxo-2-[4-(3-pyrrolidin-1-yl-propyl)-[1,4]diazepan-1-yl]-ethyl}-benzamide	632.5
3.24	4-(2-Benzoyl-phenylsulfamoyl)- <i>N</i> -[2-oxo-2-(4-oxo-piperidin-1-yl)-ethyl]-benzamide	520.3

Example 4.1**4-[5-Fluoro-2-(4-fluoro-phenoxy)-phenylsulfamoyl]-*N*-(2-oxo-2-piperidin-1-yl-ethyl)-benzamide**5 **a) 4-[5-Fluoro-2-(4-fluoro-phenoxy)-phenylsulfamoyl]-benzoic acid**

The title compound was prepared from 5-fluoro-2-(4-fluoro-phenoxy)-phenylamine [*Yakugaku Zasshi*; **88** (1968) 1361, 1365; *Chem. Abstr.*; **70** (1969) 68312] according to the method described in Example 1.1/c. MS (EI) 406.3 (MH⁺).

10 **b) {4-[5-Fluoro-2-(4-fluoro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid ethyl ester**

The title compound was prepared from 4-[5-fluoro-2-(4-fluoro-phenoxy)-phenylsulfamoyl]-benzoic acid and glycine ethyl ester hydrochloride (Aldrich) according to the method described in Example 1.1/d.

c) {4-[5-Fluoro-2-(4-fluoro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid

The title compound was prepared from {4-[5-fluoro-2-(4-fluoro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid ethyl ester according to the method
5 described in Example 1.1/e. MS (EI) 463.1 (MH⁺).

d) 4-[5-Fluoro-2-(4-fluoro-phenoxy)-phenylsulfamoyl]-N-(2-oxo-2-piperidin-1-yl-ethyl)-benzamide

The title compound was prepared from {4-[5-fluoro-2-(4-fluoro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid and piperidine according to the method
10 described in Example 1.1/f. MS (EI) 533.3 (MH⁺).

Compounds of Table 4 were prepared from {4-[5-fluoro-2-(4-fluoro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid (Example 4.1/c) according to the method
15 described in Example 1.1/f.

Table 4

Example	Name	MS (EI) (MH ⁺)
4.2	<i>N</i> -(2-Azepan-1-yl-2-oxo-ethyl)-4-[5-fluoro-2-(4-fluoro-phenoxy)-phenylsulfamoyl]-benzamide	544.4
4.3	4-[5-Fluoro-2-(4-fluoro-phenoxy)-phenylsulfamoyl]- <i>N</i> -[2-(4-hydroxy-piperidin-1-yl)-2-oxo-ethyl]-benzamide	546.3
4.4	4-[5-Fluoro-2-(4-fluoro-phenoxy)-phenylsulfamoyl]- <i>N</i> -[2-(4-hydroxymethyl-piperidin-1-yl)-2-oxo-ethyl]-benzamide	560.3
4.5	4-[5-Fluoro-2-(4-fluoro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-[4-(2-hydroxy-ethyl)-piperidin-1-yl]-2-oxo-ethyl}-benzamide	574.4
4.6	4-[5-Fluoro-2-(4-fluoro-phenoxy)-phenylsulfamoyl]- <i>N</i> -[2-oxo-2-(4-phenyl-piperazin-1-yl)-ethyl]-benzamide	607.4

4.7	4-[5-Fluoro-2-(4-fluoro-phenoxy)-phenylsulfamoyl]- <i>N</i> -{2-oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperidin-1-yl]-ethyl}-benzamide	627.5
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Example 5.1**4-[2-(2-Chloro-4-fluoro-phenoxy)-phenylsulfamoyl]-*N*-[2-(4-hydroxy-piperidin-1-yl)-2-oxo-ethyl]-benzamide**5 **a) 2-Chloro-4-fluoro-1-(2-nitro-phenoxy)-benzene**

The title compound was prepared from 2-chloro-4-fluoro-phenol according to the method described in Example 1.1/a.

b) 2-(2-Chloro-4-fluoro-phenoxy)-phenylamine

10 The title compound was prepared from 2-chloro-4-fluoro-1-(2-nitro-phenoxy)-benzene according to the method described in Example 1.1/b.

c) 4-[2-(2-Chloro-4-fluoro-phenoxy)-phenylsulfamoyl]-benzoic acid

15 The title compound was prepared from 2-(2-chloro-4-fluoro-phenoxy)-phenylamine according to the method described in Example 1.1/c. MS (EI) 422.1 (MH⁺).

d) {4-[2-(2-Chloro-4-fluoro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid ethyl ester

20 The title compound was prepared from 4-[2-(2-chloro-4-fluoro-phenoxy)-phenylsulfamoyl]-benzoic acid and glycine ethyl ester hydrochloride according to the method described in Example 1.1/d.

e) {4-[2-(2-Chloro-4-fluoro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid

25 The title compound was prepared from {4-[2-(2-chloro-4-fluoro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid ethyl ester according to the method described in Example 1.1/e. MS (EI) 479 (MH⁺).

f) 4-[2-(2-Chloro-4-fluoro-phenoxy)-phenylsulfamoyl]-N-[2-(4-hydroxy-piperidin-1-yl)-2-oxo-ethyl]-benzamide

The title compound was prepared from {4-[2-(2-chloro-4-fluoro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid and 4-hydroxypiperidine according to the method described in Example 1.1/f. MS (EI) 562.3 (MH⁺).

Compounds of Table 5 were prepared from {4-[2-(2-chloro-4-fluoro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid (Example 5.1/e) according to the method described in Example 1.1/f.

10

Table 5

Example	Name	MS (EI) (MH ⁺)
5.2	4-[2-(2-Chloro-4-fluoro-phenoxy)-phenylsulfamoyl]-N-{2-oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperazin-1-yl]-ethyl}-benzamide	644.4
5.3	4-[2-(2-Chloro-4-fluoro-phenoxy)-phenylsulfamoyl]-N-{2-oxo-2-[4-(3-pyrrolidin-1-yl-propyl)-piperazin-1-yl]-ethyl}-benzamide	658.5
5.4	4-[2-(2-Chloro-4-fluoro-phenoxy)-phenylsulfamoyl]-N-{2-oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperidin-1-yl]-ethyl}-benzamide	643.4
5.5	4-[2-(2-Chloro-4-fluoro-phenoxy)-phenylsulfamoyl]-N-[2-(4-hydroxymethyl-piperidin-1-yl)-2-oxo-ethyl]-benzamide	576.3
5.6	1-(2-{4-[2-(2-Chloro-4-fluoro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetyl)-piperidine-4-carboxylic acid amide	589.3
5.7	4-[2-(2-Chloro-4-fluoro-phenoxy)-phenylsulfamoyl]-N-{2-[4-(1-methyl-piperidin-4-yl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide	644.4

Example 6.1**4-[2-(2,4-Dichloro-benzoyl)-phenylsulfamoyl]-N-{2-oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperazin-1-yl]-ethyl}-benzamide****a) 4-[2-(2,4-Dichloro-benzoyl)-phenylsulfamoyl]-benzoic acid**

- 5 The title compound was prepared from (2-amino-phenyl)-(2,4-dichloro-phenyl)-methanone [*Synthesis*, (1980) 677-688] and 4-chlorosulfonyl-benzoic acid according to the method described in Example 1.1/c. MS (EI) 451 (MH⁺).

10 **b) {4-[2-(2,4-Dichloro-benzoyl)-phenylsulfamoyl]-benzoylamino}-acetic acid ethyl ester**

 The title compound was prepared from 4-[2-(2,4-dichloro-benzoyl)-phenylsulfamoyl]-benzoic acid and glycine ethyl ester hydrochloride according to the method described in Example 1.1/d. MS (EI) 536.1 (MH⁺).

15 **c) {4-[2-(2,4-Dichloro-benzoyl)-phenylsulfamoyl]-benzoylamino}-acetic acid**

 The title compound was prepared from {4-[2-(2,4-dichloro-benzoyl)-phenylsulfamoyl]-benzoylamino}-acetic acid ethyl ester according to the method described in Example 1.1/e. MS (EI) 508 (MH⁺).

20 **d) 4-[2-(2,4-Dichloro-benzoyl)-phenylsulfamoyl]-N-{2-oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperazin-1-yl]-ethyl}-benzamide**

- The title compound was prepared from {4-[2-(2,4-dichloro-benzoyl)-phenylsulfamoyl]-benzoylamino}-acetic acid and 1-(2-pyrrolidin-1-yl-ethyl)-piperazine (EMKA-Chemie) according to the method described in Example 1.1/f. MS (EI) 673.2
25 (MH⁺).

Compounds of Table 6 were prepared from {4-[2-(2,4-dichloro-benzoyl)-phenylsulfamoyl]-benzoylamino}-acetic acid (Example 6.1/c) according to the method described in Example 1.1/f.

Table 6

Example	Name	MS (EI) (MH ⁺)
6.2	4-[2-(2,4-Dichloro-benzoyl)-phenylsulfamoyl]- <i>N</i> -{2-oxo-2-[4-(3-piperidin-1-yl-propyl)-piperazin-1-yl]-ethyl}-benzamide	701.4
6.3	4-[2-(2,4-Dichloro-benzoyl)-phenylsulfamoyl]- <i>N</i> -{2-oxo-2-[4-(3-pyrrolidin-1-yl-propyl)-piperazin-1-yl]-ethyl}-benzamide	687.2
6.4	4-[2-(2,4-Dichloro-benzoyl)-phenylsulfamoyl]- <i>N</i> -{2-[4-(3-dimethylamino-propyl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide	661.4
6.5	4-[2-(2,4-Dichloro-benzoyl)-phenylsulfamoyl]- <i>N</i> -{2-oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperidin-1-yl]-ethyl}-benzamide	672.4
6.6	4-[2-(2,4-Dichloro-benzoyl)-phenylsulfamoyl]- <i>N</i> -[2-(4-hydroxy-piperidin-1-yl)-2-oxo-ethyl]-benzamide	591.2
6.7	4-[2-(2,4-Dichloro-benzoyl)-phenylsulfamoyl]- <i>N</i> -[2-(4-hydroxymethyl-piperidin-1-yl)-2-oxo-ethyl]-benzamide	605.2
6.8	1-(2-{4-[2-(2,4-Dichloro-benzoyl)-phenylsulfamoyl]-benzoylamino}-acetyl)-piperidine-4-carboxylic acid amide	618.3
6.9	4-[2-(2,4-Dichloro-benzoyl)-phenylsulfamoyl]- <i>N</i> -{2-[4-(1-methyl-piperidin-4-yl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide	673.4

Example 7.1

5 **4-[2-(4-Fluoro-phenoxy)-phenylsulfamoyl]-*N*-[2-(4-hydroxy-piperidin-1-yl)-2-oxo-ethyl]-benzamide**

a) **4-[2-(4-Fluoro-phenoxy)-phenylsulfamoyl]-benzoic acid**

The title compound was prepared from 2-(4-fluoro-phenoxy)-phenylamine [Helv. Chim. Acta; **48** (1965) 336-347] according to the method described in Example

10 1.1/c. MS (EI) 388.2 (MH⁺).

b) {4-[2-(4-Fluoro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid ethyl ester

The title compound was prepared from 4-[2-(4-fluoro-phenoxy)-phenylsulfamoyl]-benzoic acid and glycine ethyl ester hydrochloride according to the method described in Example 1.1/d.

c) {4-[2-(4-Fluoro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid

The title compound was prepared from {4-[2-(4-fluoro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid ethyl ester according to the method described in Example 1.1/e. MS (EI) 445.1 (MH^+).

d) 4-[2-(4-Fluoro-phenoxy)-phenylsulfamoyl]-N-[2-(4-hydroxy-piperidin-1-yl)-2-oxo-ethyl]-benzamide

The title compound was prepared from {4-[2-(4-fluoro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid and 4-hydroxypiperidine according to the method described in Example 1.1/f. MS (EI) 528.4 (MH^+).

Compounds of Table 7 were prepared from {4-[2-(4-fluoro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid (Example 7.1/c) according to the method described in Example 1.1/f.

Table 7

Example	Name	MS (EI) (MH^+)
7.2	4-[2-(4-Fluoro-phenoxy)-phenylsulfamoyl]-N-(2-oxo-2-piperidin-1-yl-ethyl)-benzamide	512.3
7.3	4-[2-(4-Fluoro-phenoxy)-phenylsulfamoyl]-N-[2-(4-hydroxymethyl-piperidin-1-yl)-2-oxo-ethyl]-benzamide	542.4
7.4	4-[2-(4-Fluoro-phenoxy)-phenylsulfamoyl]-N-{2-[4-(2-	556.2

	hydroxy-ethyl)-piperidin-1-yl]-2-oxo-ethyl}-benzamide	
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Example 8.1**N-[2-(4-Hydroxy-piperidin-1-yl)-2-oxo-ethyl]-4-[2-(4-trifluoromethyl-phenoxy)-phenylsulfamoyl]-benzamide****a) 4-[2-(4-Trifluoromethyl-phenoxy)-phenylsulfamoyl]-benzoic acid**

The title compound was prepared from 2-(4-trifluoromethyl-phenoxy)-phenylamine [*J. Chem. Soc. Perkin Trans. 1.* (1976) 1279-1285] according to the method described in Example 1.1/c. MS (EI) 438.0 (MH⁺).

b) {4-[2-(4-Trifluoromethyl-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid ethyl ester

The title compound was prepared from 4-[2-(4-trifluoromethyl-phenoxy)-phenylsulfamoyl]-benzoic acid and glycine ethyl ester hydrochloride according to the method described in Example 1.1/d.

c) {4-[2-(4-Trifluoromethyl-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid

The title compound was prepared from {4-[2-(4-trifluoromethyl-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid ethyl ester according to the method described in Example 1.1/e. MS (EI) 475.2 (MH⁺).

d) N-[2-(4-Hydroxy-piperidin-1-yl)-2-oxo-ethyl]-4-[2-(4-trifluoromethyl-phenoxy)-phenylsulfamoyl]-benzamide

The title compound was prepared from {4-[2-(4-trifluoromethyl-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid and 4-hydroxypiperidine according to the method described in Example 1.1/f. MS (EI) 578.3 (MH⁺).

Example 9.1**N-[2-(4-Hydroxy-piperidin-1-yl)-2-oxo-ethyl]-4-[2-(4-trifluoromethoxy-phenoxy)-phenylsulfamoyl]-benzamide****a) 4-[2-(4-Trifluoromethoxy-phenoxy)-phenylsulfamoyl]-benzoic acid**

The title compound was prepared from 2-(4-trifluoromethoxy-phenoxy)-phenylamine [*J. Med. Chem.* 13 (1970) 295-297] according to method described in Example 1.1/c. MS (EI) 454.1 (MH⁺).

5 b) {4-[2-(4-Trifluoromethoxy-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid ethyl ester

The title compound was prepared from 4-[2-(4-trifluoromethoxy-phenoxy)-phenylsulfamoyl]-benzoic acid and glycine ethyl ester hydrochloride according to the method described in Example 1.1/d.

10

c) {4-[2-(4-Trifluoromethoxy-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid

The title compound was prepared from {4-[2-(4-trifluoromethoxy-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid ethyl ester according to the method described in Example 1.1/e. MS (EI) 511 (MH⁺).

15

d) N-[2-(4-Hydroxy-piperidin-1-yl)-2-oxo-ethyl]-4-[2-(4-trifluoromethoxy-phenoxy)-phenylsulfamoyl]-benzamide

The title compound was prepared from {4-[2-(4-trifluoromethoxy-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid and 4-hydroxypiperidine according to the method described in Example 1.1/f. MS (EI) 594.3 (MH⁺).

20

Compounds of Table 9 were prepared from {4-[2-(4-trifluoromethoxy-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid (Example 9.1/c) according to the method described in Example 1.1/f.

25

Table 9

Example	Name	MS (EI) (MH ⁺)
9.2	N-{2-Oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperazin-1-yl]-ethyl}-4-[2-(4-trifluoromethoxy-phenoxy)-phenylsulfamoyl]-	676.5

	benzamide	
9.3	<i>N</i> -{2-[4-(1-Methyl-piperidin-4-yl)-piperazin-1-yl]-2-oxo-ethyl}-4-[2-(4-trifluoromethoxy-phenoxy)-phenylsulfamoyl]-benzamide	676.5

Example 10.1**4-[2-(4-Bromo-2-chloro-phenoxy)-phenylsulfamoyl]-*N*-[2-(4-hydroxy-piperidin-1-yl)-2-oxo-ethyl]-benzamide**5 **a) 4-Bromo-2-chloro-1-(2-nitro-phenoxy)-benzene**

The title compound was prepared from 4-bromo-2-chloro-phenol according to the method described in Example 1.1/a. MS (EI) 329.3 (MH⁺).

b) 2-(4-Bromo-2-chloro-phenoxy)-phenylamine

10 The title compound was prepared from 4-bromo-2-chloro-1-(2-nitro-phenoxy)-benzene according to the method described in Example 1.1/b. MS (EI) 300.2 (MH⁺).

c) 4-[2-(4-Bromo-2-chloro-phenoxy)-phenylsulfamoyl]-benzoic acid

15 The title compound was prepared from 2-(4-bromo-2-chloro-phenoxy)-phenylamine according to the method described in Example 1.1/c. MS (EI) 483.4 (MH⁺).

d) {4-[2-(4-Bromo-2-chloro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid ethyl ester

20 The title compound was prepared from 4-[2-(4-bromo-2-chloro-phenoxy)-phenylsulfamoyl]-benzoic acid and glycine ethyl ester hydrochloride according to the method described in Example 1.1/d.

e) {4-[2-(4-Bromo-2-chloro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid

25 The title compound was prepared from {4-[2-(4-bromo-2-chloro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid ethyl ester according to the method described in Example 1.1/e. MS (EI) 541.1 (MH⁺).

f) 4-[2-(4-Bromo-2-chloro-phenoxy)-phenylsulfamoyl]-N-[2-(4-hydroxy-piperidin-1-yl)-2-oxo-ethyl]-benzamide

The title compound was prepared from {4-[2-(4-bromo-2-chloro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid and 4-hydroxypiperidine according to the method described in Example 1.1/f. MS (EI) 623.3 (MH⁺).

Compounds of Table 10 were prepared from {4-[2-(4-bromo-2-chloro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid (Example 10.1/e) according to the method described in Example 1.1/f.

Table 10

Example	Name	MS (EI) (MH ⁺)
10.2	4-[2-(4-Bromo-2-chloro-phenoxy)-phenylsulfamoyl]-N-{2-oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperazin-1-yl]-ethyl}-benzamide	705.4
10.3	4-[2-(4-Bromo-2-chloro-phenoxy)-phenylsulfamoyl]-N-{2-oxo-2-[4-(3-pyrrolidin-1-yl-propyl)-piperazin-1-yl]-ethyl}-benzamide	720.4
10.4	4-[2-(4-Bromo-2-chloro-phenoxy)-phenylsulfamoyl]-N-{2-oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperidin-1-yl]-ethyl}-benzamide	705.4
10.5	1-(2-{4-[2-(4-Bromo-2-chloro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetyl)-piperidine-4-carboxylic acid amide	651.3
10.6	4-[2-(4-Bromo-2-chloro-phenoxy)-phenylsulfamoyl]-N-[2-(4-hydroxymethyl-piperidin-1-yl)-2-oxo-ethyl]-benzamide	638.3
10.7	4-[2-(4-Bromo-2-chloro-phenoxy)-phenylsulfamoyl]-N-{2-[4-(1-methyl-piperidin-4-yl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide	706.4

Example 11.1**N-(2-[1,4]Diazepan-1-yl-2-oxo-ethyl)-4-(2-phenoxy-phenylsulfamoyl)-benzamide hydrochloride**

5 To a stirred solution of [4-(2-phenoxy-phenylsulfamoyl)-benzoylamino]-acetic acid (Example 2.1/c) (36 mg, 0.085 mmol) in a mixture of dichloromethane (2 mL) and dimethylformamide (0.2 mL) and [1,4]diazepane-1-carboxylic acid *tert*-butyl ester (Fluka) (20 mg, 0.1 mmol), HBTU (46 mg, 0.12 mmol) and triethylamine (30 μ L, 0.2 mmol) were added. The mixture was stirred at room temperature for 24 h, then purified
10 by column chromatography using Kieselgel 60 (0.015-0.040 mm) as adsorbent (Merck) and gradient elution starting with 100% A eluent and processing to 100% B eluent over a period of 20 minutes (eluent A: n-hexane; eluent B: ethyl acetate). The purified compound was dissolved in ethyl acetate (0.5 mL) 2.5 M hydrogen chloride in ethyl acetate (2.0 mL) was added and the mixture was stirred at room temperature for 24 h.
15 The precipitated product was filtered, washed with diethyl ether and dried in vacuum to yield 29 mg (62 %) of the title compound. MS (EI) 509.2 (MH^+).

Example 11.2**N-(2-Oxo-2-piperazin-1-yl-ethyl)-4-(2-phenoxy-phenylsulfamoyl)-benzamide hydrochloride**

20 The title compound was prepared from [4-(2-phenoxy-phenylsulfamoyl)-benzoylamino]-acetic acid (Example 2.1/c) and piperazine-1-carboxylic acid *tert*-butyl ester (Aldrich) according to the method described in Example 11.1. MS (EI) 495.2 (MH^+).

25

Example 11.3**N-[2-(4-Amino-piperidin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide hydrochloride**

The title compound was prepared from [4-(2-phenoxy-phenylsulfamoyl)-benzoylamino]-acetic acid (Example 2.1/c) and piperidin-4-yl-carbamic acid *tert*-butyl ester (Aldrich) according to the method described in Example 11.1. MS (EI) 509.0 (MH^+).

30

Example 11.4**4-[2-(2,4-Dichloro-phenoxy)-phenylsulfamoyl]-N-(2-oxo-2-piperazin-1-yl-ethyl)-benzamide hydrochloride**

5 The title compound was prepared from {4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid (Example 1.1/e) and piperazine-1-carboxylic acid *tert*-butyl ester (Aldrich) according to the method described in Example 11.1. MS (EI) 564.2 (MH⁺).

10 **Example 11.5**

N-(2-[1,4]Diazepan-1-yl-2-oxo-ethyl)-4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-benzamide hydrochloride

 The title compound was prepared from {4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid (Example 1.1/e) and [1,4]diazepane-1-carboxylic acid *tert*-butyl ester (Fluka) according to the method described in Example
15 11.1. MS (EI) 578.2 (MH⁺).

Example 11.6**4-(2-Benzoyl-phenylsulfamoyl)-N-(2-[1,4]diazepan-1-yl-2-oxo-ethyl)-benzamide hydrochloride**

20 The title compound was prepared from [4-(2-benzoyl-phenylsulfamoyl)-benzoylamino]-acetic acid (Example 3.1/c) and [1,4]diazepane-1-carboxylic acid *tert*-butyl ester (Fluka) according to the method described in Example 11.1. MS (EI) 521.2 (MH⁺).

25

Example 11.7**4-(2-Benzoyl-phenylsulfamoyl)-N-(2-oxo-2-piperazin-1-yl-ethyl)-benzamide hydrochloride**

 The title compound was prepared from [4-(2-benzoyl-phenylsulfamoyl)-benzoylamino]-acetic acid (Example 3.1/c) and piperazine-1-carboxylic acid *tert*-butyl ester (Aldrich) according to the method described in Example 11.1. MS (EI) 507.2 (MH⁺).

30

Example 11.8**N-[2-(4-Amino-piperidin-1-yl)-2-oxo-ethyl]-4-(2-benzoyl-phenylsulfamoyl)-benzamide hydrochloride**

5 The title compound was prepared from [4-(2-benzoyl-phenylsulfamoyl)-benzoylamino]-acetic acid (Example 3.1/c) and piperidin-4-yl-carbamic acid *tert*-butyl ester (Aldrich) according to the method described in Example 11.1. MS (EI) 521.2 (MH⁺).

10 **Example 11.9**

N-[2-(4-Amino-piperidin-1-yl)-2-oxo-ethyl]-4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-benzamide hydrochloride

15 The title compound was prepared from {4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid (Example 1.1/e) and piperidin-4-yl-carbamic acid *tert*-butyl ester (Aldrich) according to the method described in Example 11.1. MS (EI) 577.2 (MH⁺).

Example 11.10

20 **4-[5-Fluoro-2-(4-fluoro-phenoxy)-phenylsulfamoyl]-N-(2-oxo-2-piperazin-1-yl-ethyl)-benzamide hydrochloride**

 The title compound was prepared from {4-[5-fluoro-2-(4-fluoro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid (Example 4.1/c) and piperazine-1-carboxylic acid *tert*-butyl ester (Aldrich) according to the method described in Example 11.1. MS (EI) 531.2 (MH⁺).

25

Example 11.11**N-(2-[1,4]Diazepan-1-yl-2-oxo-ethyl)-4-[2-(2,4-dichloro-benzoyl)-phenylsulfamoyl]-benzamide hydrochloride**

30 The title compound was prepared from {4-[2-(2,4-dichloro-benzoyl)-phenylsulfamoyl]-benzoylamino}-acetic acid (Example 6.1/c)) and [1,4]diazepane-1-carboxylic acid *tert*-butyl ester (Fluka) according to the method described in Example 11.1. MS (EI) 589.3 (MH⁺).

Example 11.12**4-[2-(2,4-Dichloro-benzoyl)-phenylsulfamoyl]-N-(2-oxo-2-piperazin-1-yl-ethyl)-benzamide hydrochloride**

5 The title compound was prepared from {4-[2-(2,4-dichloro-benzoyl)-phenylsulfamoyl]-benzoylamino}-acetic acid (Example 6.1/c)) and piperazine-1-carboxylic acid *tert*-butyl ester (Aldrich) according to the method described in Example 11.1. MS (EI) 575.3 (MH⁺).

10 **Example 11.13**

N-[2-(4-Amino-piperidin-1-yl)-2-oxo-ethyl]-4-[2-(2,4-dichloro-benzoyl)-phenylsulfamoyl]-benzamide hydrochloride

15 The title compound was prepared from {4-[2-(2,4-dichloro-benzoyl)-phenylsulfamoyl]-benzoylamino}-acetic acid (Example 6.1/c)) and piperidin-4-yl-carbamic acid *tert*-butyl ester (Aldrich) according to the method described in Example 11.1. MS (EI) 589.3 (MH⁺).

Example 11.14**N-(2-Oxo-2-piperazin-1-yl-ethyl)-4-[2-(4-trifluoromethoxy-phenoxy)-phenylsulfamoyl]-benzamide hydrochloride**

20 The title compound was prepared from {4-[2-(4-trifluoromethoxy-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid (Example 9.1/c) and piperazine-1-carboxylic acid *tert*-butyl ester (Aldrich) according to the method described in Example 11.1. MS (EI) 579.3 (MH⁺).

25

Example 11.15**4-[2-(4-Bromo-2-chloro-phenoxy)-phenylsulfamoyl]-N-(2-oxo-2-piperazin-1-yl-ethyl)-benzamide hydrochloride**

30 The title compound was prepared from {4-[2-(4-bromo-2-chloro-phenoxy)-phenylsulfamoyl]-benzoylamino}-acetic acid (Example 10.1/e) and piperazine-1-carboxylic acid *tert*-butyl ester (Aldrich) according to the method described in Example 11.1. MS (EI) 609.2 (MH⁺).

Example 12**N-((S)-2-2,5-Diaza-bicyclo[2.2.1]hept-2-yl-2-oxo-ethyl)-4-(2-phenoxy-phenylsulfamoyl)-benzamide**

5 A stirred mixture of N-[2-((S)-5-benzyl-2,5-diaza-bicyclo[2.2.1]hept-2-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide (Example 2.61) (46 mg, 0.077 mmol) and 10 % Pd/C (10 mg) in acetic acid (5 mL) was hydrogenated at 5 bar at room temperature for 2 h. The catalyst was filtered off and the filtrate was concentrated *in vacuo*. The residue was purified by column chromatography using Kieselgel 60 (0.015-10 0.040 mm) (Merck) as adsorbent and chloroform:methanol:ammonium hydroxide = 9:1:0.1 as eluent to yield 37.9 mg (97 %) of the title compound. MS (EI) 507.1 (MH⁺).

Example 13**Preparation of pharmaceutical compositions:****a) Tablets:**

0.01-50 % of active ingredient of formula (I), 15-50 % of lactose, 15-50 % of potato starch, 5-15 % of polyvinyl pyrrolidone, 1-5 % of talc, 0.01-3 % of magnesium stearate, 1-3 % of colloid silicon dioxide and 2-7 % of ultraamylopectin were mixed, then granulated by wet granulation and pressed to tablets.

b) Dragées, filmcoated tablets:

The tablets made according to the method described above were coated by a layer consisting of entero- or gastrosolvent film, or of sugar and talc. The dragées were polished by a mixture of beeswax and carnuba wax.

c) Capsules:

25 0.01-50 % of active ingredient of formula (I), 1-5 % of sodium lauryl sulfate, 15-50 % of starch, 15-50 % of lactose, 1-3 % of colloid silicon dioxide and 0.01-3 % of magnesium stearate were thoroughly mixed, the mixture was passed through a sieve and filled in hard gelatin capsules.

d) Suspensions:

30 Ingredients: 0.01-15 % of active ingredient of formula (I), 0.1-2 % of sodium hydroxide, 0.1-3 % of citric acid, 0.05-0.2 % of nipagin (sodium methyl 4-hydroxybenzoate), 0.005-0.02 % of nipasol, 0.01-0.5 % of carbopol (polyacrylic acid),

0.1-5 % of 96 % ethanol, 0.1-1 % of flavoring agent, 20-70 % of sorbitol (70 % aqueous solution) and 30-50 % of distilled water.

To solution of nipagin and citric acid in 20 ml of distilled water, carbopol was added in small portions under vigorous stirring, and the solution was left to stand for 10-12 h. Then the sodium hydroxide in 1 ml of distilled water, the aqueous solution of sorbitol and finally the ethanolic raspberry flavor were added with stirring. To this carrier the active ingredient was added in small portions and suspended with an immersing homogenizator. Finally the suspension was filled up to the desired final volume with distilled water and the suspension syrup was passed through a colloid milling equipment.

e) Suppositories:

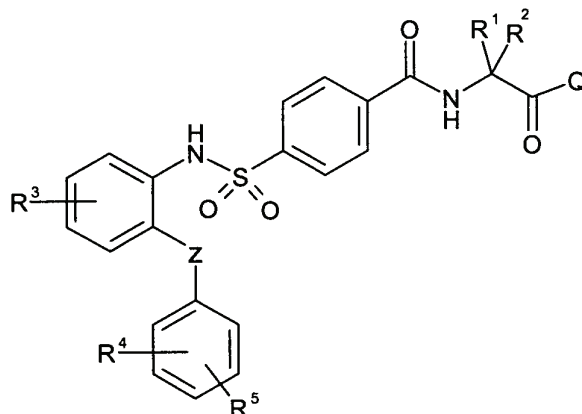
For each suppository 0.01-15% of active ingredient of formula (I) and 1-20% of lactose were thoroughly mixed, then 50-95% of adeps pro suppository (for example Witepsol 4) was melted, cooled to 35 °C and the mixture of active ingredient and lactose was mixed in it with homogenizator. The obtained mixture was mould in cooled forms.

f) Lyophilized powder ampoule compositions:

A 5 % solution of mannitol or lactose was made with bidistilled water for injection use, and the solution was filtered so as to have sterile solution. A 0.01-5 % solution of the active ingredient of formula (I) was also made with bidistilled water for injection use, and this solution was filtered so as to have sterile solution. These two solutions were mixed under aseptic conditions, filled in 1 ml portions into ampoules, the content of the ampoules was lyophilized, and the ampoules were sealed under nitrogen. The contents of the ampoules were dissolved in sterile water or 0.9 % (physiological) sterile aqueous sodium chloride solution before administration.

Claims

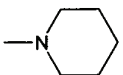
1. New bradykinin B1 receptor antagonist phenylsulfamoyl benzamide derivatives of formula (I)

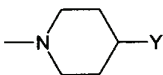


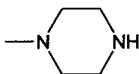
(I)

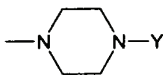
wherein

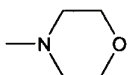
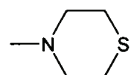
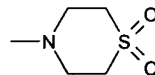
- R^1 is hydrogen atom or C_1 - C_4 alkyl group;
- R^2 is selected from (1) hydrogen atom; (2) C_1 - C_6 straight or branched alkyl group;
- (3) $-(CH_2)_n-NH_2$; (4) $-(CH_2)_n-OH$; (5) $-(CH_2)_n-CO-NH_2$; (6) $-(CH_2)_n-COOR^c$;
- (7) benzyl optionally substituted with one or more hydroxy group or halogen atom; or
- R^1 , R^2 and the carbon atom to which they are both attached together form a 3-7 membered cycloalkyl ring;
- R^3 , R^4 and R^5 are independently of each other hydrogen atom; halogen atom; cyano; nitro; amino; or amino substituted with one or more C_1 - C_4 alkyl group; trifluoromethyl; C_1 - C_4 alkyl; C_1 - C_4 alkoxy; trifluoromethoxy; C_1 - C_4 alkoxycarbonyl; $-C(=O)-NH_2$ or hydroxy group;
- Z is selected from (1) single bond; (2) oxygen atom; (3) CH_2 group; (4) CO group;
- (5) NR^c group; (6) S atom; (7) SO_2 group;
- Q is selected from
- (1) , optionally substituted with $-(CH_2)_m-OH$ group, or $-(CH_2)_m-X-P$ group;

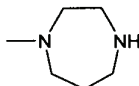
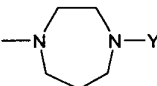
(2) , optionally substituted with one or more C₁-C₄ alkyl group, one or more halogen atom, -(CH₂)_m-OH group, -(CH₂)_m-NH₂ group, -(CH₂)_m-CO-NH₂ group, trifluoromethyl group, oxo group, -(CH₂)_m-CN group; -NH-CO-(C₁-C₄ alkyl) group, -NH-SO₂-(C₁-C₄ alkyl) group, -(CH₂)_m-COOR^c group, -CO-NR^cR^d group, -(C₁-C₄ alkoxy) group, -NH-CO-(CH₂)_m-CF₃ group, -NH-SO₂-CH₂-CF₃ group;

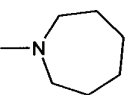
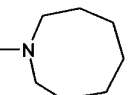
(3)  group;

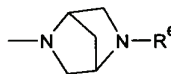
(4) , optionally substituted with oxo group, -SO₂-(C₁-C₄ alkyl) group, C₁-C₄ alkyl group, -CO-(C₁-C₄ alkyl) group, -(CH₂)_m-O-(CH₂)_m-OH group, -(CH₂)_m-OH group, -SO₂-NR^cR^d group, -CO-NR^cR^d group;

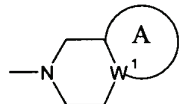
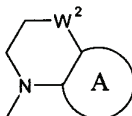
(5)  group;

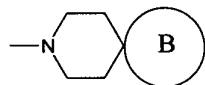
(6)  or  or  group;

(7)  or  group;

(8)  or , optionally substituted with -(CH₂)_m-OH group,

(9)  group;

(10)  or  group;

(11)  group;

- Y is selected from (1) $-(CH_2)_n-NR^aR^b$; (2) $-(CH_2)_n-X-P$ group;
- n is an integer from 0 to 6;
- m is an integer from 0 to 3;
- X is selected from (1) single bond; (2) oxygen atom; (3) $-CO-NR^c$ group; (4) CO
5 or SO_2 group;
- P is selected from (1) phenyl group, optionally substituted with one or more halogen atom, hydroxy, cyano, amino or C_1-C_4 alkyl group; (2) a saturated, partially unsaturated or aromatic 4-7 membered ring containing 1-3 heteroatom selected from O, S, SO_2 and N; wherein said ring is optionally substituted with
10 one or more halogen atom, oxo, hydroxy, cyano, amino or C_1-C_4 alkyl group; (3) C_5-C_8 cycloalkyl group;
- R^a and R^b are (1) hydrogen atom, with the proviso that R^a and R^b can not be simultaneously hydrogen atom; (2) straight or branched C_1-C_6 alkyl group; (3) R^a , R^b and the nitrogen atom to which they are both attached together form a
15 saturated, partially unsaturated or aromatic 4-7 membered ring containing 0-3 heteroatom (in addition to the nitrogen atom to which R^a and R^b attached) selected from O, S, SO_2 and N; wherein said ring is optionally substituted with one or more halogen atom, oxo, cyano, hydroxy or C_1-C_4 alkyl group;
- R^c is hydrogen atom or C_1-C_4 alkyl group;
- 20 R^d is hydrogen atom, C_1-C_4 alkyl group, C_1-C_4 hydroxyalkyl group, C_3-C_8 cycloalkyl group;
- R^e is hydrogen atom, C_1-C_4 alkyl group, benzyl group;
- A is (1) a C_4-C_7 cycloalkyl ring; (2) a saturated, partially unsaturated or aromatic 5-7 membered ring containing 0-4 heteroatom including W^1 selected from O, S, SO_2 and N; wherein said ring is optionally substituted with one or more halogen
25 atom, oxo, cyano, hydroxy, amino, phenyl or C_1-C_4 alkyl group;
- B is a saturated, partially unsaturated or aromatic 4-7 membered ring containing 1-3 heteroatom selected from O, S, SO_2 and N; wherein said ring is optionally substituted with one or more halogen atom, oxo, cyano, hydroxy, amino, phenyl
30 or C_1-C_4 alkyl group;
- W^1 is carbon atom, nitrogen atom, or CH group;
- W^2 is oxygen atom, sulfur atom, NH, CH_2 or SO_2 group;

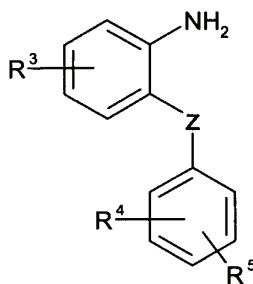
and optical antipodes or racemates and/or salts and/or hydrates and/or solvates thereof.

2. A compound of Claim 1 selected from the group of 4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-*N*-{2-oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperazin-1-yl]-ethyl}-benzamide; 4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-*N*-{2-[4-(2-dimethylamino-ethyl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide; 4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-*N*-{2-[4-(2-diethylamino-ethyl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide; 4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-*N*-{2-oxo-2-[4-(3-pyrrolidin-1-yl-propyl)-piperazin-1-yl]-ethyl}-benzamide; 4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-*N*-{2-[4-(1-methyl-piperidin-3-ylmethyl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide; 4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-*N*-{2-oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperidin-1-yl]-ethyl}-benzamide; 4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-*N*-[2-oxo-2-(4-pyrimidin-2-yl-piperazin-1-yl)-ethyl]-benzamide; 4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-*N*-{2-[4-(3-morpholin-4-yl-propyl)-[1,4]diazepan-1-yl]-2-oxo-ethyl}-benzamide; 4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-*N*-{2-oxo-2-[4-(3-piperidin-1-yl-propyl)-piperazin-1-yl]-ethyl}-benzamide; 4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-*N*-{2-[4-(3-dimethylamino-propyl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide; 4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-*N*-{2-oxo-2-[4-(3-pyrrolidin-1-yl-propyl)-[1,4]diazepan-1-yl]-ethyl}-benzamide; 4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-*N*-{2-[4-(3-morpholin-4-yl-propyl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide; 4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-*N*-{2-oxo-2-[4-(2-piperidin-1-yl-ethyl)-piperazin-1-yl]-ethyl}-benzamide; 4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-*N*-[2-oxo-2-(4-pyrrolidin-1-yl-piperidin-1-yl)-ethyl]-benzamide; 4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-*N*-[2-(4-hydroxy-piperidin-1-yl)-2-oxo-ethyl]-benzamide; *N*-{2-oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperazin-1-yl]-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide; *N*-{2-[4-(2-dimethylamino-ethyl)-piperazin-1-yl]-2-oxo-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide; *N*-{2-[4-(2-diethylamino-ethyl)-piperazin-1-yl]-2-oxo-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide; *N*-{2-oxo-2-[4-(3-pyrrolidin-1-yl-propyl)-piperazin-1-yl]-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide; *N*-{2-[4-(3-dimethylamino-propyl)-piperazin-1-yl]-2-oxo-ethyl}-4-(2-phenoxy-

phenylsulfamoyl)-benzamide; *N*-{2-oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperidin-1-yl]-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide; *N*-[2-(4-hydroxy-piperidin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide; 1-{2-[4-(2-phenoxy-phenylsulfamoyl)-benzoylamino]-acetyl}-piperidine-4-carboxylic
 5 acid amide; *N*-[2-(4-hydroxymethyl-piperidin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide; *N*-{2-[4-(1-methyl-piperidin-4-yl)-piperazin-1-yl]-2-oxo-ethyl}-4-(2-phenoxy-phenylsulfamoyl)-benzamide; *N*-(2-[1,4]diazepan-1-yl-2-oxo-ethyl)-4-(2-phenoxy-phenylsulfamoyl)-benzamide hydrochloride; *N*-(2-oxo-2-piperazin-1-yl-ethyl)-4-(2-phenoxy-phenylsulfamoyl)-benzamide
 10 hydrochlorid; *N*-[2-(4-amino-piperidin-1-yl)-2-oxo-ethyl]-4-(2-phenoxy-phenylsulfamoyl)-benzamide hydrochloride; 4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-*N*-(2-oxo-2-piperazin-1-yl-ethyl)-benzamide hydrochloride; *N*-(2-[1,4]diazepan-1-yl-2-oxo-ethyl)-4-[2-(2,4-dichloro-phenoxy)-phenylsulfamoyl]-benzamide hydrochloride; 4-(2-benzoyl-phenylsulfamoyl)-*N*-
 15 {2-oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperazin-1-yl]-ethyl}-benzamide; 4-(2-benzoyl-phenylsulfamoyl)-*N*-{2-[4-(2-dimethylamino-ethyl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide; 4-(2-benzoyl-phenylsulfamoyl)-*N*-(2-oxo-2-piperidin-1-yl-ethyl)-benzamide; *N*-(2-azepan-1-yl-2-oxo-ethyl)-4-(2-benzoyl-phenylsulfamoyl)-benzamide; 4-(2-benzoyl-phenylsulfamoyl)-*N*-[2-(4-cyano-piperidin-1-yl)-2-oxo-ethyl]-benzamide; 4-(2-benzoyl-phenylsulfamoyl)-*N*-[2-oxo-2-(4-trifluoromethyl-piperidin-1-yl)-ethyl]-benzamide; 4-(2-benzoyl-phenylsulfamoyl)-*N*-[2-(4-methyl-piperidin-1-yl)-2-oxo-ethyl]-benzamide; 4-(2-benzoyl-phenylsulfamoyl)-*N*-{2-[4-(1-methyl-piperidin-3-ylmethyl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide; 4-(2-benzoyl-phenylsulfamoyl)-*N*-[2-(4-hydroxymethyl-piperidin-1-yl)-2-oxo-ethyl]-benzamide; 4-(2-benzoyl-phenylsulfamoyl)-*N*-{2-[4-(2-hydroxy-ethyl)-piperidin-1-yl]-2-oxo-ethyl}-benzamide; 4-(2-benzoyl-phenylsulfamoyl)-*N*-{2-oxo-2-[4-(3-pyrrolidin-1-yl-propyl)-piperazin-1-yl]-ethyl}-benzamide; 4-(2-benzoyl-phenylsulfamoyl)-*N*-{2-[4-(3-dimethylamino-propyl)-piperazin-1-yl]-2-oxo-ethyl}-benzamide; 4-(2-benzoyl-phenylsulfamoyl)-*N*-{2-oxo-2-[4-(2-pyrrolidin-1-yl-ethyl)-piperidin-1-yl]-ethyl}-benzamide; 4-(2-benzoyl-phenylsulfamoyl)-*N*-[2-(4-hydroxy-piperidin-1-yl)-2-oxo-ethyl]-benzamide; 1-{2-[4-(2-benzoyl-phenylsulfamoyl)-

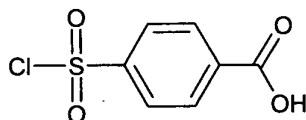
benzoylamino]-acetyl}-piperidine-4-carboxylic acid amide; 4-(2-benzoyl-phenylsulfamoyl)-*N*-(2-[1,4]diazepan-1-yl-2-oxo-ethyl)-benzamide hydrochloride; 4-(2-benzoyl-phenylsulfamoyl)-*N*-(2-oxo-2-piperazin-1-yl-ethyl)-benzamide hydrochloride.

- 5 3. A process for preparing the compounds of formula (I) as claimed in Claim 1 which comprises reacting an amine derivative of formula (II)



(II)

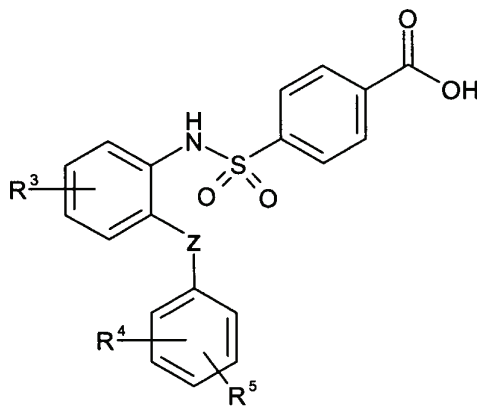
- 10 - wherein the meaning of R^3 , R^4 and R^5 is as described above for the formula (I) – with the sulfonyl chloride of formula (III)



(III)

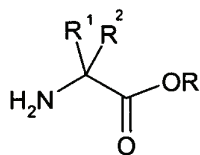
then reacting the so obtained phenylsulfamoyl benzoic acid derivative of formula (IV)

15



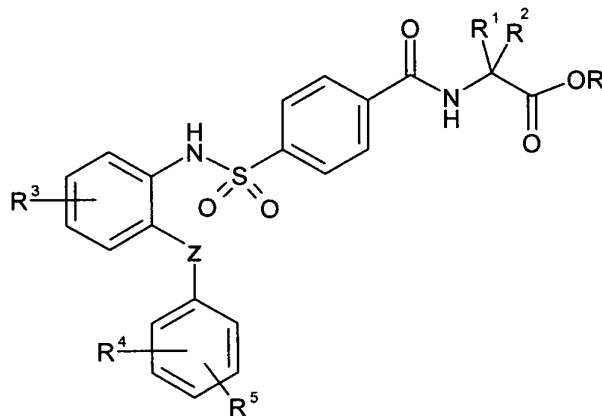
(IV)

- wherein the meaning of R^3 , R^4 and R^5 is as described above for the formula (I) –with an amino acid of formula (V)



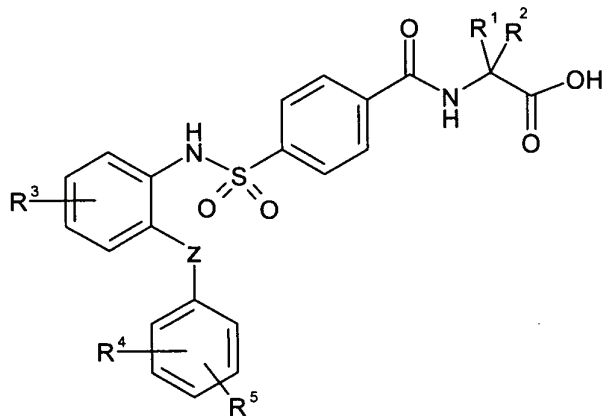
(V)

- wherein the meaning of R^1 and R^2 is as described above for the formula (I) and R is C_1 - C_4 alkyl group – and hydrolyzing the so obtained compound of formula (VI)



(VI)

- wherein the meaning of R^1 , R^2 , R^3 , R^4 , R^5 and R is as defined above –to furnish an acid derivative of formula (VII)



(VII)

- wherein the meaning of R^1 , R^2 , R^3 , R^4 and R^5 is as defined above – finally reacting the acid derivative of formula (VII) an amine derivative Q and to obtain a phenylsulfamoyl benzamide derivative of formula (I) or optical antipodes or racemates and/or
5 pharmaceutically acceptable salts and/or hydrates and/or solvates thereof.
4. A process for preparing the compounds of formula (I) as claimed in Claim 1 which comprises transforming a compound of formula (I) into an other compound of formula (I) by introducing new substituents and/or modifying or removing the existing ones, and/or salt formation and/or liberating the compound from salts.
- 10 5. A pharmaceutical composition comprising a therapeutically effective amount of a compound of formula (I) as claimed in Claim 1 or optical antipodes or racemates or pharmaceutically acceptable salt or hydrate or solvate thereof and one or more pharmaceutically acceptable excipients.
6. Use of a compound of formula (I) as claimed in Claim 1 or optical antipodes or
15 racemates or a pharmaceutically acceptable salt or hydrate or solvate thereof for the manufacture of a medicament for prevention and/or treatment of a condition which requires inhibition of a bradykinin receptor.
7. Use according to Claim 6 wherein the bradykinin receptor is bradykinin B1 receptor.