



HU000030526T2

(19) **HU**(11) Lajstromszám: **E 030 526**(13) **T2****MAGYARORSZÁG**
Szellemi Tulajdon Nemzeti Hivatala**EURÓPAI SZABADALOM**
SZÖVEGÉNEK FORDÍTÁSA

(21) Magyar ügyszám: **E 13 731049**
(22) A bejelentés napja: **2013. 06. 10.**
(96) Az európai bejelentés bejelentési száma:
EP 20130731049
(97) Az európai bejelentés közzétételi adatai:
EP 2861566 A1 **2013. 12. 19.**
(97) Az európai szabadalom megadásának meghirdetési adatai:
EP 2861566 B1 **2016. 12. 21.**

(51) Int. Cl.: **C07D 249/18** (2006.01)
A61K 314/38 (2006.01)
A61P 35/00 (2006.01)
C07D 405/12 (2006.01)
C07D 471/10 (2006.01)
C07D 487/10 (2006.01)
C07D 413/12 (2006.01)
C07D 405/06 (2006.01)
C07D 205/12 (2006.01)

(86) A nemzetközi (PCT) bejelentési szám:
PCT/EP 13/061890

(87) A nemzetközi közzétételi szám:
WO 13186159

(30) Elsőbbségi adatok: 12171839 2012. 06. 13. EP	(73) Jogosult(ak): F.HOFFMANN-LA ROCHE AG, 4070 Basel (CH)
(72) Feltalálók(k): HUNZIKER, Daniel, CH-4313 Moehlin (CH) MATTEI, Patrizio, CH-4125 Riehen (CH) MAUSER, Harald, CH-4125 Riehen (CH) PRUNOTTO, Marco, CH-2800 Delémont (CH) ULLMER, Christoph, 79592 Fischingen (DE)	(74) Képviselő: dr. Miskolczi Mária, Budapest

(54) **Új diazaspirocikloalkán és azaspirocikloalkán**

Az európai szabadalom ellen, megadásának az Európai Szabadalmi Közlönyben való meghirdetésétől számított kilenc hónapon belül, felszólalást lehet benyújtani az Európai Szabadalmi Hivatalnál. (Európai Szabadalmi Egyezmény 99. cikk(1))

A fordítást a szabadalmas az 1995. évi XXXIII. törvény 84/H. §-a szerint nyújtotta be. A fordítás tartalmi helyességét a Szellemi Tulajdon Nemzeti Hivatala nem vizsgálta.



(11) **EP 2 861 566 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention of the grant of the patent:
21.12.2016 Bulletin 2016/51

(21) Application number: **13731049.6**

(22) Date of filing: **10.06.2013**

(51) Int Cl.:
C07D 249/18 (2006.01) **C07D 471/10** (2006.01)
C07D 487/10 (2006.01) **C07D 205/12** (2006.01)
C07D 405/06 (2006.01) **C07D 405/12** (2006.01)
C07D 413/12 (2006.01) **A61K 31/438** (2006.01)
A61P 35/00 (2006.01)

(86) International application number:
PCT/EP2013/061890

(87) International publication number:
WO 2013/186159 (19.12.2013 Gazette 2013/51)

(54) **NEW DIAZASPIROCYCLOALKANE AND AZASPIROCYCLOALKANE**

NEUES DIAZASPIROCYCLOALKAN UND AZASPIROCYCLOALKAN

NOUVEAUX COMPOSÉS DIAZASPIROCYCLOALCANE ET AZASPIROCYCLOALCANE

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR

(30) Priority: **13.06.2012 EP 12171839**

(43) Date of publication of application:
22.04.2015 Bulletin 2015/17

(73) Proprietor: **F. Hoffmann-La Roche AG**
4070 Basel (CH)

(72) Inventors:
• **HUNZIKER, Daniel**
CH-4313 Moehlin (CH)
• **MATTEI, Patrizio**
CH-4125 Riehen (CH)
• **MAUSER, Harald**
CH-4125 Riehen (CH)
• **PRUNOTTO, Marco**
CH-2800 Delémont (CH)
• **ULLMER, Christoph**
79592 Fischen (DE)

(74) Representative: **Bernard, Guillaume**
F. Hoffmann-La Roche AG
Patent Department
Grenzacherstrasse 124
4070 Basel (CH)

(56) References cited:
EP-A1- 2 301 936 **EP-A2- 0 417 631**
WO-A1-2005/040167 **WO-A1-2007/030061**
WO-A1-2008/033456 **WO-A1-2010/055006**
WO-A1-2010/141817 **WO-A1-2011/114271**
WO-A1-2011/115813 **WO-A1-2013/033059**
WO-A1-2013/064467 **WO-A1-2013/065712**
WO-A2-2008/060767 **WO-A2-2009/046841**
WO-A2-2010/115491 **US-A1- 2010 298 290**

- **HARALD M. H. G. ALBERS ET AL:** "Chemical Evolution of Autotaxin Inhibitors", **CHEMICAL REVIEWS**, vol. 112, no. 5, 9 May 2012 (2012-05-09), pages 2593-2603, XP055073234, ISSN: 0009-2665, DOI: 10.1021/cr2003213
- **DANIEL W KUNG ET AL:** "Identification of spirocyclic piperidine-azetidone inverse agonists of the ghrelin receptor", **BIOORGANIC & MEDICINAL CHEMISTRY LETTERS**, vol. 22, no. 13, 8 May 2012 (2012-05-08), pages 4281-4287, XP028490993, PERGAMON, ELSEVIER SCIENCE, GB ISSN: 0960-894X, DOI: 10.1016/J.BMCL.2012.05.024 [retrieved on 2012-05-17]
- **STOCKS MICHAEL J ET AL:** "A Practical Method for Targeted Library Design Balancing Lead-like Properties with Diversity", **CHEMMEDCHEM**, vol. 4, no. 5, May 2009 (2009-05), pages 800-808, XP002707616, ISSN: 1860-7179

Note: Within nine months of the publication of the mention of the grant of the European patent in the European Patent Bulletin, any person may give notice to the European Patent Office of opposition to that patent, in accordance with the Implementing Regulations. Notice of opposition shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

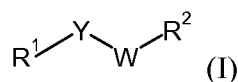
EP 2 861 566 B1

- SUVI T.M. ORR (NEE SIMILA) ET AL: "One-pot synthesis of chiral azetidines from chloroaldehyde and chiral amines", TETRAHEDRON LETTERS, vol. 52, no. 28, 1 July 2011 (2011-07-01), pages 3618-3620, XP055073241, ISSN: 0040-4039, DOI: 10.1016/j.tetlet.2011.05.027
- C. G. OVERBERGER ET AL: "Absolute configuration of 2,7-diazaspiro[4,4]nonane. A reassignment", THE JOURNAL OF ORGANIC CHEMISTRY, vol. 46, no. 13, 1 June 1981 (1981-06-01), pages 2757-2764, XP055072840, ISSN: 0022-3263, DOI: 10.1021/jo00326a031
- DATABASE REGISTRY [Online] CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US; 12 January 2012 (2012-01-12), Allichem LLC: XP002707617, retrieved from STN Database accession no. 1352926-14-7
- DATABASE REGISTRY [Online] CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US; 25 May 2011 (2011-05-25), Focus Synthesis LLC: XP002707618, retrieved from STN Database accession no. 1300725-30-7
- DATABASE REGISTRY [Online] CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US; 22 February 2010 (2010-02-22), BroadPharm: XP002707619, retrieved from STN Database accession no. 1206969-43-8
- DATABASE REGISTRY [Online] CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US; 26 December 2007 (2007-12-26), NIH Chemical Genomics Center: XP002707620, retrieved from STN Database accession no. 959567-58-9

Description

[0001] The present invention relates to organic compounds useful for therapy or prophylaxis in a mammal, and in particular to autotaxin (ATX) inhibitors which are inhibitors of lysophosphatidic acid (LPA) production and thus modulators of LPA levels and associated signaling, for the treatment or prophylaxis of renal conditions, liver conditions, inflammatory conditions, conditions of the nervous system, conditions of the respiratory system, vascular and cardiovascular conditions, fibrotic diseases, cancer, ocular conditions, metabolic conditions, cholestatic and other forms of chronic pruritus and acute and chronic organ transplant rejection.

[0002] The present invention provides novel compounds of formula (I)

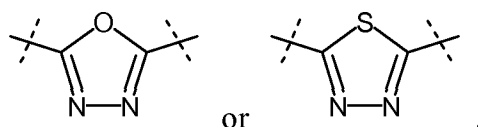


wherein

R^1 is alkyl, haloalkyl, cycloalkyl, substituted phenyl, substituted phenylalkyl, substituted phenoxyalkyl, substituted phenylcycloalkyl, substituted phenylalkenyl, substituted phenylalkynyl, substituted pyridinyl, substituted pyridinylalkyl, substituted pyridinylalkenyl, substituted pyridinylalkynyl, substituted thiophenyl, substituted thiophenylalkyl, substituted thiophenylalkenyl, substituted thiophenylalkynyl, substituted 2,3-dihydro-1H-isindol-2-yl, substituted 1H-indol-2-yl or substituted benzofuran-2-yl, wherein substituted phenyl, substituted phenylalkyl, substituted phenoxyalkyl, substituted phenylcycloalkyl, substituted phenylalkenyl, substituted phenylalkynyl, substituted pyridinyl, substituted pyridinylalkyl, substituted pyridinylalkenyl, substituted pyridinylalkynyl, substituted thiophenyl, substituted thiophenylalkyl, substituted thiophenylalkenyl, substituted thiophenylalkynyl, substituted 2,3-dihydro-1H-isindol-2-yl, substituted 1H-indol-2-yl and substituted benzofuran-2-yl are substituted with R^8 , R^9 and R^{10}

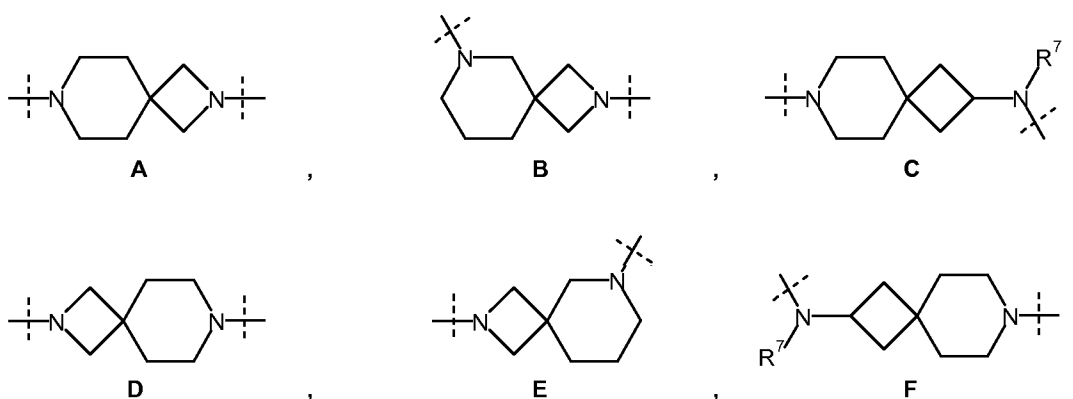
R^2 is $-(CR^4R^5)_n-R^3$, $-C(O)-R^3$, $-S(O)_2-R^3$ or $-C(O)-NR^6R^3$;

Y is $-OC(O)-$, $-NR^{14}C(O)-$, $-C(O)-$, $-S(O)_2-$,



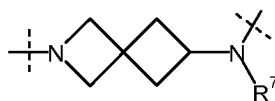
wherein in case R^1 is substituted phenylalkenyl, substituted pyridinylalkenyl or substituted thiophenylalkenyl, then Y is not $-OC(O)-$;

W is selected from one of the following ring systems:

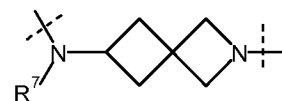




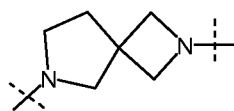
G



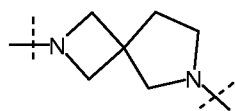
H



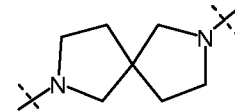
I



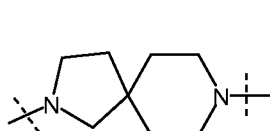
J



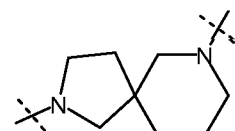
K



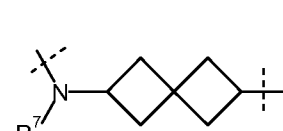
L



M



N



O



P



Q

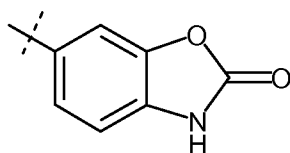


R

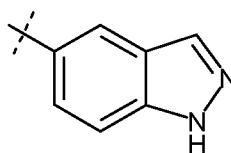
wherein in case W is the ring system O, then R² is -C(O)-NR⁶R³;

R³

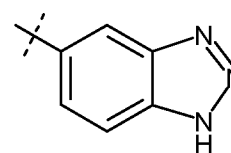
is selected from the following groups



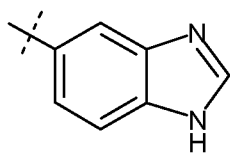
S



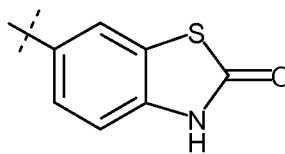
T



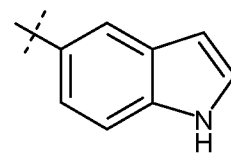
U



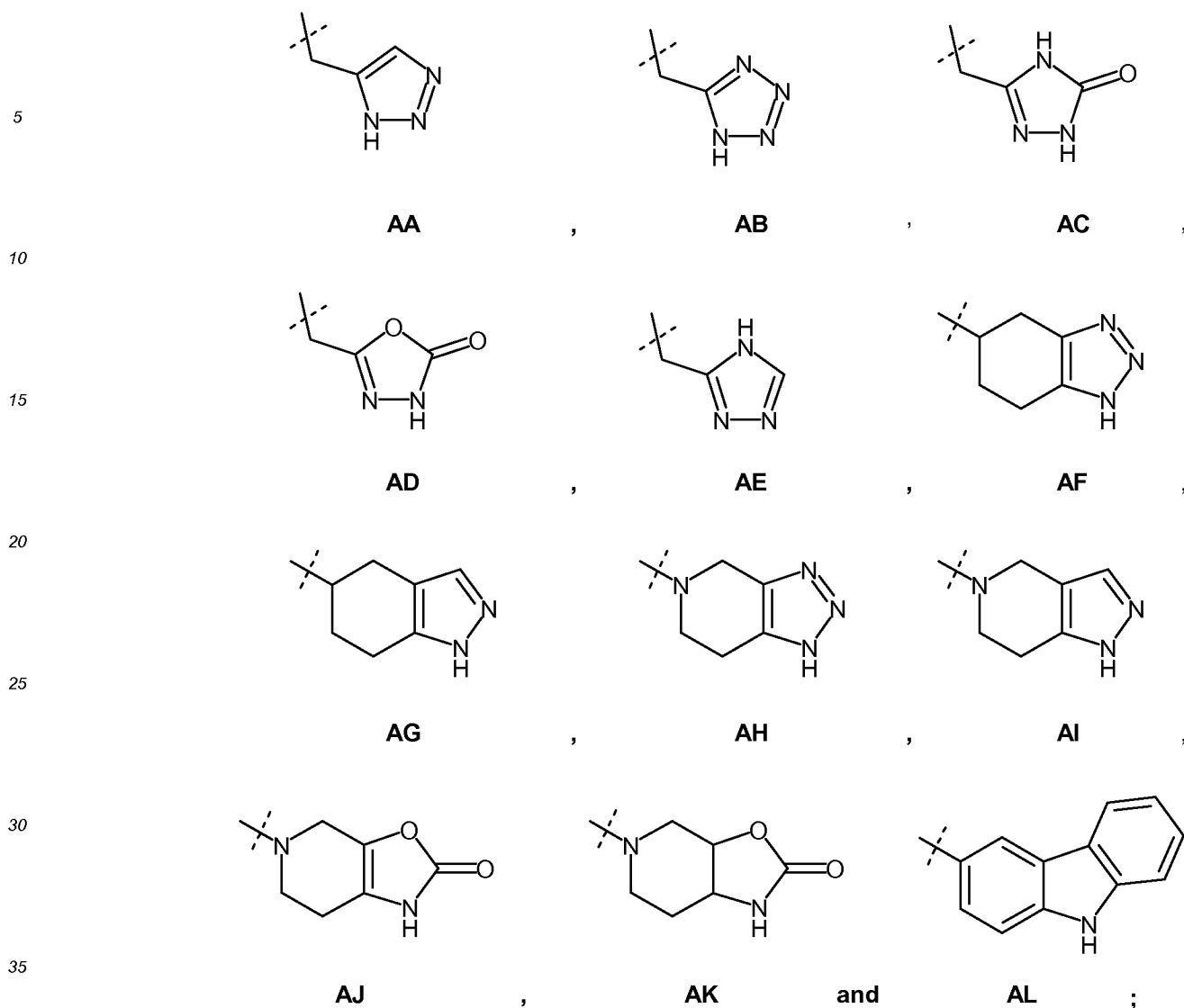
V



X



Z



or in certain individual compounds

40 R^3 is substituted phenyl, substituted pyridinyl or substituted thiophenyl, wherein substituted phenyl, substituted pyridinyl and substituted thiophenyl are substituted with R^{11} , R^{12} and R^{13} ;

45 R^4 and R^5 are independently selected from H, halogen, alkyl and cycloalkyl;

R^6 , R^7 and R^{14} are independently selected from H, alkyl and cycloalkyl;

50 R^8 , R^9 , R^{10} , R^{11} , R^{12} , and R^{13} are independently selected from H, alkyl, hydroxyalkyl, haloalkyl, cycloalkyl, cycloalkylalkyl, cycloalkylalkoxy, cycloalkoxy, cycloalkoxyalkyl, cycloalkylalkoxyalkyl, alkoxy, alkoxyalkyl, haloalkoxy, haloalkoxyalkyl, alkoxyalkoxy, alkoxyalkoxyalkyl, halogen, hydroxy, cyano, alkylsulfonyl, cycloalkylsulfonyl, substituted aminosulfonyl, substituted amino and substituted aminoalkyl, wherein substituted aminosulfonyl, substituted amino and substituted aminoalkyl are substituted on the nitrogen atom with one to two substituents independently selected from hydrogen, alkyl, cycloalkyl, cycloalkylalkyl, hydroxyalkyl, alkoxyalkyl, alkylcarbonyl and cycloalkylcarbonyl;

55 n is zero, 1, 2 or 3;

or pharmaceutically acceptable salts.

[0003] Autotaxin (ATX) is a secreted enzyme also called ectonucleotide pyrophosphatase / phosphodiesterase 2 or lysophospholipase D that is important for converting lysophosphatidyl choline (LPC) to the bioactive signaling molecule lysophosphatidic acid (LPA). It has been shown that plasma LPA levels are well correlated with ATX activity and hence ATX is believed to be an important source of extracellular LPA. Early experiments with a prototype ATX inhibitor have shown that such a compound is able to inhibit the LPA synthesizing activity in mouse plasma. Work conducted in the 1970s and early 1980s has demonstrated that LPA can elicit a wide range of cellular response; including smooth muscle cell contraction, platelet activation, cell proliferation, chemotaxis and others. LPA mediates its effects via signaling to several G protein coupled receptors (GPCRs); the first members were originally denoted Edg (endothelial cell differentiation gene) receptors or ventricular zone gene-1(vzg-1) but are now called LPA receptors. The prototypic group now consists of LPA1/Edg-2/VZG-1, LPA2/Edg-4, and LPA3/Edg-7. Recently, three additional LPA receptors LPA4/p2y9/GPR23, LPA5/GPR92 and LPA6/p2Y5 have been described that are more closely related to nucleotide-selective purinergic receptors than to the prototypic LPA1-3 receptors. The ATX-LPA signaling axis is involved in a large range of physiological and pathophysiological functions, including, for example, nervous system function, vascular development, cardiovascular physiology, reproduction, immune system function, chronic inflammation, tumor metastasis and progression, organ fibrosis as well as obesity and/or other metabolic diseases such as diabetes mellitus. Therefore, increased activity of ATX and/or increased levels of LPA, altered LPA receptor expression and altered responses to LPA may contribute to the initiation, progression and/or outcome of a number of different pathophysiological conditions related to the ATX/LPA axis.

[0004] In accordance with the invention, the compounds of formula (I) or their pharmaceutically acceptable salts and esters can be used for the treatment or prophylaxis of diseases, disorders or conditions that are associated with the activity of autotaxin and/or the biological activity of lysophosphatidic acid (LPA).

[0005] The compounds of formula (I) or their pharmaceutically acceptable salts and esters herein inhibit autotaxin activity and therefore inhibit LPA production and modulate LPA levels and associated signaling. Autotaxin inhibitors described herein are useful as agents for the treatment or prevention of diseases or conditions in which ATX activity and/or LPA signaling participates, is involved in the etiology or pathology of the disease, or is otherwise associated with at least one symptom of the disease. The ATX-LPA axis has been implicated for example in angiogenesis, chronic inflammation, autoimmune diseases, fibrotic diseases, cancer and tumor metastasis and progression, ocular conditions, metabolic conditions such as obesity and/or diabetes mellitus, conditions such as cholestatic or other forms of chronic pruritus as well as acute and chronic organ transplant rejection.

[0006] Objects of the present invention are the compounds of formula (I) and their aforementioned salts and esters and their use as therapeutically active substances, a process for the manufacture of the said compounds, intermediates, pharmaceutical compositions, medicaments containing the said compounds, their pharmaceutically acceptable salts or esters, the use of the said compounds, salts or esters for the treatment or prophylaxis of disorders or conditions that are associated with the activity of ATX and/or the biological activity of lysophosphatidic acid (LPA), particularly in the treatment or prophylaxis of renal conditions, liver conditions, inflammatory conditions, conditions of the nervous system, conditions of the respiratory system, vascular and cardiovascular conditions, fibrotic diseases, cancer, ocular conditions, metabolic conditions, cholestatic and other forms of chronic pruritus and acute and chronic organ transplant rejection, and the use of the said compounds, salts or esters for the production of medicaments for the treatment or prophylaxis of renal conditions, liver conditions, inflammatory conditions, conditions of the nervous system, conditions of the respiratory system, vascular and cardiovascular conditions, fibrotic diseases, cancer, ocular conditions, metabolic conditions, cholestatic and other forms of chronic pruritus and acute and chronic organ transplant rejection.

[0007] The term "alkenyl" denotes a monovalent linear or branched hydrocarbon group of 2 to 7 carbon atoms with at least one double bond. In particular embodiments, alkenyl has 2 to 4 carbon atoms with at least one double bond. Examples of alkenyl include ethenyl, propenyl, prop-2-enyl, isopropenyl, n-butenyl and iso-butenyl. Particular alkenyl group is ethenyl.

[0008] The term "alkoxy" denotes a group of the formula -O-R', wherein R' is an alkyl group. Examples of alkoxy group include methoxy, ethoxy, n-propoxy, isopropoxy, n-butoxy, isobutoxy and tert-butoxy. Particular alkoxy group include methoxy.

[0009] The term "alkoxyalkoxy" denotes an alkoxy group wherein at least one of the hydrogen atoms of the alkoxy group has been replaced by another alkoxy group. Examples of alkoxyalkoxy group include methoxymethoxy, ethoxymethoxy, methoxyethoxy, ethoxyethoxy, methoxypropoxy and ethoxypropoxy. Particular alkoxyalkoxy groups include methoxymethoxy and methoxyethoxy.

[0010] The term "alkoxyalkoxyalkyl" denotes an alkyl group wherein at least one of the hydrogen atoms of the alkyl group has been replaced by an alkoxyalkoxy group. Examples of alkoxyalkoxyalkyl group include methoxymethoxymethyl, ethoxymethoxymethyl, methoxyethoxymethyl, ethoxyethoxymethyl, methoxypropoxymethyl, ethoxypropoxymethyl, methoxymethoxyethyl, ethoxymethoxyethyl, methoxyethoxyethyl, ethoxyethoxyethyl, methoxypropoxyethyl and ethoxypropoxyethyl.

[0011] The term "alkoxyalkyl" denotes an alkyl group wherein at least one of the hydrogen atoms of the alkyl group has been replaced by an alkoxy group. Exemplary alkoxyalkyl groups include methoxymethyl, ethoxymethyl, methoxyethyl, ethoxyethyl, methoxypropyl, ethoxypropyl and isopropoxymethyl. Particular alkoxyalkyl groups include methoxymethyl, methoxyethyl and isopropoxymethyl.

[0012] The term "alkyl" denotes a monovalent linear or branched saturated hydrocarbon group of 1 to 12 carbon atoms. In particular embodiments, alkyl has 1 to 7 carbon atoms, and in more particular embodiments 1 to 4 carbon atoms. Examples of alkyl include methyl, ethyl, propyl, isopropyl, n-butyl, iso-butyl and sec-butyl, pentyl. Particular alkyl groups include methyl, ethyl, propyl and isopropyl. More particular alkyl group is methyl.

[0013] The term "alkylcarbonyl" denotes a group of the formula $-C(O)-R'$, wherein R' is an alkyl group. Examples of alkylcarbonyl groups include groups of the formula $-C(O)-R'$, wherein R' is methyl or ethyl. Particular alkylcarbonyl groups include groups of the formula $-C(O)-R'$, wherein R' is methyl.

[0014] The term "alkylsulfonyl" denotes a group of the formula $-S(O)_2-R'$, wherein R' is an alkyl group. Examples of alkylsulfonyl groups include groups of the formula $-S(O)_2-R'$, wherein R' is methyl, ethyl, n-propyl, isopropyl, n-butyl, isobutyl or tert-butyl. Particular alkylsulfonyl groups include groups of the formula $-S(O)_2-R'$, wherein R' is methyl.

[0015] The term "alkynyl" denotes a monovalent linear or branched saturated hydrocarbon group of 2 to 7 carbon atoms comprising one, two or three triple bonds. In particular embodiments alkynyl has from 2 to 4 carbon atoms comprising one or two triple bonds. Examples of alkynyl include ethynyl, propynyl, prop-2-ynyl, isopropynyl and n-butylnyl.

[0016] The term "amino" denotes a $-NH_2$ group.

[0017] The term "aminosulfonyl" denotes a $-S(O)_2-NH_2$ group.

[0018] The term "carbonyl" denotes a $-C(O)-$ group.

[0019] The term "cyano" denotes a $-C\equiv N$ group.

[0020] The term "cycloalkoxy" denotes a group of the formula $-O-R'$, wherein R' is a cycloalkyl group. Examples of cycloalkoxy groups include cyclopropoxy, cyclobutoxy, cyclopentyloxy, cyclohexyloxy, cycloheptyloxy and cyclooctyloxy. Particular cycloalkoxy group is cyclopropoxy.

[0021] The term "cycloalkoxyalkyl" denotes an alkyl group wherein at least one of the hydrogen atoms of the alkyl group has been replaced by a cycloalkoxy group. Examples of cycloalkoxyalkyl groups include cyclopropoxymethyl, cyclopropoxyethyl, cyclobutoxymethyl, cyclobutoxyethyl, cyclopentyloxymethyl, cyclopentyloxyethyl, cyclohexyloxymethyl, cyclohexyloxyethyl, cycloheptyloxymethyl, cycloheptyloxyethyl, cyclooctyloxymethyl and cyclooctyloxyethyl.

[0022] The term "cycloalkyl" denotes a monovalent saturated monocyclic or bicyclic hydrocarbon group of 3 to 10 ring carbon atoms. In particular embodiments, cycloalkyl denotes a monovalent saturated monocyclic hydrocarbon group of 3 to 8 ring carbon atoms. Bicyclic means consisting of two saturated carbocycles having two carbon atoms in common. Particular cycloalkyl groups are monocyclic. Examples for monocyclic cycloalkyl are cyclopropyl, cyclobutanyl, cyclopentyl, cyclohexyl or cycloheptyl. Examples for bicyclic cycloalkyl are bicyclo[2.2.1]heptanyl or bicyclo[2.2.2]octanyl. Particular monocyclic cycloalkyl groups are cyclopropyl, cyclobutanyl, cyclopentyl and cyclohexyl. More particular monocyclic cycloalkyl group is cyclopropyl.

[0023] The term "cycloalkylalkoxy" denotes an alkoxy group wherein at least one of the hydrogen atoms of the alkoxy group is replaced by a cycloalkyl group. Examples of cycloalkylalkoxy include cyclopropylmethoxy, cyclobutylmethoxy, cyclopentylmethoxy, cyclohexylmethoxy, cycloheptylmethoxy and cyclooctylmethoxy.

[0024] The term "cycloalkylalkoxyalkyl" denotes an alkyl group wherein at least one of the hydrogen atoms of the alkyl group is replaced by a cycloalkylalkoxy group. Examples of cycloalkylalkoxyalkyl include cyclopropylmethoxymethyl, cyclopropylmethoxyethyl, cyclobutylmethoxymethyl, cyclobutylmethoxyethyl, cyclopentylmethoxyethyl, cyclopentylmethoxyethyl, cyclohexylmethoxymethyl, cyclohexylmethoxyethyl, cycloheptylmethoxymethyl, cycloheptylmethoxyethyl, cyclooctylmethoxymethyl and cyclooctylmethoxyethyl.

[0025] The term "cycloalkylalkyl" denotes an alkyl group wherein at least one of the hydrogen atoms of the alkyl group is replaced by a cycloalkyl group. Examples of cycloalkylalkyl include cyclopropylmethyl, cyclopropylethyl, cyclopropylbutyl, cyclobutylpropyl, 2-cyclopropylbutyl and cyclopentylbutyl. Particular examples of cycloalkylalkyl groups are cyclopropylmethyl, cyclopropylbutyl and 2-cyclopropylbutyl.

[0026] The term "cycloalkylcarbonyl" of the formula $-C(O)-R'$, wherein R' is a cycloalkyl group. Examples of cycloalkylcarbonyl groups include groups of the formula $-C(O)-R'$, wherein R' is cyclopropyl.

[0027] The term "cycloalkylsulfonyl" denotes a group of the formula $-S(O)_2-R'$, wherein R' is a cycloalkyl group. Examples of cycloalkylsulfonyl groups include groups of the formula $-S(O)_2-R'$, wherein R' is cyclopropyl.

[0028] The term "haloalkoxy" denotes an alkoxy group wherein at least one of the hydrogen atoms of the alkoxy group has been replaced by the same or different halogen atoms. The term "perhaloalkoxy" denotes an alkoxy group where all hydrogen atoms of the alkoxy group have been replaced by the same or different halogen atoms. Examples of haloalkoxy include fluoromethoxy, difluoromethoxy, trifluoromethoxy, trifluoroethoxy, trifluoromethylethoxy, trifluorodimethylethoxy and pentafluoroethoxy. Particular haloalkoxy group is trifluoromethoxy.

[0029] The term "haloalkoxyalkyl" denotes an alkyl group wherein at least one of the hydrogen atoms of the alkyl group has been replaced by a haloalkoxy group. Examples of haloalkoxyalkyl include fluoromethoxymethyl, difluorometh-

oxymethyl, trifluoromethoxymethyl, fluoroethoxymethyl, difluoroethoxymethyl, trifluoroethoxymethyl, fluoromethoxyethyl, difluoromethoxyethyl, trifluoromethoxyethyl, fluoroethoxyethyl, difluoroethoxyethyl, trifluoroethoxyethyl, fluoromethoxypropyl, difluoromethoxypropyl, trifluoromethoxypropyl, fluoroethoxypropyl, difluoroethoxypropyl and trifluoroethoxypropyl. Particular haloalkoxyalkyl is 2,2,2-trifluoroethoxyethyl.

5 **[0030]** The term "haloalkyl" denotes an alkyl group wherein at least one of the hydrogen atoms of the alkyl group has been replaced by the same or different halogen atoms. The term "perhaloalkyl" denotes an alkyl group where all hydrogen atoms of the alkyl group have been replaced by the same or different halogen atoms. Examples of haloalkyl include fluoromethyl, difluoromethyl, trifluoromethyl, trifluoroethyl, trifluoromethylethyl and pentafluoroethyl. Particular haloalkyl group is trifluoromethyl.

10 **[0031]** The term "halogen" and "halo" are used interchangeably herein and denote fluoro, chloro, bromo, or iodo. Particular halogens are chloro, fluoro and bromo.

[0032] In the case of R⁸, R⁹ and R¹⁰ further particular halogen is chloro.

[0033] In the case of R¹², further particular halogen is fluoro.

[0034] The term "hydroxy" denotes a -OH group.

15 **[0035]** The term "hydroxyalkyl" denotes an alkyl group wherein at least one of the hydrogen atoms of the alkyl group has been replaced by a hydroxy group. Examples of hydroxyalkyl include hydroxymethyl, hydroxyethyl, hydroxy-1-methyl-ethyl, hydroxypropyl, hydroxymethylpropyl and dihydroxypropyl. Particular examples are hydroxymethyl and hydroxyethyl.

[0036] The term "phenoxy" denotes a group of the formula -O-R', wherein R' is a phenyl.

20 **[0037]** The term "phenoxyalkyl" denotes an alkyl group wherein at least one of the hydrogen atoms of the alkyl group has been replaced by a phenoxy group. Exemplary phenoxyalkyl groups include phenoxymethyl, phenoxyethyl and phenoxypropyl. Particular alkoxyalkyl group is phenoxymethyl.

[0038] The term "phenylalkenyl" denotes an alkenyl group wherein at least one of the hydrogen atoms of the alkenyl group has been replaced a phenyl. Particular phenylalkenyl group is phenylethenyl.

25 **[0039]** The term "phenylalkyl" denotes an alkyl group wherein at least one of the hydrogen atoms of the alkyl group has been replaced a phenyl. Particular phenylalkyl groups are benzyl, phenethyl and phenylpropyl. More particular phenylalkyl groups are benzyl, phenethyl-1-yl, phenethyl-2-yl and phenylpropyl. Further particular phenylalkyl group is benzyl.

30 **[0040]** The term "phenylalkynyl" denotes an alkynyl group wherein at least one of the hydrogen atoms of the alkynyl group has been replaced a phenyl. Particular phenylalkynyl group is phenylethynyl.

[0041] The term "phenylcycloalkyl" denotes a cycloalkyl group wherein at least one of the hydrogen atoms of the cycloalkyl group has been replaced a phenyl. Particular phenylcycloalkyl group is phenylcyclopropyl.

[0042] The term "pyridinylalkenyl" denotes an alkenyl group wherein at least one of the hydrogen atoms of the alkenyl group has been replaced a pyridinyl. Particular pyridinylalkenyl group is pyridinylethenyl.

35 **[0043]** The term "pyridinylalkyl" denotes an alkyl group wherein at least one of the hydrogen atoms of the alkyl group has been replaced a pyridinyl. Particular pyridinylalkyl groups are pyridinylmethyl, pyridinylethyl and pyridinylpropyl. More particular pyridinylalkyl group is pyridinylmethyl.

[0044] The term "pyridinylalkynyl" denotes an alkynyl group wherein at least one of the hydrogen atoms of the alkynyl group has been replaced a pyridinyl. Particular pyridinylalkynyl group is pyridinylethynyl.

40 **[0045]** The term "thiophenylalkenyl" denotes an alkenyl group wherein at least one of the hydrogen atoms of the alkenyl group has been replaced a thiophenyl. Particular thiophenylalkenyl group is thiophenylethenyl.

[0046] The term "thiophenylalkyl" denotes an alkyl group wherein at least one of the hydrogen atoms of the alkyl group has been replaced a thiophenyl. Particular thiophenylalkyl groups are thiophenylmethyl, thiophenylethyl and thiophenylpropyl. More particular thiophenylalkyl group is thiophenylmethyl.

45 **[0047]** The term "thiophenylalkynyl" denotes an alkynyl group wherein at least one of the hydrogen atoms of the alkynyl group has been replaced a thiophenyl. Particular thiophenylalkynyl group is thiophenylethynyl.

[0048] The term "pharmaceutically acceptable salts" refers to those salts which retain the biological effectiveness and properties of the free bases or free acids, which are not biologically or otherwise undesirable. The salts are formed with inorganic acids such as hydrochloric acid, hydrobromic acid, sulfuric acid, nitric acid, phosphoric acid and the like, in particular hydrochloric acid, and organic acids such as acetic acid, propionic acid, glycolic acid, pyruvic acid, oxalic acid, maleic acid, malonic acid, succinic acid, fumaric acid, tartaric acid, citric acid, benzoic acid, cinnamic acid, mandelic acid, methanesulfonic acid, ethanesulfonic acid, p-toluenesulfonic acid, salicylic acid, N-acetylcystein and the like. In addition, these salts may be prepared by addition of an inorganic base or an organic base to the free acid. Salts derived from an inorganic base include, but are not limited to, the sodium, potassium, lithium, ammonium, calcium, magnesium salts and the like. Salts derived from organic bases include, but are not limited to salts of primary, secondary, and tertiary amines, substituted amines including naturally occurring substituted amines, cyclic amines and basic ion exchange resins, such as isopropylamine, trimethylamine, diethylamine, triethylamine, tripropylamine, ethanolamine, lysine, arginine, N-ethylpiperidine, piperidine, polyimine resins and the like. Particular pharmaceutically acceptable salts of com-

pounds of formula (I) are the hydrochloride salts, methanesulfonic acid salts and citric acid salts.

[0049] "Pharmaceutically acceptable esters" means that compounds of general formula (I) may be derivatised at functional groups to provide derivatives which are capable of conversion back to the parent compounds in vivo. Examples of such compounds include physiologically acceptable and metabolically labile ester derivatives, such as methoxymethyl esters, methylthiomethyl esters and pivaloyloxymethyl esters. Additionally, any physiologically acceptable equivalents of the compounds of general formula (I), similar to the metabolically labile esters, which are capable of producing the parent compounds of general formula (I) in vivo, are within the scope of this invention.

[0050] The term "protecting group" (PG) denotes a group which selectively blocks a reactive site in a multifunctional compound such that a chemical reaction can be carried out selectively at another unprotected reactive site in the meaning conventionally associated with it in synthetic chemistry. Protecting groups can be removed at the appropriate point. Exemplary protecting groups are amino-protecting groups, carboxy-protecting groups or hydroxy-protecting groups. Particular protecting groups are the tert-butoxycarbonyl (Boc), benzyloxycarbonyl (Cbz), fluorenylmethoxycarbonyl (Fmoc) and benzyl (Bn). Further particular protecting groups are the tert-butoxycarbonyl (Boc) and the fluorenylmethoxycarbonyl (Fmoc). More particular protecting group is the tert-butoxycarbonyl (Boc).

[0051] The abbreviation μM means microMolar and is equivalent to the symbol μM .

[0052] The abbreviation μL means microliter and is equivalent to the symbol μL .

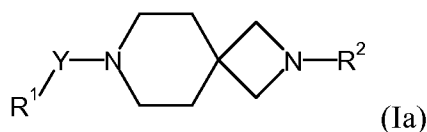
[0053] The abbreviation μg means microgram and is equivalent to the symbol μg .

[0054] The compounds of formula (I) can contain several asymmetric centers and can be present in the form of optically pure enantiomers, mixtures of enantiomers such as, for example, racemates, optically pure diastereoisomers, mixtures of diastereoisomers, diastereoisomeric racemates or mixtures of diastereoisomeric racemates.

[0055] According to the Cahn-Ingold-Prelog Convention the asymmetric carbon atom can be of the "R" or "S" configuration.

[0056] Also an embodiment of the present invention are compounds according to formula (I) as described herein and pharmaceutically acceptable salts or esters thereof, in particular compounds according to formula (I) as described herein and pharmaceutically acceptable salts thereof, more particularly compounds according to formula (I) as described herein.

[0057] The substituents Y and R^2 are respectively connected to the left hand-side and right hand-side of the ring system W as described herein. For example, in case W is A, then the compounds of formula (I) as described herein are of formula (Ia).



[0058] Another embodiment of the present invention are compounds according to formula (I) as described herein, wherein R^1 is substituted phenyl, substituted phenylalkyl, substituted phenoxyalkyl, substituted phenylcycloalkyl, substituted phenylalkenyl, substituted phenylalkynyl, substituted pyridinylalkyl, substituted thiophenylalkyl, substituted 2,3-dihydro-1H-isoindol-2-yl, substituted 1H-indol-2-yl or substituted benzofuran-2-yl, wherein substituted phenyl, substituted phenylalkyl, substituted phenoxyalkyl, substituted phenylcycloalkyl, substituted phenylalkenyl, substituted pyridinylalkyl, substituted thiophenylalkyl, substituted 2,3-dihydro-1H-isoindol-2-yl, substituted 1H-indol-2-yl and substituted benzofuran-2-yl are substituted with R^8 , R^9 and R^{10} .

[0059] A further embodiment of the present invention are compounds according to formula (I) as described herein, wherein R^1 is substituted phenyl, substituted phenylalkyl, substituted phenoxyalkyl, substituted phenylcycloalkyl, substituted phenylalkenyl, substituted pyridinylalkyl, substituted thiophenylalkyl, substituted 2,3-dihydro-1H-isoindol-2-yl, substituted 1H-indol-2-yl or substituted benzofuran-2-yl, wherein substituted phenyl, substituted phenylalkyl, substituted phenoxyalkyl, substituted phenylcycloalkyl, substituted phenylalkenyl, substituted pyridinylalkyl, substituted thiophenylalkyl, substituted 2,3-dihydro-1H-isoindol-2-yl, substituted 1H-indol-2-yl and substituted benzofuran-2-yl are substituted with R^8 , R^9 and R^{10} .

[0060] A particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein R^1 is substituted phenyl, substituted phenylalkyl, substituted phenoxyalkyl, substituted phenylcycloalkyl or substituted phenylalkenyl, wherein substituted phenyl, substituted phenylalkyl, substituted phenoxyalkyl, substituted phenylcycloalkyl and substituted phenylalkenyl are substituted with R^8 , R^9 and R^{10} .

[0061] In a further embodiment of the present invention are compounds according to formula (I) as described herein, wherein R^1 is substituted phenylalkyl or substituted phenylalkenyl, wherein substituted phenylalkyl and substituted phenylalkenyl are substituted with R^8 , R^9 and R^{10} .

[0062] Another embodiment of the present invention are compounds according to formula (I) as described herein, wherein R^1 is 3,5-dichlorobenzyl, 3-chloro-5-(methylsulfonyl)benzyl, 3-(methylsulfonyl)-5-(trifluoromethyl)benzyl or 3,5-

dichlorophenylethenyl.

[0063] The present invention also relates to compounds according to formula (I) as described herein, wherein R¹ is phenylalkyl substituted with R⁸, R⁹ and R¹⁰.

[0064] A further particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein R¹ is 3,5-dichlorobenzyl, 3-chloro-5-(methylsulfonyl)benzyl or 3-(methylsulfonyl)-5-(trifluoromethyl)benzyl.

[0065] Another further embodiment of the present invention are compounds according to formula (I) as described herein, wherein R¹ is phenylalkenyl substituted with R⁸, R⁹ and R¹⁰.

[0066] Another embodiment of the present invention are compounds according to formula (I) as described herein, wherein R¹ is 3,5-dichlorophenylethenyl.

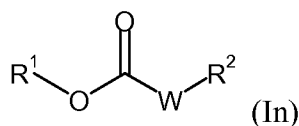
[0067] A more particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein R² is -C(O)-R³.

[0068] Also an embodiment of the present invention are compounds according to formula (I) as described herein, wherein Y is -OC(O)- or -C(O)-, wherein in case R¹ is substituted phenylalkenyl, substituted pyridinylalkenyl or substituted thiophenylalkenyl, then Y is not -OC(O)-.

[0069] The present invention also relates to compounds according to formula (I) as described herein, wherein Y is -OC(O)- and R¹ is not substituted phenylalkenyl, substituted pyridinylalkenyl or substituted thiophenylalkenyl.

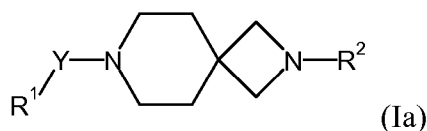
[0070] Another embodiment of the present invention are compounds according to formula (I) as described herein, wherein Y is -C(O)-.

[0071] Another embodiment of the present invention are compounds according to formula (I) as described herein, wherein Y is -C(O)- and of formula (In).

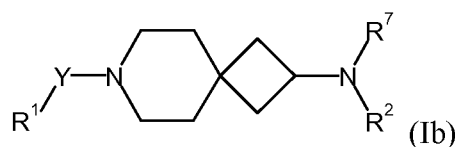


[0072] A further particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein W is selected from one of the ring systems A, C, D, H, I, J, L, M, N, O, Q and R, wherein in case W is one of the ring systems M or N, then R³ is selected from the groups S, T, U, V, X, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK and AL, and wherein in case W is the ring system O, then R² is -C(O)-NR⁶R³.

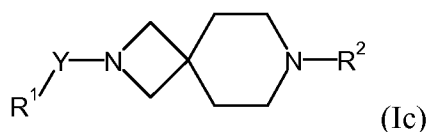
[0073] A further particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein W is A and of formula (Ia).



[0074] A further particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein W is C and of formula (Ib).

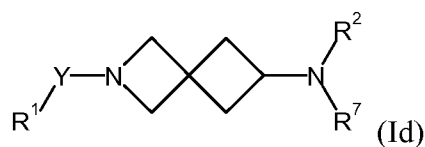


[0075] A further particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein W is D and of formula (Ic).



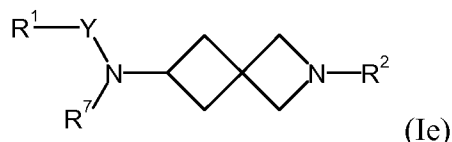
[0076] A further particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein W is H and of formula (Id).

5



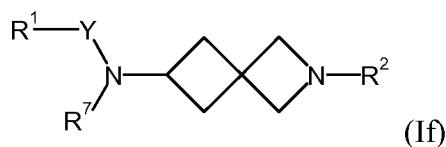
[0077] A further particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein W is I and of formula (Ie).

15



[0078] A further particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein W is J and of formula (If).

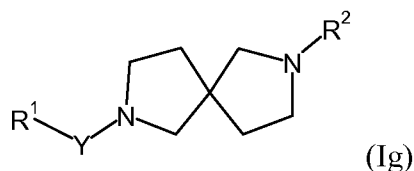
20



25

[0079] A further particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein W is L and of formula (Ig).

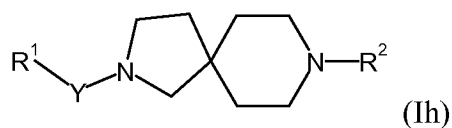
30



35

[0080] A further particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein W is M, R³ is selected from the groups S, T, U, V, X, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK and AL and of formula (Ih).

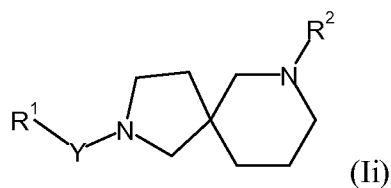
40



45

[0081] A further particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein W is N, R³ is selected from the groups S, T, U, V, X, Z, AA, AB, AC, AD, AE, AF, AG, AH, AI, AJ, AK and AL and of formula (Ii).

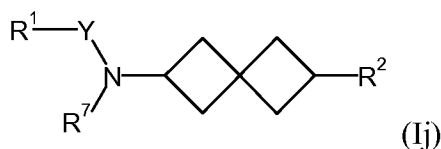
50



55

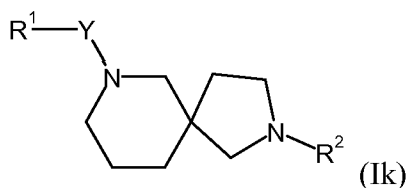
[0082] A further particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein W is O R² is -C(O)-NR⁶R³ and of formula (Ij).

5



[0083] A further particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein W is Q and of formula (Ik).

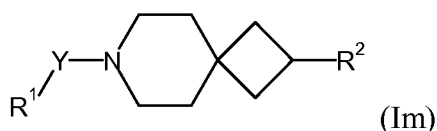
15



20

[0084] A further particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein W is R and of formula (Im).

25



[0085] A particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein W is selected from one of the ring systems A and H.

[0086] Also an embodiment of the present invention are compounds according to formula (I) as described herein, wherein W is the ring system A.

[0087] Another embodiment of the present invention are compounds according to formula (I) as described herein, wherein R³ is selected from the groups S, T, U, V, X, Z, AA, AB, AC and AD.

[0088] Also an embodiment of the present invention are compounds according to formula (I) as described herein, wherein R³ is selected from the groups S, U, X, AA and AF.

[0089] Also an embodiment of the present invention are compounds according to formula (I) as described herein, wherein R³ is selected from the groups S, U, X and AA.

[0090] Another embodiment of the present invention are compounds according to formula (I) as described herein, wherein R³ is selected from the groups S, U and AF.

[0091] Another embodiment of the present invention are compounds according to formula (I) as described herein, wherein R³ is selected from the groups S and U.

[0092] Also an embodiment of the present invention are compounds according to formula (I) as described herein, wherein R⁴ and R⁵ are H.

[0093] A particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein R⁶, R⁷ and R¹⁴ are H.

[0094] A further particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein R⁸, R⁹ and R¹⁰ are independently selected from H, alkyl, haloalkyl, haloalkoxy, halogen, cyano and alkylsulfonyl.

[0095] A more particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein R⁸ is H, alkyl, haloalkyl, haloalkoxy, halogen, cyano or alkylsulfonyl.

[0096] Also a particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein R⁸ is haloalkoxy, halogen or alkylsulfonyl.

[0097] Also a particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein R⁸ is halogen or alkylsulfonyl.

[0098] The present invention also relates to compounds according to formula (I) as described herein, wherein R⁹ is H, alkyl, haloalkyl or halogen.

[0099] A further particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein R⁹ is alkyl, haloalkyl or halogen.

[0100] A more particular embodiment of the present invention are compounds according to formula (I) as described herein, wherein R⁹ is haloalkyl or halogen.

5 **[0101]** Also an embodiment of the present invention are compounds according to formula (I) as described herein, wherein R¹⁰ is H or halogen.

[0102] The present invention also relates to compounds according to formula (I) as described herein, wherein R¹⁰ is H.

[0103] The present invention also relates to compounds according to formula (I) as described herein, wherein n is zero or 1.

10

Particular examples of compounds of formula (I) as described herein are selected from 3,5-dichlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

15

benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

4-chlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

3-chlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

20

1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3,5-dichlorophenyl)propan-1-one;

1-(2-(4-amino-3-hydroxybenzoyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3,5-dichlorophenyl)propan-1-one;

25

3,5-dichlorobenzyl 2-(4-amino-3-hydroxybenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

6-[(1H-benzotriazole-5-carbonyl)-amino]-2-aza-spiro[3.3]heptane-2-carboxylic acid benzyl ester;

N-(2-(4-phenylbutanoyl)-2-azaspiro[3.3]heptan-6-yl)-1H-benzo[d][1,2,3]triazole-5-carboxamide;

30

3-chloro-5-(methylsulfonyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

[2-(1H-benzotriazole-5-carbonyl)-2-aza-spiro[3.3]hept-6-yl]-carbamic acid benzyl ester;

35

N-(2-(3-(3,5-dichlorophenyl)propanoyl)-2-azaspiro[3.3]heptan-6-yl)-1H-benzo[d][1,2,3]triazole-5-carboxamide;

[2-(1H-benzotriazole-5-carbonyl)-2-aza-spiro[3.3]hept-6-yl]-carbamic acid 3,5-dichloro-benzyl ester;

6-[(1H-benzotriazole-5-carbonyl)-amino]-2-aza-spiro[3.3]heptane-2-carboxylic acid 3,5-dichloro-benzyl ester;

40

3,5-dichlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,6-diazaspiro[3.4]octane-6-carboxylate;

3,5-dichlorobenzyl 7-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-2-carboxylate;

45

3,5-dichlorobenzyl 6-(4-amino-3-hydroxybenzamido)-2-azaspiro[3.3]heptane-2-carboxylate;

3-chloro-5-(methylsulfonyl)benzyl 2-(4-sulfamoylbenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

3-chloro-5-(methylsulfonyl)benzyl 2-(3-sulfamoylbenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

50

3,5-dichlorobenzyl 8-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,8-diazaspiro[4.5]decane-2-carboxylate;

3-fluoro-5-(trifluoromethoxy)benzyl 7-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[4.5]decane-2-carboxylate;

55

(1H-benzotriazol-5-yl)-{7-[2-(3-chloro-phenyl)-ethanesulfonyl]-2,7-diaza-spiro[3.5]non-2-yl} -methanone;

3,5-dichlorobenzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,6-diazaspiro[3.4]octane-6-carboxylate;

EP 2 861 566 B1

- 3-chloro-5-(methylsulfonyl)benzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
- 5 7-(2-oxo-2,3-dihydro-benzooxazole-6-carbonyl)-2,7-diaza-spiro[3.5]nonane-2-carboxylic acid 3,5-dichloro-benzyl ester;
- 3,5-dichlorobenzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-ylsulfonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
- 10 2-oxo-2,3-dihydro-benzooxazole-6-sulfonic acid [2-(4-phenyl-butyl)-2-azaspiro[3.3]hept-6-yl]-amide;
- benzyl 6-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-sulfonamido)-2-azaspiro[3.3]heptane-2-carboxylate;
- 15 2-oxo-2,3-dihydro-benzooxazole-6-sulfonic acid {2-[3-(3,5-dichloro-phenyl)-propionyl]-2-aza-spiro[3.3]hept-6-yl]-amide;
- 3,5-dichlorobenzyl 6-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-sulfonamido)-2-azaspiro[3.3]heptane-2-carboxylate;
- [2-(2-oxo-2,3-dihydro-benzooxazole-6-sulfonyl)-2-aza-spiro[3.3]hept-6-yl]-carbamic acid 3,5-dichloro-benzyl ester;
- 20 3-chloro-5-(methylsulfonyl)benzyl 2-(2-oxo-2,3-dihydrobenzo[d]thiazol-6-ylsulfonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
- 3,5-dichlorobenzyl 2-((2-oxo-2,3-dihydrobenzo[d]oxazol-6-yl)methyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
- 25 3,5-dichlorobenzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
- 6-(7-(3-(3,5-dichlorophenyl)propanoyl)-2,7-diazaspiro[3.5]nonane-2-carbonyl)benzo[d]oxazol-2(3H)-one;
- 30 6-[(2-oxo-2,3-dihydro-benzooxazole-6-carbonyl)-amino]-2-aza-spiro[3.3]heptane-2-carboxylic acid 3,5-dichloro-benzyl ester;
- (E)-1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3,5-dichlorophenyl)prop-2-en-1-one;
- 35 6-(7-(3-(3,5-dichlorophenyl)propanoyl)-7-azaspiro[3.5]nonan-2-ylamino)benzo[d]oxazol-2(3H)-one;
- 1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-2-(3,5-dichlorophenoxy)ethanone;
- (2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)(3,5-dichlorophenyl)methanone;
- 40 6-{7-[(E)-3-(3,5-dichloro-phenyl)-acryloyl]-2,7-diaza-spiro[3.5]nonane-2-carbonyl}-3H-benzooxazol-2-one;
- (2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)(trans-2-(3,5-difluorophenyl)cyclopropyl)methanone;
- 45 (7-(1H-benzo[d][12,3]triazole-5-carbonyl)-2,7-diazaspiro[4.4]nonan-2-yl)(5-chloro-1H-indol-2-yl)methanone;
- (7-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[4.4]nonan-2-yl)(5-chlorobenzofuran-2-yl)methanone;
- 50 (E)-N-((1H-1,2,3-triazol-5-yl)methyl)-7-(3-(4-(trifluoromethoxy)phenyl)acryloyl)-7-azaspiro [3.5]nonane-2-carboxamide;
- (1H-benzo[d][1,2,3]triazol-5-yl)(7-(5-(3,5-dichlorophenyl)-1,3,4-oxadiazol-2-yl)-2,7-diazaspiro[3.5]nonan-2-yl)methanone;
- 55 (1H-benzo[d][1,2,3]triazol-5-yl)(7-(5-(4-chlorophenyl)-1,3,4-oxadiazol-2-yl)-2,7-diazaspiro[3.5]nonan-2-yl)methanone;

EP 2 861 566 B1

(1H-benzo[d][1,2,3]triazol-5-yl)(7-(5-(4-chlorophenyl)-1,3,4-thiadiazol-2-yl)-2,7-diazaspiro[3.5]nonan-2-yl)methanone;

2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-N-(3,5-dichlorobenzyl)-2,7-diazaspiro[3.5]nonane-7-carboxamide;

(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)(5-chloroisindolin-2-yl)methanone;

benzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-ylamino)-7-azaspiro[3.5]nonane-7-carboxylate;

4-chloro-3-fluorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

(2,6-dichloropyridin-4-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

3,4-dichlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

(5,6-dichloropyridin-3-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

2,4-dichlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

(6-chloropyridin-3-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

4-chloro-3-(methylsulfonyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

1-(3,5-dichlorophenyl)ethyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

(5-chloropyridin-3-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

(5-bromopyridin-3-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

(4,6-dichloropyridin-2-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

3-chloro-4-fluorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

(5-chlorothiophen-3-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

thiophen-3-ylmethyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

(5-bromothiophen-3-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

4-(trifluoromethyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

3,5-dichlorobenzyl 7-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[4.4]nonane-2-carboxylate;

2,4,6-trichlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

6-[(1H-benzotriazole-5-carbonyl)-amino]-2-aza-spiro[3.3]heptane-2-carboxylic acid 3-chloro-5-trifluoromethoxybenzyl ester;

6-[(1H-benzotriazole-5-carbonyl)-amino]-2-aza-spiro[3.3]heptane-2-carboxylic acid 3-trifluoromethyl-benzyl ester;

6-[(1H-benzotriazole-5-carbonyl)-amino]-2-aza-spiro[3.3]heptane-2-carboxylic acid 3-chloro-5-cyano-benzyl ester;

6-[(1H-benzotriazole-5-carbonyl)-amino]-2-aza-spiro[3.3]heptane-2-carboxylic acid 3-chloro-4-fluoro-benzyl ester;

EP 2 861 566 B1

4-(trifluoromethyl)benzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

6-[(1H-benzotriazole-5-carbonyl)-amino]-2-aza-spiro[3.3]heptane-2-carboxylic acid 3-fluoro-5-trifluoromethyl-benzyl ester;

6-[(1H-benzotriazole-5-carbonyl)-amino]-2-aza-spiro[3.3]heptane-2-carboxylic acid 3-chloro-4-methyl-benzyl ester;

3-(methylsulfonyl)-5-(trifluoromethyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

3-(methylsulfonyl)-5-(trifluoromethyl)benzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

4-chloro-2-(methylsulfonyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

2-chloro-4-(methylsulfonyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

3,5-dichlorobenzyl 6-(1H-benzo[d][1,2,3]triazol-5-ylcarbamoyl)spiro[3.3]heptan-2-ylcarbamate;

3-fluoro-5-(trifluoromethoxy)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[4.5]decane-7-carboxylate;

3-chloro-5-(methylsulfonyl)benzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-ylsulfonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

2-[(3H-[1,2,3]triazol-4-ylmethyl)-carbamoyl]-7-aza-spiro[3.5]nonane-7-carboxylic acid 3,5-dichloro-benzyl ester;

and pharmaceutically acceptable salts thereof.

[0104] Also particular examples of compounds of formula (I) as described herein are selected from

4-(trifluoromethoxy)benzyl 2-(4-sulfamoylbenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

2-fluoro-4-(trifluoromethoxy)benzyl 2-(4-sulfamoylbenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(4-(trifluoromethoxy)phenyl)propan-1-one;

3-isopropyl-4-(2-oxo-2-(2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)ethoxy)benzotrile;

1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-2-(4-chloro-2-isopropylphenoxy)ethanone;

2-(4-chloro-2-isopropylphenoxy)-1-(2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)ethanone;

1-(2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(4-(trifluoromethoxy)phenyl)propan-1-one;

1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3-chlorophenyl)prop-2-yn-1-one;

1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(4-chlorophenyl)prop-2-yn-1-one;

3-fluoro-4-(trifluoromethoxy)benzyl 7-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-2-carboxylate;

EP 2 861 566 B1

- 4-(trifluoromethoxy)benzyl 7-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-2-carboxylate;
- 5 [4-(trifluoromethyl)phenyl]methyl 2-(3a,4,5,6,7,7a-hexahydro-1H-benzotriazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
- [2-fluoro-4-(trifluoromethyl)phenyl]methyl 2-(4,5,6,7-tetrahydro-1H-benzotriazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
- 10 [2-methyl-4-(trifluoromethoxy)phenyl]methyl 2-(4,5,6,7-tetrahydro-1H-benzotriazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
- 2-fluoro-4-(2,2,2-trifluoroethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
- 15 4-(2,2,2-trifluoroethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
- 3-fluoro-4-(2,2,2-trifluoroethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
- 20 2-fluoro-4-(trifluoromethoxy)benzyl 7-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-2-carboxylate;
- 25 2-fluoro-4-(trifluoromethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
- 4-(trifluoromethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
- 30 3-chloro-5-(trifluoromethyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
- 3-(methylsulfonyl)-5-(trifluoromethyl)benzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-ylsulfonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
- 35 4-(trifluoromethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-[1,2,3]triazolo[4,5-c]pyridine-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
- 40 2-fluoro-4-(trifluoromethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-[1,2,3]triazolo[4,5-c]pyridine-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
- [4-(trifluoromethoxy)phenyl]methyl 2-((1H-triazol-4-ylmethyl)carbamoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
- 45 [2-fluoro-4-(trifluoromethoxy)phenyl]methyl 2-((1H-triazol-4-ylmethyl)carbamoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
- (-)-2-fluoro-4-(trifluoromethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate ;
- 50 (+)-2-fluoro-4-(trifluoromethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
- [2-fluoro-4-(trifluoromethyl)phenyl]methyl 2-[4,5,6,7-tetrahydro-1H-benzotriazole-5-carbonyl]-2,7-diazaspiro[3.5]nonane-7-carboxylate (enantiomer A);
- 55 [2-fluoro-4-(trifluoromethyl)phenyl]methyl 2-[4,5,6,7-tetrahydro-1H-benzotriazole-5-carbonyl]-2,7-diazaspiro[3.5]nonane-7-carboxylate (enantiomer B);

and pharmaceutically acceptable salts thereof.

[0105] Further particular examples of compounds of formula (I) as described herein are selected from

3,5-dichlorobenzyl 2-(1-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

3-chloro-5-(methylsulfonyl)benzyl 2-(1-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

3-chloro-5-(methylsulfonyl)benzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

3,5-dichlorobenzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

(E)-1-(2-(1-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3,5-dichlorophenyl)prop-2-en-1-one;

3-(methylsulfonyl)-5-(trifluoromethyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

[2-methyl-4-(trifluoromethoxy)phenyl]methyl 2-(4,5,6,7-tetrahydro-1H-benzotriazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

(+)-2-fluoro-4-(trifluoromethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

and pharmaceutically acceptable salts thereof.

[0106] Also further particular examples of compounds of formula (I) as described herein are selected from

3,5-dichlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

3-chloro-5-(methylsulfonyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

3-chloro-5-(methylsulfonyl)benzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

3,5-dichlorobenzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

(E)-1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3,5-dichlorophenyl)prop-2-en-1-one;

3-(methylsulfonyl)-5-(trifluoromethyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;

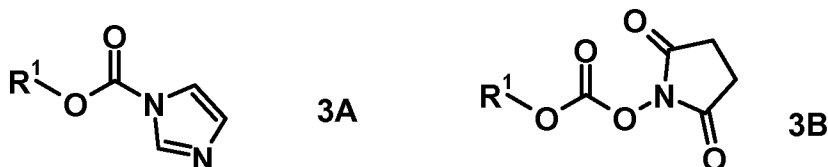
and pharmaceutically acceptable salts thereof

[0107] Processes for the manufacture of compounds of formula (I) as described herein are an object of the invention.

[0108] The preparation of compounds of formula (I) of the present invention may be carried out in sequential or convergent synthetic routes. Syntheses of the invention are shown in the following general schemes. The skills required for carrying out the reaction and purification of the resulting products are known to those persons skilled in the art. In case a mixture of enantiomers or diastereoisomers is produced during a reaction, these enantiomers or diastereoisomers can be separated by methods described herein or known to the man skilled in the art such as e.g. chiral chromatography or crystallization. The substituents and indices used in the following description of the processes have the significance given herein.

[0109] Compounds of general formula (I) can be synthesised from amine precursor H-W-R² (1) and appropriate reagents, using methods well known in the art.

[0110] For instance, amine 1 is reacted with a suitable chloroformate ester of formula R¹-O-C(O)-Cl (2), or with an imidazole-1-carboxylate ester of formula (3A), or with a succinimidyl carbonate derivative of formula (3B), leading to compound of formula (I) wherein Y is -OC(O)-.



5

10

15

20

25

30

35

40

45

50

55

[0111] The reaction is performed in a suitable solvent such as dichloromethane, tetrahydrofuran, N,N-dimethylformamide, acetonitrile, acetone, water, or mixtures thereof, in the presence or not of a base, e. g., triethylamine, diisopropylethylamine, pyridine, potassium hydrogencarbonate, potassium carbonate, at temperatures between 0°C and the boiling point of the solvent or solvent mixture.

[0112] Chloroformate esters **2** are commercially available or can be synthesised from the corresponding alcohol of formula R¹-OH, by reaction with phosgene or a phosgene equivalent (e.g., diphosgene, triphosgene) by methods known to those skilled in the art.

[0113] Imidazole-1-carboxylate esters **3A** are synthesised from the corresponding alcohols of formula R¹-OH, by reaction with 1,1'-carbonyldiimidazole. The reaction is performed at room temperature, in a solvent such as dichloromethane, tetrahydrofuran, or acetonitrile. The imidazole-1-carboxylate esters **3A** are typically not isolated but directly reacted with amines **1** as described above.

[0114] Succinimidyl carbonate derivatives **3B** are synthesised from the corresponding alcohols of formula R¹-OH, by reaction with N,N'-disuccinimidyl carbonate. The reaction is performed at room temperature, in a solvent such as dichloromethane, tetrahydrofuran, or acetonitrile, optionally in the presence of a base, e. g., triethylamine. The succinimidyl carbonate derivatives **3B** are typically not isolated but directly reacted with amines **1** as described above.

[0115] Alcohols of formula R¹-OH are commercially available or can be produced by method described herein or known in the art.

[0116] Alternatively, amine **1** is reacted with a suitable N-(chlorocarbonyl)amine of formula R¹-N(R¹⁴)-C(O)-Cl (**4**), or, in the case where R¹⁴ is H, with isocyanate of formula R¹-NCO (**5**), leading to compound of formula (I) wherein Y is -NR¹⁴C(O)-.

[0117] N-(Chlorocarbonyl)amines (**4**) are synthesised from the corresponding amines of formula R¹-N(R¹⁴)H by reaction with phosgene or a phosgene equivalent, as described in the literature.

[0118] Isocyanates **5** are commercially available or can be prepared from the corresponding amines of formula R¹-NH₂, by reaction with phosgene or a phosgene equivalent (e. g., diphosgene, triphosgene, 1,1'-carbonyldiimidazole), as described in the literature.

[0119] Alternatively, amine **1** is reacted with a suitable carboxylic acid of formula R¹-COOH (**6**) leading to compound of formula (I), wherein Y is -C(O)-. The reaction is performed in the presence of a coupling agent such as 1,1'-carbonyldiimidazole, N,N'-dicyclohexylcarbodiimide, 1-(3-dimethylaminopropyl)-3-ethyl-carbodiimide hydrochloride, O-(benzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluoro-phosphate, O-(7-azabenzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluoro-phosphate or bromo-tris-pyrrolidino-phosphonium hexafluorophosphate, in aprotic solvents such as dichloromethane, tetrahydrofuran, N,N-dimethylformamide, N-methylpyrrolidinone and mixtures thereof at temperatures between -40°C and 80°C in the presence or absence of a base such as triethylamine, diisopropylethylamine, 4-methylmorpholine and/or 4-(dimethylamino)pyridine.

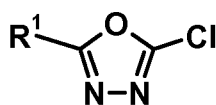
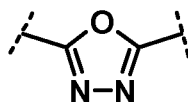
[0120] Amine **1** can also be reacted with suitable acylating reagents, such as acyl chlorides of formula R¹-COCl (**7**) to lead to compounds of formula (I) wherein Y is -C(O)-. The reaction is performed in a solvent such as dichloromethane, tetrahydrofuran, or N,N-dimethylformamide, in the presence of a base such as triethylamine or 4-methylmorpholine, at temperatures between 0°C and 80°C.

[0121] Carboxylic acids (**6**) and acyl halides (**7**) are commercially available or can be prepared as described herein or in the literature.

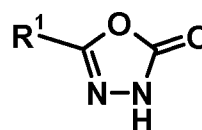
[0122] Alternatively, amine **1** is reacted with a suitable sulfonyl chloride of formula R¹-SO₂Cl (**8**), leading to compounds of formula (I) wherein Y is -S(O₂)-. The reaction is performed in a suitable solvent such as dichloromethane, tetrahydrofuran, N,N-dimethylformamide, acetonitrile, acetone, water, or mixtures thereof, in the presence of a base, e. g., triethylamine, diisopropylethylamine, pyridine, potassium hydrogencarbonate, potassium carbonate, at temperatures between 0°C and the boiling point of the solvent or solvent mixture.

[0123] Sulfonyl chlorides (**8**) are commercially available or can be synthesised as described herein or in the literature.

[0124] Alternatively, amine **1** is reacted with a suitable chloro-oxadiazole reagent of general formula 9, or with oxadiazolone reagent **10**, leading to compound of formula (I), wherein Y is



9



10

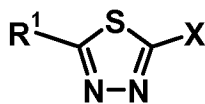
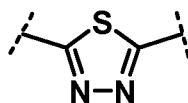
[0125] In the case where compounds of formula (I) are produced from amine **1** and chloro-oxadiazole **9**, the reaction is performed in the presence of a base, e. g., potassium carbonate, triethylamine, or 1,8-diazabicyclo[5.4.0]undec-7-ene, in a solvent such as toluene, ethanol, N,N-dimethylformamide, or 1,4-dioxane, at temperatures between 20°C and 150°C.

[0126] In the case where compounds of formula (I) are produced from amine **1** and oxadiazolone **10**, the reaction is performed in the presence of a coupling agent, e. g., benzotriazol-1-yl-oxy-tris-(dimethylamino)-phosphonium hexafluorophosphate, and a base, e. g., diisopropylethylamine or 4-methylmorpholine, in a solvent such as N,N-dimethylformamide, at temperatures between 20°C and 100°C, as described in the literature (Org. Lett. 2008, 10, 1755).

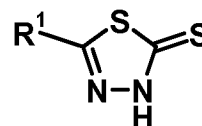
[0127] Oxadiazolones **10** are commercially available or can be produced as described in the experimental section.

[0128] Chloro-oxadiazoles **9** are commercially available or can be produced from the corresponding oxadiazolones, by reaction with a suitable halogenating reagent, e. g., phosphorus oxychloride and/or phosphorus pentachloride, at temperatures between 60°C and 120°C.

[0129] Alternatively, amine **1** is reacted with a suitable halo-thiadiazole reagent of general formula **11** (X = Cl or Br), or with thiadiazolethione reagent **12**, leading to compounds of (I) wherein Y is



11



12

[0130] In the case where compounds of formula (I) are produced from amine **1** and halo-thiadiazole **11**, the reaction is performed in the presence of a base, e. g., potassium carbonate, triethylamine, or 1,8-diazabicyclo[5.4.0]undec-7-ene, in a solvent such as toluene, ethanol, N,N-dimethylformamide, or 1,4-dioxane, at temperatures between 20°C and 150°C.

[0131] In the case where compounds of formula (I) are produced from amine **1** and thiadiazolethione **12**, the reaction is performed in a solvent such as ethanol or N,N-dimethylformamide, at temperatures between 20°C and 100°C, as described in the literature.

[0132] Thiadiazolethiones **12** are commercially available or can be produced as described in the literature.

[0133] Halo-thiadiazoles **11** are commercially available or can be produced as described in the literature.

[0134] Amines of general formula H-W-R² (**1**) are synthesised from suitably protected precursors, PG-W-R² (**13**). Suitable protective groups (PG) are tert-butoxycarbonyl benzyloxycarbonyl and substituted benzyloxycarbonyl such as 3,5-dichloro benzyloxycarbonyl. The deprotection of intermediates **13** can be performed using methods and reagents known in the art.

[0135] For instance, in the case where PG is optionally substituted benzyloxycarbonyl, the deprotection may be performed by hydrogenation at pressures between 1 bar and 100 bar, in the presence of a suitable catalyst such as palladium on activated charcoal, at temperatures between 20°C and 150°C, in solvents such as methanol or ethanol.

[0136] Alternatively, in the case where PG is tert-butoxycarbonyl, the deprotection may be performed in the presence

of a suitable acid, e. g. hydrochloric acid or trifluoroacetic acid, in a solvent such as water, 2-propanol, dichloromethane, or 1,4-dioxane, at temperatures between 0°C and 30°C.

[0137] Carbamates **13**, wherein W is **A, B, C, D, E, F, G, H, I, J, K, L, M, N, P** or **Q** are represented by general structure PG-W-R² (**13A**). PG is a suitable protective group, e. g., tert-butoxycarbonyl, benzyloxycarbonyl and substituted benzyloxycarbonyl such as 3,5-dichloro benzyloxycarbonyl.

[0138] Carbamates **13A** can be produced from amine precursors of general formula PG-W-H (**14**) by reaction with appropriate reagents, using methods known in the art.

[0139] For instance, **14** is reacted with alkylating agents of general formula X-(CR⁴R⁵)_n-R³ (**15**) where X is a leaving group such as Cl, Br, I, or OSO₂CH₃, leading to **13A**, wherein R² is -(CR⁴R⁵)_n-R³. This reaction is performed in a solvent such as tetrahydrofuran or N,N-dimethylformamide, in the presence of a base, e. g., triethylamine or potassium carbonate, at temperatures between 0°C and 100°C.

[0140] Alternatively, compounds of formula **13A**, wherein R² is -(CR⁴R⁵)_n-R³, R⁴ is hydrogen, alkyl or cycloalkyl, R⁵ is H and n is 1, amine **14** is reacted with aldehydes or ketones of general formula R⁴-C(O)-R³ (**16**) in a reductive amination reaction, leading to **13A**. This reaction is performed in the presence of a suitable reducing agent, e. g., sodium borohydride or sodium triacetoxymethylborohydride, in a solvent such as methanol, acetic acid, tetrahydrofuran, 1,2-dichloroethane, or mixtures thereof, at temperatures between 0°C and 50°C.

[0141] Alternatively, amine **14** is reacted with a suitable carboxylic acid of formula R³-COOH (**17**), leading to compounds of formula **13A**, wherein R² is -C(O)-R³. The reaction is performed in the presence of a coupling agent such as 1,1'-carbonyldiimidazole, N,N'-dicyclohexylcarbodiimide, 1-(3-dimethylaminopropyl)-3-ethyl-carbodiimide hydrochloride, O-(benzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluoro-phosphate, O-(7-azabenzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluoro-phosphate or bromo-tris-pyrrolidino-phosphonium hexafluorophosphate, in aprotic solvents such as dichloromethane, tetrahydrofuran, N,N-dimethylformamide, N-methylpyrrolidinone and mixtures thereof at temperatures between -40°C and 80°C, in the presence or absence of a base such as triethylamine, diisopropylethylamine, 4-methylmorpholine and/or 4-(dimethylamino)pyridine.

[0142] Alternatively, amine **14** is reacted with a suitable sulfonyl chloride of formula R³-SO₂Cl (**18**), leading to compounds of formula **13A**, wherein R² is -S(O₂)-R³. The reaction is performed in a suitable solvent such as dichloromethane, tetrahydrofuran, N,N-dimethylformamide, acetonitrile, acetone, water, or mixtures thereof, in the presence of a base, e. g., triethylamine, diisopropylethylamine, pyridine, potassium hydrogencarbonate, potassium carbonate, at temperatures between 0°C and the boiling point of the solvent or solvent mixture.

[0143] Alternatively, amine **14** is reacted with a suitable N-(chlorocarbonyl)amine of formula R³-N(R⁶)-C(O)-Cl (**19**) leading to compounds of formula **13A**, wherein R² is -C(O)-NR⁶R³, or with isocyanate of formula R³-NCO (**20**), leading to compounds of formula **13A**, wherein R² is -C(O)-NR⁶R³ and R⁶ is H.

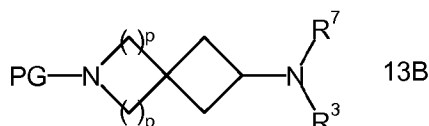
[0144] Alternatively, amine **14** is reacted with phosgene or a phosgene equivalent (diphosgene, triphosgene) in the presence of a base (e. g., pyridine, triethylamine), in a solvent such as dichloromethane or tetrahydrofuran, to the corresponding N-(chlorocarbonyl)amine of formula PG-W-C(O)Cl (**21**), which is then reacted with an amine of formula HN(R⁶)R³ (**22**), leading to compounds of formula **13A**, wherein R² is -C(O)-NR⁶R³.

[0145] N-(Chlorocarbonyl)amines **19** are synthesised from the corresponding amines **22** by reaction with phosgene or a phosgene equivalent (diphosgene, triphosgene), as described in the literature.

[0146] Isocyanates **20** are commercially available or can be prepared from the corresponding amines of formula R³-NH₂, by reaction with phosgene or a phosgene equivalent (e. g., diphosgene, triphosgene, 1,1'-carbonyldiimidazole), as described in the literature.

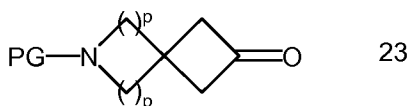
[0147] Amines **14**, alkylating agents **15**, aldehydes/ketones **16**, carboxylic acids **17**, sulfonyl chlorides **18**, and amines **22** are commercially available or can be synthesised as described in the experimental section.

[0148] Carbamates **13** wherein W is **C** or **H**, R² is -(CR⁴R⁵)_n-R³ and n is zero are represented by general formula **13B**, wherein p is 1 or 2 and PG is a suitable protective group, e. g. tert-butoxycarbonyl benzyloxycarbonyl and substituted benzyloxycarbonyl such as 3,5-dichloro benzyloxycarbonyl.



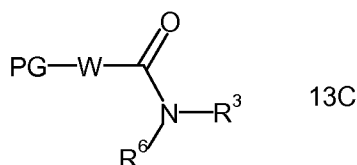
[0149] Compound **13B** is produced from ketone **23**, wherein p is 1 or 2 by reaction with an amine of formula HN(R⁷)R³ (**24**) in the presence of a suitable reducing agent, e. g., sodium borohydride or sodium triacetoxymethylborohydride, in a solvent such as methanol, acetic acid, tetrahydrofuran, 1,2-dichloroethane, or mixtures thereof, at temperatures between 0°C and 50°C.

EP 2 861 566 B1

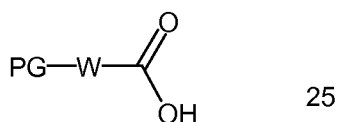


[0150] Ketones **23** and amines **24** are commercially available or can be prepared as described in the experimental section.

[0151] Carbamates **13** in W is O or R and R² is -C(O)-N(R⁶)R³ are represented by general formula **13C**.



[0152] Amide **13C** is produced from carboxylic acid **25** by coupling reaction with an amine of formula HN(R⁶)R³ (**22**).



[0153] The reaction is performed in the presence of a coupling agent such as 1,1'-carbonyldiimidazole, N,N'-dicyclohexylcarbodiimide, 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride, O-(benzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluoro-phosphate, O-(7-azabenzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluoro-phosphate or bromo-tris-pyrrolidino-phosphonium hexafluorophosphate, in aprotic solvents such as dichloromethane, tetrahydrofuran, N,N-dimethylformamide, N-methylpyrrolidinone and mixtures thereof at temperatures between -40°C and 80°C in the presence or absence of a base such as triethylamine, diisopropylethylamine, 4-methylmorpholine and/or 4-(dimethylamino)pyridine.

[0154] Carboxylic acids **25** are commercially available or can be produced as described in the literature.

[0155] Compounds of formula (I), wherein W is A, B, C, D, E, F, G, H, I, J, K, L, M, N, P or Q can be produced from amine precursors of general formula R¹-Y-W-H (**26**) by reaction with appropriate reagents, using methods known in the art.

[0156] For instance, an amine of formula **26** is reacted with alkylating agents of general formula X-(CR⁴R⁵)_nR³ (**15**) where X is a leaving group such as Cl, Br, I, or OSO₂CH₃, leading to compounds of formula (I), wherein W is A, B, C, D, E, F, G, H, I, J, K, L, M, N, P or Q and R² is -(CR⁴R⁵)_nR³. This reaction is performed in a solvent such as tetrahydrofuran or N,N-dimethylformamide, in the presence of a base, e. g., triethylamine or potassium carbonate, at temperatures between 0°C and 100°C.

[0157] Alternatively, an amine of formula **26** is reacted with aldehydes or ketones of general formula R⁴-C(O)-R³ (**16**) in a reductive amination reaction, leading to compounds of formula (I) wherein W is A, B, C, D, E, F, G, H, I, J, K, L, M, N, P or Q, R² is -(CR⁴R⁵)_nR³, R⁴ is hydrogen, alkyl or cycloalkyl, R⁵ is H and n is 1. This reaction is performed in the presence of a suitable reducing agent, e. g., sodium borohydride or sodium triacetoxyborohydride, in a solvent such as methanol, acetic acid, tetrahydrofuran, 1,2-dichloroethane, or mixtures thereof, at temperatures between 0°C and 50°C.

[0158] Alternatively, amine **26** is reacted with a suitable carboxylic acid of formula R³-COOH (**17**), leading to compounds of formula (I) wherein W is A, B, C, D, E, F, G, H, I, J, K, L, M, N, P or Q and R² is -C(O)-R³. The reaction is performed in the presence a coupling agent such as 1,1'-carbonyldiimidazole, N,N'-dicyclohexylcarbodiimide, 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride, O-(benzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluoro-phosphate, O-(7-azabenzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluoro-phosphate or bromo-tris-pyrrolidino-phosphonium hexafluorophosphate, in aprotic solvents such as dichloromethane, tetrahydrofuran, N,N-dimethylformamide, N-methylpyrrolidinone and mixtures thereof at temperatures between -40°C and 80°C in the presence or absence of a base such as triethylamine, diisopropylethylamine, 4-methylmorpholine and/or 4-(dimethylamino)pyridine.

[0159] Alternatively, amine **26** is reacted with a suitable sulfonyl chloride of formula R³-SO₂Cl (**18**), leading to wherein W is A, B, C, D, E, F, G, H, I, J, K, L, M, N, P or Q and R² is -S(O₂)-R³. The reaction is performed in a suitable solvent such as dichloromethane, tetrahydrofuran, N,N-dimethylformamide, acetonitrile, acetone, water, or mixtures thereof, in the presence of a base, e.g., triethylamine, diisopropylethylamine, pyridine, potassium hydrogencarbonate, potassium carbonate, at temperatures between 0°C and the boiling point of the solvent or solvent mixture.

[0160] Alternatively, an amine of formula **26** is reacted with a suitable N-(chlorocarbonyl)amine of formula R³-N(R⁶)-C(O)-Cl (**19**) leading to compounds of formula (I), wherein R² is -C(O)-NR⁶R³, or with isocyanate R³-NCO

(20), leading to compounds of formula (I), wherein R^2 is $-C(O)-NR^6R^3$ and R^6 is H.

[0161] Amines 26 can be synthesised from their tert-butyl carbamate derivatives of formula $R^1-Y-W-C(O)O-C(CH_3)_3$ (27) by carbamate deprotection. The deprotection may be performed in the presence of a suitable acid, e. g., hydrochloric acid or trifluoroacetic acid, in a solvent such as water, 2-propanol, dichloromethane, or 1,4-dioxane, at temperatures between 0°C and 30°C.

[0162] Tert-Butyl carbamates 27 can be synthesised from an amine precursor of formula $H-W-C(O)O-C(CH_3)_3$ (28) and appropriate reagents, using methods well known in the art.

[0163] For instance, an amine of formula 28 is reacted with a suitable chloroformate ester of formula $R^1-O-C(O)-Cl$ (2), or with an imidazole-1-carboxylate ester of formula (3A) or with a succinimidyl carbonate derivative of formula (3B), leading to compounds of formula 27, wherein Y is $-OC(O)-$. The reaction is performed in a suitable solvent such as dichloromethane, tetrahydrofuran, N,N-dimethylformamide, acetonitrile, acetone, water, or mixtures thereof, in the presence or not of a base, e. g., triethylamine, diisopropylethylamine, pyridine, potassium hydrogencarbonate, potassium carbonate, at temperatures between 0°C and the boiling point of the solvent or solvent mixture.

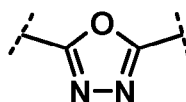
[0164] Alternatively, an amine of formula 28 is reacted with a suitable N-(chlorocarbonyl)amine of formula $R^1-N(R^{14})-C(O)-Cl$ (4) leading to compounds of formula 27, wherein Y is $-NR^{14}C(O)-$, or with an isocyanate of formula R^1-NCO (5) leading to compounds of formula 27, wherein Y is $-NR^{14}C(O)-$ and R^{14} is H.

[0165] Alternatively, amine 28 is reacted with a suitable carboxylic acid of formula R^1-COOH (6) leading to compounds of formula 27, wherein Y is $-C(O)-$. The reaction is performed in the presence of a coupling agent such as 1,1'-carbonyldiimidazole, N,N'-dicyclohexylcarbodiimide, 1-(3-dimethylaminopropyl)-3-ethyl-carbodiimide hydrochloride, O-(benzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluoro-phosphate, O-(7-azabenzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluoro-phosphate or bromo-tris-pyrrolidino-phosphonium hexafluorophosphate, in aprotic solvents such as dichloromethane, tetrahydrofuran, N,N-dimethylformamide, N-methylpyrrolidinone and mixtures thereof at temperatures between -40°C and 80°C in the presence or absence of a base such as triethylamine, diisopropylethylamine, 4-methylmorpholine and/or 4-(dimethylamino)pyridine.

[0166] Amine 28 can also be reacted with suitable acylating reagents, such as acyl chlorides of formula R^1-COCl (7) to lead to compounds of formula 27, wherein Y is $-C(O)-$. The reaction is performed in a solvent such as dichloromethane, tetrahydrofuran, or N,N-dimethylformamide, in the presence of a base such as triethylamine or 4-methylmorpholine, at temperatures between 0°C and 80°C.

[0167] Alternatively, amine 1 is reacted with a suitable sulfonyl chloride of formula R^1-SO_2Cl (8), leading to compounds of formula 27, wherein Y is $-S(O_2)-$. The reaction is performed in a suitable solvent such as dichloromethane, tetrahydrofuran, N,N-dimethylformamide, acetonitrile, acetone, water, or mixtures thereof, in the presence of a base, e. g., triethylamine, diisopropylethylamine, pyridine, potassium hydrogencarbonate, potassium carbonate, at temperatures between 0°C and the boiling point of the solvent or solvent mixture.

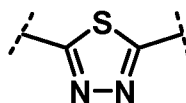
[0168] Alternatively, amine 28 is reacted with a suitable chloro-oxadiazole reagent of general formula 9, or with oxadiazolone reagent 10, leading to compounds of formula 27, wherein Y is



[0169] In the case where 27 is produced from amine 28 and chloro-oxadiazole 9, the reaction is performed in the presence of a base, e. g., potassium carbonate, triethylamine, or 1,8-diazabicyclo[5.4.0]undec-7-ene, in a solvent such as toluene, ethanol, N,N-dimethylformamide, or 1,4-dioxane, at temperatures between 20°C and 150°C.

[0170] In the case where 27 is produced from amine 28 and oxadiazolone 10, the reaction is performed in the presence of a coupling agent, e. g., benzotriazol-1-yl-oxy-tris-(dimethylamino)-phosphonium hexafluorophosphate, and a base, e. g., diisopropylethylamine or 4-methylmorpholine, in a solvent such as N,N-dimethylformamide, at temperatures between 20°C and 100°C, as described in the literature (Org. Lett. 2008, 10, 1755).

[0171] Alternatively, amine 28 is reacted with a suitable halo-thiadiazole reagent of general formula 11 (X is Cl or Br), or with thiadiazolethione reagent 12, leading to compounds of formula 27, wherein Y is



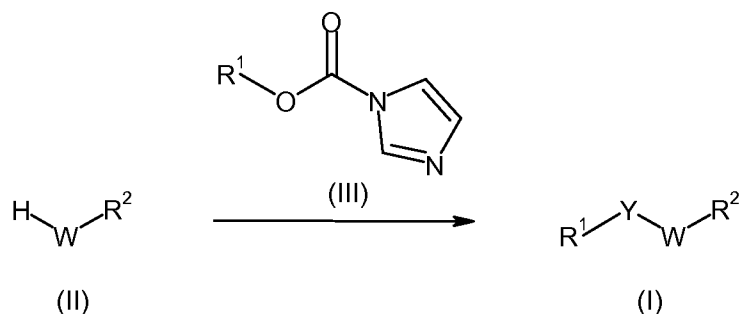
[0172] In the case where 27 is produced from amine 28 and halo-thiadiazole 11, the reaction is performed in the presence of a base, e. g., potassium carbonate, triethylamine, or 1,8-diazabicyclo[5.4.0]undec-7-ene, in a solvent such

as toluene, ethanol, N,N-dimethylformamide, or 1,4-dioxane, at temperatures between 20°C and 150°C.

[0173] In the case where **27** is produced from amine **28** and thiadiazolethione **12**, the reaction is performed in a solvent such as ethanol or N,N-dimethylformamide, at temperatures between 20°C and 100°C, as described in the literature

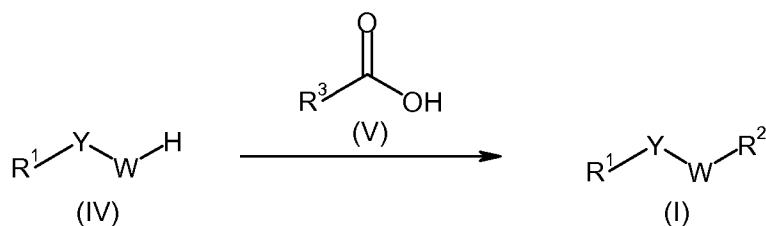
[0174] Also an embodiment of the present invention is a process to prepare a compound of formula (I) as defined above comprising

a) the reaction of a compound of formula (II) in the presence of a compound of formula (III);



20 or

b) the reaction of a compound of formula (IV) in the presence of a compound of formula (V);



wherein in step a) R¹, R² and W are as defined above, Y is -C(O)-, and wherein in step b) R¹ and Y are as defined above, W is A, B, C, D, E, F, G, H, I, J, K, L, M, N, P or Q and R² is -C(O)-R³.

[0175] In particular, in step a), in the presence of a coupling agent such as O-(7-azabenzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluoro-phosphate, in a solvent such as N,N-dimethylformamide, in the presence of a base such as 4-methylmorpholine and at a temperature comprised between -78°C and reflux, particularly between -10°C and room temperature.

[0176] In particular, in step b), in an aprotic solvent such as acetonitrile, in the presence of a base such as triethylamine and at a temperature comprised between 0°C and reflux, particularly between room temperature and reflux.

[0177] Also an object of the present invention is a compound according to formula (I) as described herein for use as a therapeutically active substance.

[0178] Likewise an object of the present invention is a pharmaceutical composition comprising a compound according to formula (I) as described herein and a therapeutically inert carrier.

[0179] An object of the invention is the use of a compound according to formula (I) as described herein for the treatment or prophylaxis of renal conditions, liver conditions, inflammatory conditions, conditions of the nervous system, conditions of the respiratory system, vascular and cardiovascular conditions, fibrotic diseases, cancer, ocular conditions, metabolic conditions, cholestatic and other forms of chronic pruritus and acute and chronic organ transplant rejection.

[0180] Renal conditions include, but are not limited to, acute kidney injury and chronic renal disease with and without proteinuria including end-stage renal disease (ESRD). In more detail, this includes decreased creatinine clearance and decreased glomerular filtration rate, micro-albuminuria, albuminuria and proteinuria, glomerulosclerosis with expansion of reticulated mesangial matrix with or without significant hypercellularity (particularly diabetic nephropathy and amyloidosis), focal thrombosis of glomerular capillaries (particularly thrombotic microangiopathies), global fibrinoid necrosis, ischemic lesions, malignant nephrosclerosis (such as ischemic retraction, reduced renal blood flow and renal arteriopathy), swelling and proliferation of intracapillary (endothelial and mesangial) and/or extracapillary cells (crescents) like in glomerular nephritis entities, focal segmental glomerular sclerosis, IgA nephropathy, vasculitides / systemic diseases as well as acute and chronic kidney transplant rejection.

[0181] Liver conditions include, but are not limited to, liver cirrhosis, hepatic congestion, cholestatic liver disease including pruritus, nonalcoholic steatohepatitis and acute and chronic liver transplant rejection.

[0182] Inflammatory conditions include, but are not limited to, arthritis, osteoarthritis, multiple sclerosis, systemic lupus erythematoses, inflammatory bowel disease, abnormal evacuation disorder and the like as well as inflammatory airways diseases such as idiopathic pulmonary fibrosis (IPF), chronic obstructive pulmonary disease (COPD) or chronic asthma bronchiale.

[0183] Further conditions of the respiratory system include, but are not limited to, other diffuse parenchymal lung diseases of different etiologies including iatrogenic drug-induced fibrosis, occupational and/or environmental induced fibrosis, systemic diseases and vasculitides, granulomatous diseases (sarcoidosis, hypersensitivity pneumonia), collagen vascular disease, alveolar proteinosis, Langerhans cell granulomatosis, lymphangioleiomyomatosis, inherited diseases (Hermansky-Pudlak Syndrome, tuberous sclerosis, neurofibromatosis, metabolic storage disorders, familial interstitial lung disease), radiation induced fibrosis, silicosis, asbestos induced pulmonary fibrosis or acute respiratory distress syndrome (ARDS).

[0184] Conditions of the nervous system include, but are not limited to, neuropathic pain, schizophrenia, neuro-inflammation (e.g. astrogliosis), peripheral and/or autonomic (diabetic) neuropathies and the like.

[0185] Vascular conditions include, but are not limited to, atherosclerosis, thrombotic vascular disease as well as thrombotic microangiopathies, proliferative arteriopathy (such as swollen myointimal cells surrounded by mucinous extracellular matrix and nodular thickening), atherosclerosis, decreased vascular compliance (such as stiffness, reduced ventricular compliance and reduced vascular compliance), endothelial dysfunction and the like.

[0186] Cardiovascular conditions include, but are not limited to, acute coronary syndrome, coronary heart disease, myocardial infarction, arterial and pulmonary hypertension, stroke and other vascular damage.

[0187] Fibrotic diseases include, but are not limited to myocardial and vascular fibrosis, renal fibrosis, liver fibrosis, pulmonary fibrosis, skin fibrosis, scleroderma and encapsulating peritonitis.

[0188] In a particular embodiment, the compounds of formula (I) or their pharmaceutically acceptable salts and esters can be used for the treatment or prophylaxis of organ or skin fibrosis.

[0189] In another embodiment, the fibrotic disease is renal tubulo-interstitial fibrosis or glomerulosclerosis.

[0190] In another embodiment, the fibrotic disease is non-alcoholic liver steatosis, liver fibrosis or liver cirrhosis.

[0191] Cancer and cancer metastasis include, but are not limited to, breast cancer, ovarian cancer, lung cancer, prostate cancer, mesothelioma, glioma, hepatic carcinoma, gastrointestinal cancers and progression and metastatic aggressiveness thereof.

[0192] Ocular conditions include, but are not limited to, proliferative and non-proliferative (diabetic) retinopathy, dry and wet age-related macular degeneration (AMD), macular edema, central arterial /venous occlusion, traumatic injury, glaucoma and the like.

[0193] Metabolic conditions include, but are not limited to, obesity and diabetes.

[0194] In another embodiment, the compounds of formula (I) or their pharmaceutically acceptable salts and esters can be used for the treatment or prophylaxis of cholestatic or non-cholestatic chronic pruritus.

[0195] The present invention also relates to the use of a compound according to formula (I) as described herein for the treatment or prophylaxis of renal conditions, liver conditions, inflammatory conditions, conditions of the nervous system, fibrotic diseases and acute and chronic organ transplant rejection.

[0196] The present invention also relates to the use of a compound according to formula (I) as described herein for the treatment or prophylaxis of renal conditions, liver conditions and fibrotic diseases.

[0197] A particular embodiment of the present invention is a compound according to formula (I) as described herein for the treatment or prophylaxis of renal conditions, liver conditions, inflammatory conditions, conditions of the nervous system, fibrotic diseases and acute and chronic organ transplant rejection.

[0198] A particular embodiment of the present invention is a compound according to formula (I) as described herein for the treatment or prophylaxis of renal conditions, liver conditions and fibrotic diseases.

[0199] The present invention also relates to the use of a compound according to formula (I) as described herein for the preparation of a medicament for the treatment or prophylaxis of renal conditions, liver conditions, inflammatory conditions, conditions of the nervous system, fibrotic diseases and acute and chronic organ transplant rejection.

[0200] The present invention also relates to the use of a compound according to formula (I) as described herein for the preparation of a medicament for the treatment or prophylaxis of renal conditions, liver conditions and fibrotic diseases.

[0201] Also an object of the invention is a method for the treatment or prophylaxis of renal conditions, liver conditions, inflammatory conditions, conditions of the nervous system, fibrotic diseases and acute and chronic organ transplant rejection, which method comprises administering an effective amount of a compound according to formula (I) as described herein.

[0202] Also an object of the invention is a method for the treatment or prophylaxis of renal conditions, liver conditions and fibrotic diseases, which method comprises administering an effective amount of a compound according to formula (I) as described herein.

EP 2 861 566 B1

[0203] In a particular embodiment, the renal condition is selected from the group consisting of acute kidney injury, chronic kidney disease, diabetic nephropathy, acute kidney transplant rejection and chronic allograft nephropathy.

[0204] In another particular embodiment, the renal condition is acute kidney injury.

[0205] In another particular embodiment, the renal condition is chronic kidney disease.

[0206] In a further particular embodiment, the renal condition is diabetic nephropathy.

[0207] In another particular embodiment, the renal condition is acute kidney transplant rejection.

[0208] In another particular embodiment, the renal condition is chronic allograft nephropathy.

[0209] In a particular embodiment, the liver condition is acute and chronic liver transplant rejection

[0210] In a particular embodiment, the inflammatory condition is arthritis.

[0211] In a particular embodiment, the condition of the nervous system is neuropathic pain.

[0212] In another embodiment, the fibrotic disease is encapsulating peritonitis

[0213] In another embodiment, the fibrotic disease is idiopathic pulmonary fibrosis.

[0214] In another embodiment, the fibrotic disease is non-alcoholic liver steatosis, liver fibrosis or liver cirrhosis.

[0215] Also an embodiment of the present invention are compounds of formula (I) as described herein, when manufactured according to any one of the described processes.

Assay procedures

PRODUCTION OF HUMAN FULL LENGTH ATX, WITH AND WITHOUT HIS TAG

[0216] **Autotaxin (ATX - ENPP2) cloning:** cDNA was prepared from commercial human hematopoietic cells total RNA and used as template in overlapping PCR to generate a full length human ENPP2 ORF with or without a 3'-6xHis tag. These full length inserts were cloned into the pcDNA3.1V5-His TOPO (Invitrogen) vector. The DNA sequences of several single clones were verified. The DNA from a correct full length clone was used to transfect Hek293 cells for verification of protein expression. The sequence of the encoded ENPP2 conforms to Swissprot entry Q13822, with or without the additional C-terminal 6xHis tag.

[0217] **ATX Fermentation:** Recombinant protein was produced by large-scale transient transfection in 20 L controlled stirred tank bioreactors (Sartorius). During cell growth and transfection, temperature, stirrer speed, pH and dissolved oxygen concentration were maintained at 37°C, 120 rpm, 7.1 and 30% DO, respectively. FreeStyle 293-F cells (Invitrogen) were cultivated in suspension in FreeStyle 293 medium (Invitrogen) and transfected at ca. 1-1.5 x 10⁶ cells/mL with above plasmid DNAs using X-tremeGENE Ro-1539 (commercial product, Roche Diagnostics) as complexing agent. Cells were fed a concentrated nutrient solution (J Immunol Methods 194 (1996), 19, 1-199 (page 193)) and induced by sodium butyrate (2 mM) at 72 h post-transfection and harvested at 96 h post-transfection. Expression was analyzed by Western Blot, enzymatic assay and/or analytical IMAC chromatography. After cooling the cell suspension to 4°C in a flow-through heat exchanger, cell separation and sterile filtration of supernatant was performed by filtration through Zeta Plus 60M02 E16 (Cuno) and Sartopore 2 XLG (Sartorius) filter units. The supernatant was stored at 4°C prior to purification.

[0218] **ATX Purification:** 20 liter of culture supernatant were conditioned for ultrafiltration by adding Brij 35 to a final concentration of 0.02% and by adjusting the pH to 7.0 using 1 M HCl. Then the supernatant was first microfiltered through a 0.2 µm Ultran-Pilot Open Channel PES filter (Whatman) and afterwards concentrated to 1 liter through an Ultran-Pilot Screen Channel PES filter with 30 kDa MWCO (Whatman). Prior to IMAC chromatography, NiSO₄ was added to a final concentration of 1 mM. The cleared supernatant was then applied to a HisTrap column (GE Healthcare) previously equilibrated in 50 mM Na₂HPO₄ pH 7.0, 0.5 M NaCl, 10% glycerol, 0.3% CHAPS, 0.02% NaN₃. The column was washed stepwise with the same buffer containing 20 mM, 40 mM and 50 mM imidazole, respectively. The protein was subsequently eluted using a linear gradient to 0.5 M imidazole in 15 column volumes. ATX containing fractions were pooled and concentrated using an Amicon cell equipped with a 30 kDa PES filter membrane. The protein was further purified by size exclusion chromatography on Superdex S-200 prep grade (XK 26/100) (GE Healthcare) in 20 mM BICINE pH 8.5, 0.15 M NaCl, 10% glycerol, 0.3% CHAPS, 0.02% NaN₃. Final yield of protein after purification was 5-10 mg ATX per liter of culture supernatant. The protein was stored at -80°C.

HUMAN ATX ENZYME INHIBITION ASSAY

[0219] ATX inhibition was measured by a fluorescence quenching assay using a specifically labeled substrate analogue (MR121 substrate). To obtain this MR121 substrate, BOC and TBS protected 6-amino-hexanoic acid (R)-3-({2-[3-(2-{2-[2-(2-amino-ethoxy)-ethoxy]-ethoxy}-propionylamino)-ethoxy]-hydroxy-phosphoryloxy)-2-hydroxy-propyl ester (Ferguson et al., Org Lett 2006, 8 (10), 2023) was labeled with MR121 fluorophore (CAS 185308-24-1, 1-(3-carboxypropyl)-11-ethyl-1,2,3,4,8,9,10,11-octahydro-dipyrido[3,2-b:2',3'-i]phenoxazin-13-ium) on the free amine of the ethanolamine side and then, after deprotection, subsequently with tryptophan on the side of the aminohexanoic acid.

EP 2 861 566 B1

[0220] Assay working solutions were made as follows:

5 Assay buffer (50 mM Tris-HCl, 140 mM NaCl, 5 mM KCl, 1 mM CaCl₂, 1 mM MgCl₂, 0.01% Triton-X-100, pH 8.0;
ATX solution: ATX (human His-tagged) stock solution (1.08 mg/mL in 20mM bicine, pH 8.5, 0.15 M NaCl, 10%
10 glycerol, 0.3% CHAPS, 0.02% NaN₃), diluted to 1.4 - 2.5x final concentration in assay buffer;
MR121 substrate solution: MR121 substrate stock solution (800 μM MR121 substrate in DMSO), diluted to 2 - 5x
15 final concentration in assay buffer.

[0221] Test compounds (10 mM stock in DMSO, 8 μL) were obtained in 384 well sample plates (Corning Costar #3655)
10 and diluted with 8 μL DMSO. Row-wise serial dilutions were made by transferring 8 μL cpd solution to the next row up
to row O. The compound and control solutions were mixed five times and 2 μL were transferred to 384 well assay plates
(Corning Costar # 3702). Then, 15 μL of 41.7 nM ATX solution was added (30 nM final concentration), mixed five times
and then incubated for 15 minutes at 30°C. 10 μL of MR121 substrate solution was added (1 μM final concentration),
15 mixed 30 times and then incubated for 15 minutes at 30 °C. Fluorescence was then measured every 2 minutes for 1
hour (Perkin Elmer plate: vision multimode reader); light intensity: 2.5%; exp. time: 1.4 sec, Filter: Fluo_630/690 nm)
and IC₅₀ values were calculated from these readouts.

Example	IC50 (μM)
---------	-----------

EP 2 861 566 B1

	Example	IC50 (µM)
5	1	0.015
	1.01	2.401
10	1.02	0.129
	1.03	0.201
15	1.04	0.115
	1.05	1.044
20	1.06	0.107
	1.07	4.14
25	1.08	3.352
	1.09	0.0505
30	1.10	3.699
	1.11	0.155
35	1.12	0.035
	1.13	5.426
40	1.14	0.0737
	1.15	0.0645
45	1.16	n.d.
	1.17	0.729
50	1.18	0.625
	1.19	0.0395
55	1.20	0.12

Example	IC50 (µM)
1.21	0.821
1.22	0.015
1.23	0.001
1.24	0.012
1.25	0.074
1.26	0.008
1.27	0.041
1.28	0.11
2	0.026
2.1	0.038
2.2	0.0137
3	0.006
3.1	3.565
3.2	0.298
3.3	0.059
3.4	0.0195
3.5	0.02
3.6	0.067
4	0.546
5	0.007
5.1	0.061

Example	IC50 (µM)
5.2	0.0265
6	0.026
6.1	0.362
6.2	0.298
6.3	2.661
6.4	0.022
6.5	3.216
6.6	0.605
6.7	3.928
6.8	0.091
6.9	0.128
6.10	0.826
7	0.043
7.1	0.26
8	0.178
9	1.061
10	3.438
11	1.287
12	0.1305
12.01	0.15
12.02	0.044

Example	IC ₅₀ (μM)	Example	IC ₅₀ (μM)	Example	IC ₅₀ (μM)
12.03	0.6225	12.20	5.64	12.37	0.001
12.04	0.017	12.21	1.253	12.38	0.0025
12.05	4.979	12.22	0.439	12.39	0.005
12.06	7.2435	12.23	1.9113	12.40	0.0025
12.07	0.3775	12.24	0.229	12.41	0.002
12.08	3.8335	12.25	0.092	12.42	0.001
12.09	1.6405	12.26	0.053	12.43	0.001
12.10	0.291	12.27	0.14	12.44	0.008
12.11	0.1685	12.28	0.138	12.45	0.039
12.12	0.3323	12.29	0.0685	13	0.003
12.13	3.5195	12.30	1.604	13.01	0.001
12.14	0.2705	12.31	0.022	14	0.023
12.15	0.035	12.32	0.044	14.01	0.0415
12.16	0.457	12.33	0.013	15A	0.016
12.17	0.0203	12.34	0.01	15B	0.001
12.18	0.0535	12.35	0.0045	16A	0.1
12.19	2.147	12.36	0.001	16B	0.009

[0222] Compounds of formula (I) and their pharmaceutically acceptable salts or esters thereof as described herein have IC₅₀ values between 0.00001 μM and 1000 μM, particular compounds have IC₅₀ values between 0.0005 μM and 500 μM, further particular compounds have IC₅₀ values between 0.0005 μM and 50 μM, more particular compounds have IC₅₀ values between 0.0005 μM and 5 μM. These results have been obtained by using the enzymatic assay described above.

[0223] The compounds of formula (I) and their pharmaceutically acceptable salts can be used as medicaments (e.g. in the form of pharmaceutical preparations). The pharmaceutical preparations can be administered internally, such as orally (e.g. in the form of tablets, coated tablets, dragees, hard and soft gelatin capsules, solutions, emulsions or suspensions), nasally (e.g. in the form of nasal sprays) or rectally (e.g. in the form of suppositories). However, the admin-

istration can also be effected parenterally, such as intramuscularly or intravenously (e.g. in the form of injection solutions).

[0224] The compounds of formula (I) and their pharmaceutically acceptable salts can be processed with pharmaceutically inert, inorganic or organic adjuvants for the production of tablets, coated tablets, dragees and hard gelatin capsules. Lactose, corn starch or derivatives thereof, talc, stearic acid or its salts etc. can be used, for example, as such adjuvants for tablets, dragees and hard gelatin capsules.

[0225] Suitable adjuvants for soft gelatin capsules, are, for example, vegetable oils, waxes, fats, semi-solid substances and liquid polyols, etc.

[0226] Suitable adjuvants for the production of solutions and syrups are, for example, water, polyols, saccharose, invert sugar, glucose, etc.

[0227] Suitable adjuvants for injection solutions are, for example, water, alcohols, polyols, glycerol, vegetable oils, etc.

[0228] Suitable adjuvants for suppositories are, for example, natural or hardened oils, waxes, fats, semi-solid or liquid polyols, etc.

[0229] Moreover, the pharmaceutical preparations can contain preservatives, solubilizers, viscosity-increasing substances, stabilizers, wetting agents, emulsifiers, sweeteners, colorants, flavorants, salts for varying the osmotic pressure, buffers, masking agents or antioxidants. They can also contain still other therapeutically valuable substances.

[0230] The dosage can vary in wide limits and will, of course, be fitted to the individual requirements in each particular case. In general, in the case of oral administration a daily dosage of about 0.1 mg to 20 mg per kg body weight, preferably about 0.5 mg to 4 mg per kg body weight (e.g. about 300 mg per person), divided into preferably 1-3 individual doses, which can consist, for example, of the same amounts, should be appropriate. It will, however, be clear that the upper limit given herein can be exceeded when this is shown to be indicated.

[0231] The invention is illustrated hereinafter by Examples, which have no limiting character.

[0232] In case the preparative examples are obtained as a mixture of enantiomers, the pure enantiomers can be separated by methods described herein or by methods known to those skilled in the art, such as e.g. chiral chromatography or crystallization.

Examples

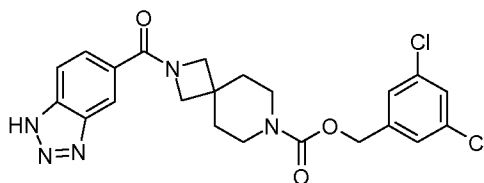
[0233] All examples and intermediates were prepared under argon atmosphere if not specified otherwise.

Abbreviations: aq. = aqueous; CAS-RN = Chemical Abstracts Service Registry Number; MS = mass spectrum; sat. = saturated.

Example 1

3,5-Dichlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate

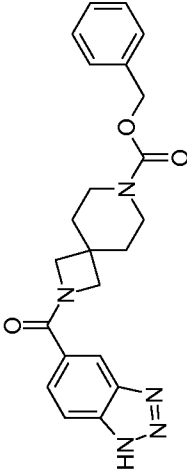
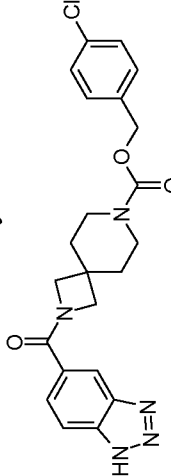
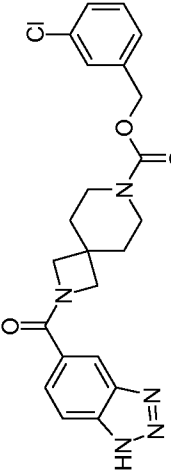
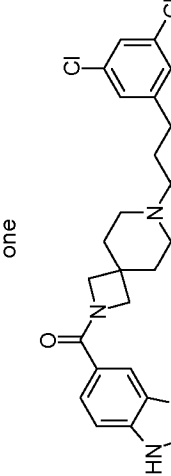
[0234]



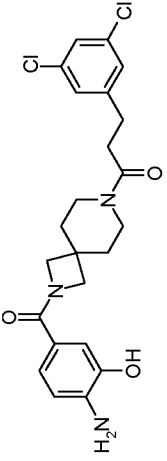
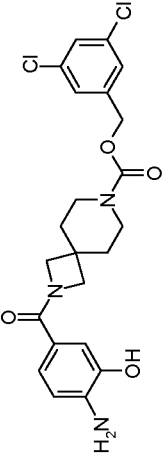
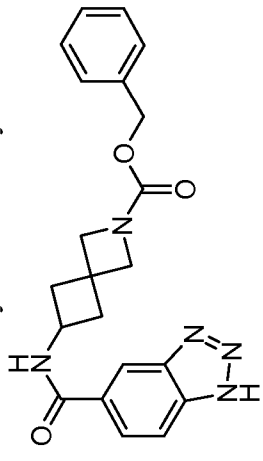
[0235] To a solution of 3,5-dichlorobenzyl 2,7-diazaspiro[3.5]nonane-7-carboxylate hydrochloride (intermediate 1.18; 30 mg, 82 μ mol), 4-methylmorpholine (41.5 mg, 410 μ mol) and 1H-benzo[d][1,2,3]triazole-5-carboxylic acid (13 mg, 82 μ mol) in N,N-dimethylformamide (1.5 ml) was added O-(7-azabenzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluoro-phosphate (46.8 mg, 123 μ mol) at 0°C. The clear yellow solution was stirred at room temperature, then after 2 h the reaction mixture was partitioned between ethyl acetate and sat. aq. sodium hydrogencarbonate solution. The combined organic layer was washed with brine, dried over magnesium sulfate, filtered and evaporated. Chromatography (silica gel; gradient dichloromethane to dichloromethane/methanol/25% aq. ammonia solution 90:10:0.25) afforded the title compound (22 mg, 57 %). Light yellow foam, MS: 474.1 (M+H)⁺.

[0236] The examples in Table 1 were prepared according to example 1, replacing 2,7-diazaspiro[3.5]nonane-7-carboxylate hydrochloride and 1H-benzo[d][1,2,3]triazole-5-carboxylic acid, respectively, by the corresponding amine reagent and carboxylic acid reagent described in Table 1.

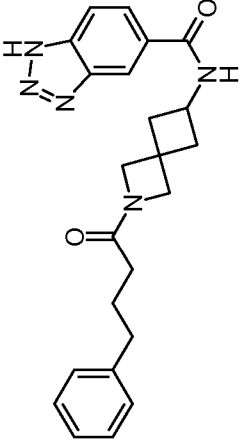
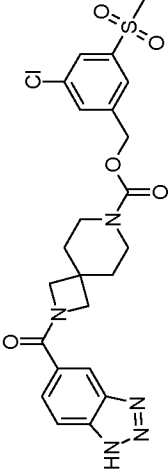
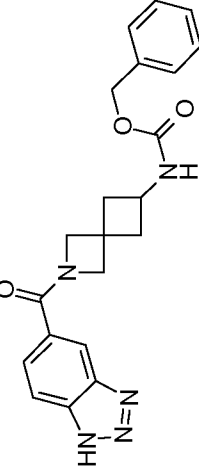
Table 1

No.	Systematic Name	Amine reagent	Carboxylic acid reagent	MS, m/e
1.01	benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	benzyl 2,7-diazaspiro[3.5]nonane-7-carboxylate hydrochloride (CAS-RN 1227382-15-1)	1H-benzo[d][1,2,3]triazole-5-carboxylic acid	406.3 (M+H) ⁺
1.02	4-chlorobenzyl 2-(1H-benzo [d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	4-chlorobenzyl 2,7-diazaspiro[3.5]nonane-7-carboxylate hydrochloride (intermediate 1.17)	1H-benzo[d][1,2,3]triazole-5-carboxylic acid	440.3 (M+H) ⁺
1.03	3-chlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	3-chlorobenzyl 2,7-diazaspiro[3.5]nonane-7-carboxylate hydrochloride (intermediate 1.16)	1H-benzo[d][1,2,3]triazole-5-carboxylic acid	440.3 (M+H) ⁺
1.04	1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3,5-dichlorophenyl)propan-1-one 	3-(3,5-dichloro-phenyl)-1-(2,7-diazaspiro[3.5]nonan-7-yl)propan-1-one hydrochloride (intermediate 1.3)	1H-benzo[d][1,2,3]triazole-5-carboxylic acid	472.3 (M+H) ⁺

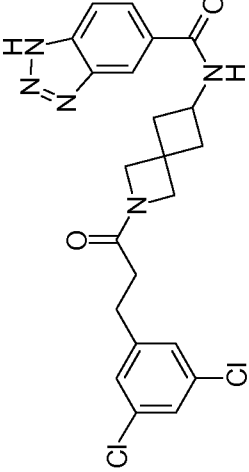
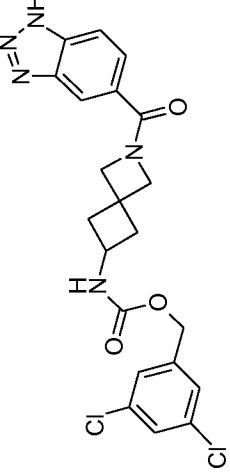
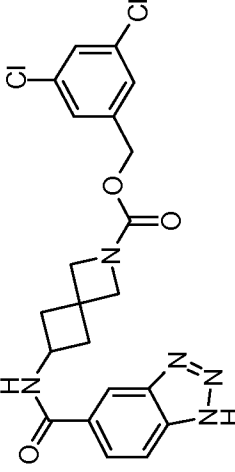
(continued)

No.	Systematic Name	Amine reagent	Carboxylic acid reagent	MS, m/e
1.05	1-(2-(4-amino-3-hydroxybenzoyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3,5-dichlorophenyl)propan-1-one 	3-(3,5-dichlorophenyl)-1-(2,7-diazaspiro[3.5]nonan-7-yl)propan-1-one hydrochloride (intermediate 1.3)	4-amino-3-hydroxybenzoic acid	462.2 (M+H) ⁺
1.06	3,5-dichlorobenzyl 2-(4-amino-3-hydroxybenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	3,5-dichlorobenzyl 2,7-diazaspiro[3.5]nonane-7-carboxylate hydrochloride (intermediate 1.18)	4-amino-3-hydroxybenzoic acid	464.3 (M+H) ⁺
1.07	6-[(1H-benzotriazole-5-carbonyl)-amino]-2-azaspiro[3.3]heptane-2-carboxylic acid benzyl ester 	benzyl 6-amino-2-azaspiro[3.3]heptane-2-carboxylate (intermediate 1.21)	1H-benzo[d]-[1,2,3]triazole-5-carboxylic acid	392.2 (M+H) ⁺

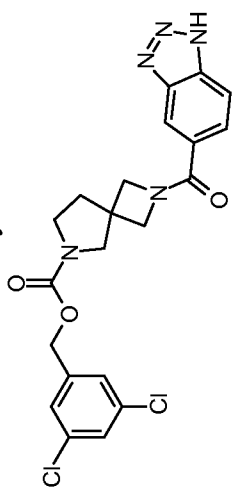
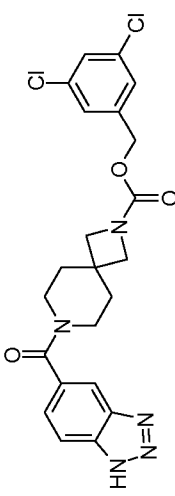
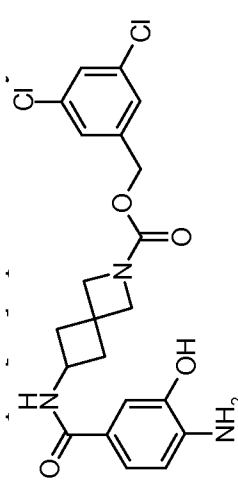
(continued)

No.	Systematic Name	Amine reagent	Carboxylic acid reagent	MS, m/e
1.08	<p>N-(2-(4-phenylbutanoyl)-2-azaspiro [3.3]heptan-6-yl)-1H-benzo[d][1,2,3]triazole-5-carboxamide</p> 	1-(6-amino-2-azaspiro[3.3]heptan-2-yl)-4-phenylbutan-1-one (intermediate 1.7)	1H-benzo[d][1,2,3]triazole-5-carboxylic acid	404.2 (M+H) ⁺
1.09	<p>3-chloro-5-(methylsulfonyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate</p> 	3-chloro-5-(methylsulfonyl)benzyl 2,7-diazaspiro[3.5]nonane-7-carboxylate hydrochloride (intermediate 1.15)	1H-benzo[d][1,2,3]triazole-5-carboxylic acid	518.4 (M+H) ⁺
1.10	<p>[2-(1H-benzotriazole-5-carbonyl)-2-aza-spiro[3.3]hept-6-yl]-carbamic acid benzyl ester</p> 	benzyl 2-azaspiro[3.3]heptan-6-ylcarbamate (intermediate 1.20)	1H-benzo[d][1,2,3]triazole-5-carboxylic acid	392.3 (M+H) ⁺

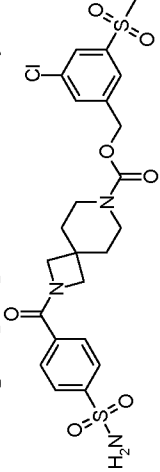
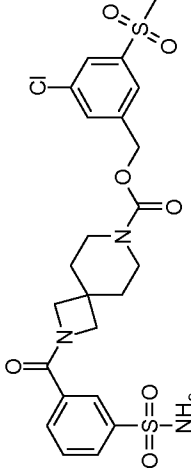
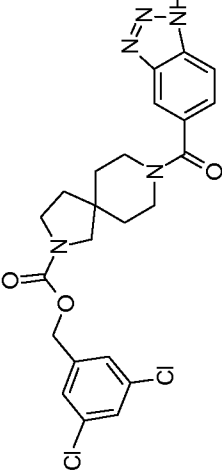
(continued)

No.	Systematic Name	Amine reagent	Carboxylic acid reagent	MS, m/e
1.11	<p>N-(2-(3-(3,5-dichlorophenyl)propanoyl)-2-azaspiro[3.3]heptan-6-yl)-1H-benzo[d][1,2,3]triazole-5-carboxamide</p> 	<p>1-(6-amino-2-azaspiro[3.3]heptan-2-yl)-3-(3,5-dichlorophenyl)propan-1-one (intermediate 1.6)</p>	<p>1H-benzo[d][1,2,3]triazole-5-carboxylic acid</p>	<p>458.4 (M+H)⁺</p>
1.12	<p>[2-(1H-benzotriazole-5-carbonyl)-2-aza-spiro[3.3]hept-6-yl]-carbamic acid 3,5-dichloro-benzyl ester</p> 	<p>3,5-dichlorobenzyl 2-azaspiro[3.3]heptan-6-ylcarbamate (intermediate 1.12)</p>	<p>1H-benzo[d][1,2,3]triazole-5-carboxylic acid</p>	<p>460.1 (M+H)⁺</p>
1.13	<p>6-[(1H-benzotriazole-5-carbonyl)-amino]-2-azaspiro[3.3]heptane-2-carboxylic acid 3,5-dichloro-benzyl ester</p> 	<p>3,5-dichlorobenzyl 6-amino-2-azaspiro[3.3]heptane-2-carboxylate (intermediate 1.19)</p>	<p>1H-benzo[d][1,2,3]triazole-5-carboxylic acid</p>	<p>460.3 (M+H)</p>

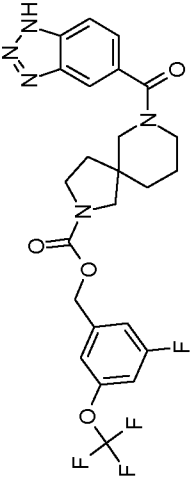
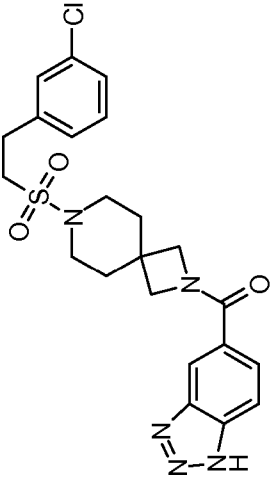
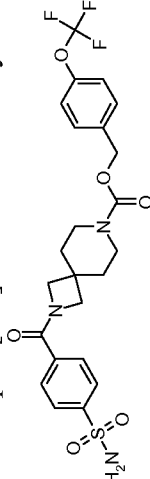
(continued)

No.	Systematic Name	Amine reagent	Carboxylic acid reagent	MS, m/e
1.14	3,5-dichlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)- 2,6-diazaspiro[3.4]octane-6-carboxylate 	3,5-dichlorobenzyl 2,6-diazaspiro[3.4]octane-6-carboxylate hydrochloride (intermediate 1.14)	1H-benzo[d][1,2,3]triazole-5-carboxylic acid	460.4 (M+H) ⁺
1.15	3,5-dichlorobenzyl 7-(1H-benzo[d][1,2,3]triazole-5-carbonyl)- 2,7-diazaspiro[3.5]nonane-2-carboxylate 	3,5-dichlorobenzyl 2,7-diazaspiro[3.5]nonane-2-carboxylate hydrochloride (intermediate 1.13)	1H-benzo[d][1,2,3]triazole-5-carboxylic acid	474.4 (M+H)
1.16	3,5-dichlorobenzyl 6-(4-amino-3-hydroxybenzamido)-2- azaspiro[3.3]heptane-2-carboxylate 	3,5-dichlorobenzyl 6-amino-2-azaspiro[3.3]heptane-2-carboxylate (intermediate 1.19)	4-amino-3-hydroxybenzoic acid	450.4 (M+H) ⁺

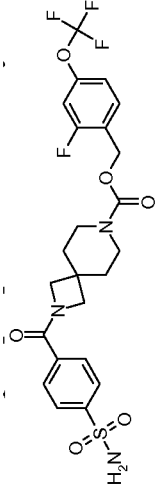
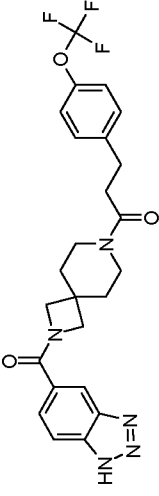
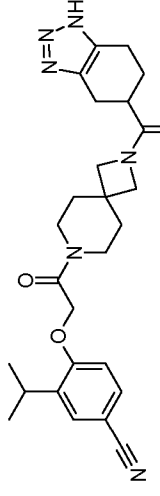
(continued)

No.	Systematic Name	Amine reagent	Carboxylic acid reagent	MS, m/e
1.17	3-chloro-5-(methylsulfonyl)benzyl 2-(4-sulfamoylbenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	3-chloro-5-(methylsulfonyl)benzyl 2,7-diazaspiro[3.5]nonane-7-carboxylate hydrochloride (intermediate 1.15)	4-sulfamoyl-benzoic acid	556.4 (M+H) ⁺
1.18	3-chloro-5-(methylsulfonyl)benzyl 2-(3-sulfamoylbenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	3-chloro-5-(methylsulfonyl)benzyl 2,7-diazaspiro[3.5]nonane-7-carboxylate hydrochloride (intermediate 1.15)	3-sulfamoyl-benzoic acid	556.3 (M+H) ⁺
1.19	3,5-dichlorobenzyl 8-(1H-benzotriazol-5-yl)-2,8-diazaspiro[4.5]decane-2-carboxylate 	3,5-dichlorobenzyl 2,8-diazaspiro[4.5]decane-2-carboxylate hydrochloride (intermediate 1.10)	1H-benzo[d][1,2,3]triazole-5-carboxylic acid	488.4 (M+H) ⁺

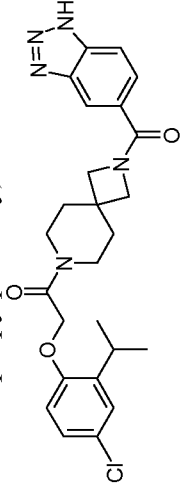
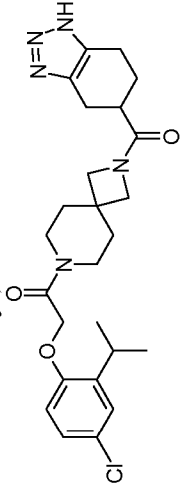
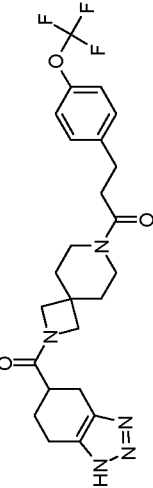
(continued)

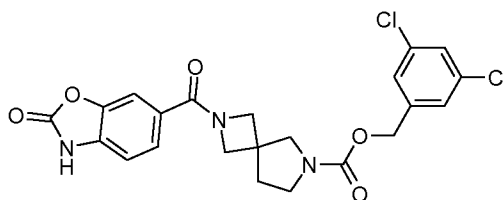
No.	Systematic Name	Amine reagent	Carboxylic acid reagent	MS, m/e
1.20	3-fluoro-5-(trifluoromethoxy)benzyl 7-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[4.5]decane-2-carboxylate 	3-fluoro-5-(trifluoro-methoxy)benzyl 2,7-diazaspiro[4.5]decane-2-carboxylate 2,2,2-trifluoroacetate (intermediate 1.23)	1H-benzo[d]-[1,2,3]triazole-5-carboxylic acid	522.5 (M+H) ⁺
1.21	(1H-benzotriazol-5-yl)-{7-[2-(3-chloro-phenyl)-ethanesulfonyl]-2,7-diaza-spiro[3.5]non-2-yl}-methanone 	7-(3-chlorophenethyl-sulfonyl)-2,7-diazaspiro[3.5]nonane (intermediate 3)	1H-benzo[d]-[1,2,3]triazole-5-carboxylic acid	474.5 (M+H) ⁺
1.22	4-(trifluoromethoxy)benzyl 2-(4-sulfamoylbenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	4-(trifluoromethoxy)-benzyl 2,7-diazaspiro[3.5]nonane-7-carboxylate (intermediate 1.27)	4-sulfamoyl-benzoic acid	528.5 (M+H) ⁺

(continued)

No.	Systematic Name	Amine reagent	Carboxylic acid reagent	MS, m/e
1.23	2-fluoro-4-(trifluoromethoxy)benzyl 2-(4-sulfamoylbenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	2-fluoro-4-(trifluoromethoxy)-benzyl 2,7-diazaspiro[3.5]nonane-7-carboxylate (intermediate 1.28)	4-sulfamoyl-benzoic acid	546.5 (M+H) ⁺
1.24	1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(4-(trifluoromethoxy)phenyl)propan-1-one 	1-(2,7-diaza-spiro[3.5]nonan-7-yl)-3-(4-(trifluoromethoxy)-phenyl)propan-1-one (intermediate 1.30)	1H-benzo[d]-[1,2,3]triazole-5-carboxylic acid	488.6 (M+H) ⁺
1.25	3-isopropyl-4-(2-oxo-2-(2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)ethoxy)benzonitrile 	3-isopropyl-4-(2-oxo-2-(2,7-diazaspiro[3.5]nonan-7-yl)ethoxy)benzonitrile (intermediate 5)	4,5,6,7-tetrahydro-1H-benzo[d]-[1,2,3]triazole-5-carboxylic acid (CAS-RN 33062-47-4)	477.6 (M+H) ⁺

(continued)

No.	Systematic Name	Amine reagent	Carboxylic acid reagent	MS, m/e
1.26	1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-2-(4-chloro-2-isopropylphenoxy)ethanone 	2-(4-chloro-2-isopropylphenoxy)-1-(2,7-diaza-spiro[3.5]nonan-7-yl)ethanone (intermediate 5.1)	1H-benzo[d]-[1,2,3]triazole-5-carboxylic acid	482.4 (M+H) ⁺
1.27	2-(4-chloro-2-isopropylphenoxy)-1-(2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)ethanone 	2-(4-chloro-2-isopropylphenoxy)-1-(2,7-diaza-spiro[3.5]nonan-7-yl)ethanone (intermediate 5.1)	4,5,6,7-tetrahydro-1H-benzo[d]-[1,2,3]triazole-5-carboxylic acid (CAS-RN 33062-47-4)	486.6 (M+H) ⁺
1.28	1-(2-(4,5,6,7-tetrahydro-1H-benzo [d] [1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(4-(trifluoromethoxy)phenyl)propan-1-one 	1-(2,7-diaza-spiro[3.5]nonan-7-yl)-3-(4-(trifluoromethoxy)-phenyl)propan-1-one (intermediate 1.30)	4,5,6,7-tetrahydro-1H-benzo[d]-[1,2,3]triazole-5-carboxylic acid (CAS-RN 33062-47-4)	492.6 (M+H) ⁺

Example 2**3,5-Dichlorobenzyl 2-(2-oxo-2,3-dihydro-benzo [d] oxazole-6-carbonyl)-2,6-diazaspiro[3.4]octane-6-carboxylate****[0237]**

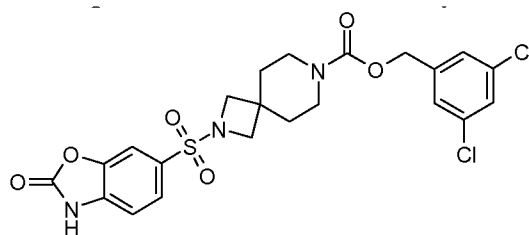
[0238] To a solution of 3,5-dichlorobenzyl 2,6-diazaspiro[3.4]octane-6-carboxylate hydrochloride (intermediate 1.14; 50 mg, 142 μ mol), 4-methylmorpholine (72 mg, 711 μ mol), and 4-amino-3-hydroxybenzoic acid (21.8 mg, 142 μ mol) in N,N-dimethylformamide (1 ml) was added O-(7-azabenzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluoro-phosphate (64.9 mg, 171 μ mol) at 0°C. After 2 h the ice bath was removed. Then after 4 h, 1,1'-carbonyldiimidazole (52.3 mg, 313 μ mol) was added. After 16 h the reaction mixture was partitioned between ethyl acetate and 1 M aq. hydrochloric acid solution. The organic layer was washed with brine, dried over magnesium sulfate, filtered and evaporated in vacuo. The residue was azeotropically distilled with toluene and then chromatographed. Chromatography (silica gel; gradient dichloromethane to dichloromethane/methanol/25% aq. ammonia solution 90:10:0.25) afforded the title compound (35 mg, 52%). Light yellow gum, MS: 476.5 (M+H)⁺.

[0239] The examples in Table 2 were prepared according to example 2, replacing 3,5-dichlorobenzyl 2,6-diazaspiro[3.4]octane-6-carboxylate hydrochloride by the corresponding amine reagent described in Table 2.

Table 2

No.	Systematic Name	Amine reagent	MS, m/e
2.1	3-chloro-5-(methylsulfonyl)benzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate	3-chloro-5-(methylsulfonyl)benzyl 2,7-diazaspiro[3.5]nonane-7-carboxylate hydrochloride (intermediate 1.15)	534.4 (M+H) ⁺
2.2	7-(2-oxo-2,3-dihydro-benzoxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-2-carboxylic acid 3,5-dichlorobenzyl ester	3,5-dichlorobenzyl 2,7-diazaspiro[3.5]nonane-2-carboxylate hydrochloride (intermediate 1.13)	490.5 (M+H) ⁺

Example 3**3,5-Dichlorobenzyl 2-(2-oxo-2,3-dihydro-benzo [d] oxazol-6-ylsulfonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate****[0240]**



5

10 **[0241]** To a suspension of 3,5-dichlorobenzyl 2,7-diazaspiro[3.5]nonane-7-carboxylate hydrochloride (intermediate 1.18; 30 mg, 82 μ mol) and pyridine (32 mg, 410 μ mol) in acetone (2 ml) was added 2-oxo-2,3-dihydrobenzo[d]oxazole-6-sulfonyl chloride (18 mg, 78 μ mol) at room temperature. Then after 16 h the reaction mixture was partitioned between ethyl acetate and sat. aq. sodium hydrogencarbonate solution. The organic layer was washed with brine, dried over magnesium sulfate, filtered, and evaporated. Chromatography (silica gel; ethyl acetate) afforded the title compound (16

15

mg, 37%). White solid, MS: 524.1 (M-H)⁻.

[0242] The examples 3.1 to 3.6 in Table 3 were prepared according to example 3, replacing 3,5-dichlorobenzyl 2,7-diazaspiro[3.5]nonane-7-carboxylate hydrochloride and 2-oxo-2,3-dihydrobenzo[d]oxazole-6-sulfonyl chloride respectively by the corresponding amine reagent and the sulfonyl chloride described in Table 3.

20

25

30

35

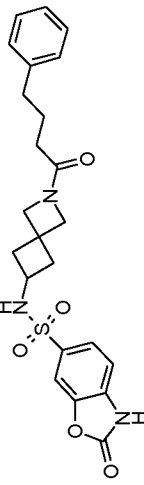
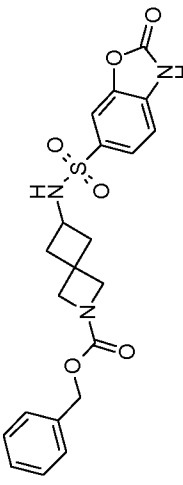
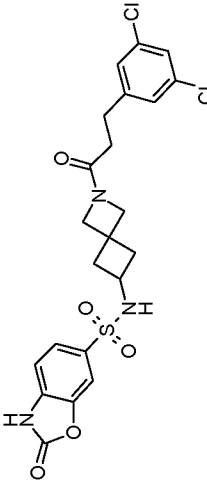
40

45

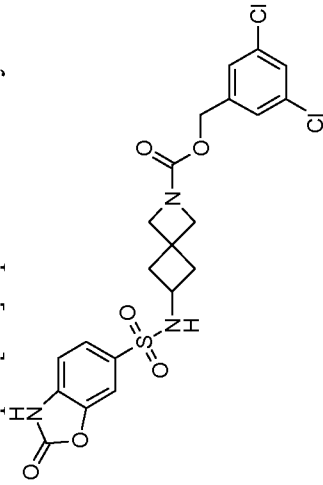
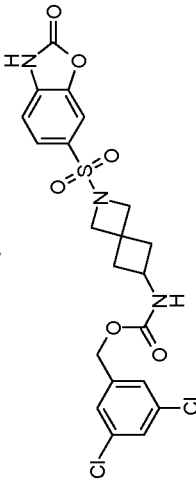
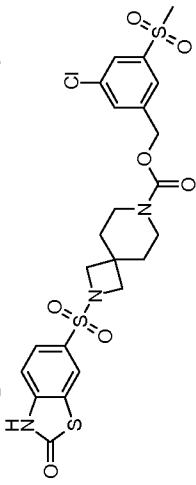
50

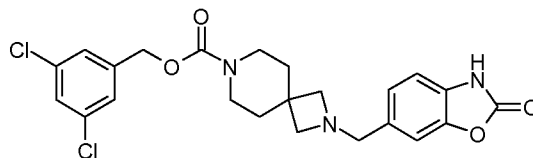
55

Table 3

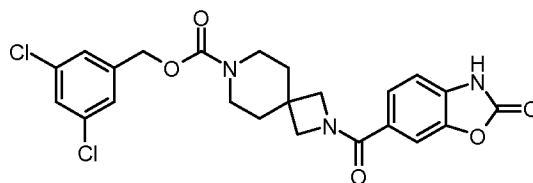
No.	Systematic Name	Amine reagent	Sulfonyl chloride	MS, m/e
3.1	2-oxo-2,3-dihydro-benzoxazole-6-sulfonic acid [2-(4-phenyl-butyl)-2-aza-spiro[3.3]hept-6-yl]-amide 	1-(6-amino-2-azaspiro[3.3]heptan-2-yl)-4-phenylbutan-1-one (intermediate 1.7)	2-oxo-2,3-dihydrobenzo[d]oxazole-6-sulfonyl chloride	456.3 (M+H)
3.2	benzyl 6-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-sulfonamido)-2-azaspiro[3.3]heptane-2-carboxylate 	benzyl 6-amino-2-azaspiro[3.3]heptane-2-carboxylate (CAS-RN 1211533-81-1)	2-oxo-2,3-dihydrobenzo[d]oxazole-6-sulfonyl chloride	442.1 (M-H) ⁻
3.3	2-oxo-2,3-dihydro-benzoxazole-6-sulfonic acid {2-[3-(3,5-dichlorophenyl)-propionyl]-2-azaspiro[3.3]hept-6-yl]-amide 	1-(6-amino-2-azaspiro[3.3]heptan-2-yl)-3-(3,5-dichlorophenyl)propan-1-one (intermediate 1.6)	2-oxo-2,3-dihydrobenzo[d]oxazole-6-sulfonyl chloride	510.4 (M+H) ⁺

(continued)

No.	Systematic Name	Amine reagent	Sulfonyl chloride	MS, m/e
3.4	<p>3,5-dichlorobenzyl 6-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-sulfonamido)-2-azaspiro[3.3]heptane-2-carboxylate</p> 	<p>3,5-dichlorobenzyl 6-amino-2-azaspiro[3.3]heptane-2-carboxylate (intermediate 1.19)</p>	<p>2-oxo-2,3-dihydrobenzo[d]oxazole-6-sulfonyl chloride</p>	<p>510.4 (M-H)⁻</p>
3.5	<p>[2-(2-oxo-2,3-dihydro-benzooxazole-6-sulfonyl)-2-azaspiro[3.3]hept-6-yl]-carbamic acid 3,5-dichloro-benzyl ester</p> 	<p>3,5-dichlorobenzyl 2-azaspiro[3.3]heptan-6-ylcarbamate (intermediate 1.12)</p>	<p>2-oxo-2,3-dihydrobenzo[d]oxazole-6-sulfonyl chloride</p>	<p>512.2 (M+H)</p>
3.6	<p>3-chloro-5-(methylsulfonyl)benzyl 2-(2-oxo-2,3-dihydrobenzo[d]thiazol-6-ylsulfonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate</p> 	<p>3-chloro-5-(methylsulfonyl)benzyl 2,7-diazaspiro[3.5]nonan e-7-carboxylate hydrochloride (intermediate 1.15)</p>	<p>2-oxo-2,3-dihydrobenzo[d]thiazole-6-sulfonyl chloride</p>	<p>586.2 (M+H)⁺</p>

Example 4**3,5-Dichlorobenzyl 2-((2-oxo-2,3-dihydro-benzo [d] oxazol-6-yl)methyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate****[0243]**

[0244] To a light yellow solution of 3,5-dichlorobenzyl 2,7-diazaspiro[3.5]nonane-7-carboxylate (intermediate 1.18; 44 mg, 121 μmol) and 2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbaldehyde (CAS-RN 54903-15-0; 21 mg, 128 μmol) in tetrahydrofuran (1 ml) were added sodium triacetoxyborohydride (39 mg, 182 μmol) and acetic acid (11 mg, 182 μmol) at room temperature. Then after 16 h the reaction mixture was partitioned between ethyl acetate and sat. aq. sodium hydrogencarbonate solution. The organic layer was washed with brine, dried over magnesium sulfate, filtered, and evaporated. Chromatography (silica gel; gradient dichloromethane to dichloromethane/methanol/25% aq. ammonia solution 95:5:0.25) afforded the title compound (12 mg, 21%). White foam, MS: 476.2 (M+H)⁺.

Example 5**3,5-Dichlorobenzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate****[0245]**

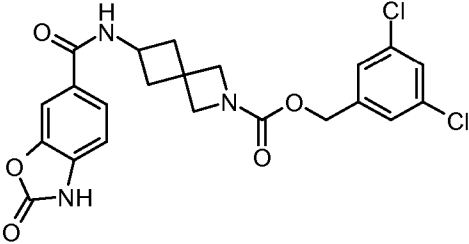
[0246] To a yellow solution of 3,5-dichlorobenzyl 2-(4-amino-3-hydroxybenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate (example 1.6; 50 mg, 108 μmol) in tetrahydrofuran (1 ml) was added dropwise at room temperature a solution of N,N'-carbonyldiimidazole (21.0 mg, 129 μmol) in tetrahydrofuran (0.5 ml). Then after 16 h the reaction mixture was partitioned between water and ethyl acetate. The organic layer was washed with brine, dried over magnesium sulfate, filtered, and evaporated. The residue was triturated in heptane/ethyl acetate 1:1 to produce the title compound (36 mg, 68%). Light yellow solid, MS: 490.2 (M+H)⁺.

[0247] The examples in Table 4 were prepared according to example 5, replacing 3,5-dichlorobenzyl 2-(4-amino-3-hydroxybenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate by the corresponding starting material described in Table 4.

Table 4

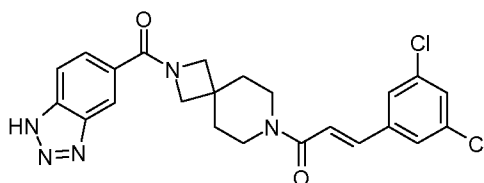
No.	Systematic Name	Starting material	MS, m/e
5.1	6-(7-(3-(3,5-dichlorophenyl)propanoyl)-2,7-diazaspiro[3.5]nonane-2-carbonyl)benzo[d]oxazol-2(3H)-one	1-(2-(4-amino-3-hydroxybenzoyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3,5-dichlorophenyl)propan-1-one (example 1.5)	488.2 (M+H) ⁺

(continued)

No.	Systematic Name	Starting material	MS, m/e
5.2	6-[(2-oxo-2,3-dihydro-benzooxazole-6-carbonyl)-amino]-2-aza-spiro[3.3]heptane-2-carboxylic acid 3,5-dichloro-benzyl ester 	3,5-dichlorobenzyl 6-(4-amino-3-hydroxybenzamido)-2-azaspiro[3.3]heptane-2-carboxylate (example 1.16)	476.4 (M+H) ⁺

Example 6

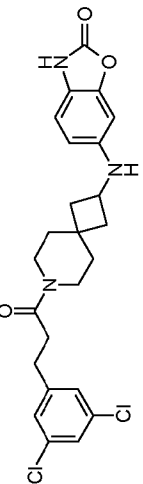
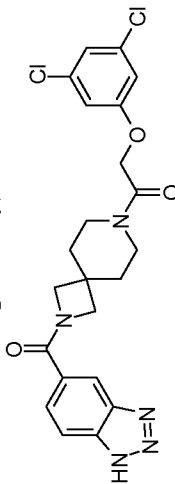
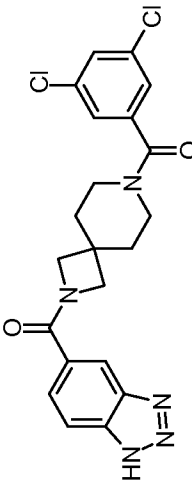
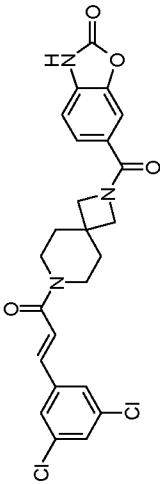
(E)-1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3,5-dichlorophenyl)prop-2-en-1-one

[0248]

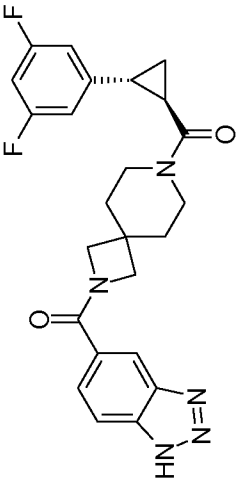
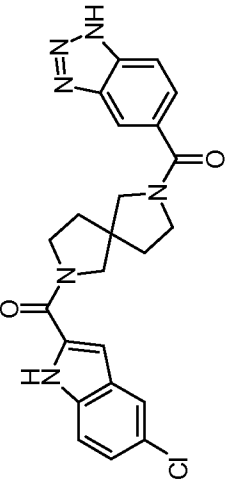
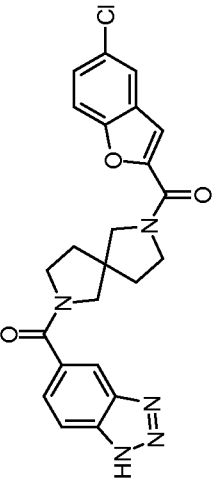
[0249] To a suspension of (1H-benzo[d][1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2; 50 mg, 162 μ mol), 4-methylmorpholine (82.2 mg, 812 μ mol) and (E)-3-(3,5-dichlorophenyl)acrylic acid (35.3 mg, 162 μ mol) in N,N-dimethylformamide (2 ml) was added O-(7-azabenzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluoro-phosphate (61.8 mg, 162 μ mol) at 0°C. Then after 16 h at room temperature, the reaction mixture was partitioned between ethyl acetate and sat. aq. sodium hydrogencarbonate solution. The organic layer was washed with brine, dried over magnesium sulfate, filtered and evaporated. Chromatography (silica gel; gradient dichloromethane to dichloromethane/methanol/25% aq. ammonia solution 90:10:0.25) produced the title compound (72 mg, 94 %). White foam, MS: 470.4 (M+H)⁺.

[0250] The examples in Table 5 were prepared according to example 6, replacing (1H-benzo[d][1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride and (E)-3-(3,5-dichlorophenyl)acrylic acid respectively by the corresponding amine reagent and carboxylic acid reagent described in Table 5.

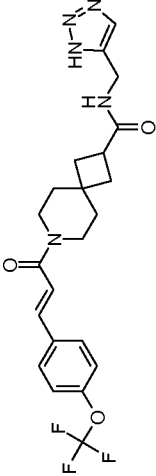
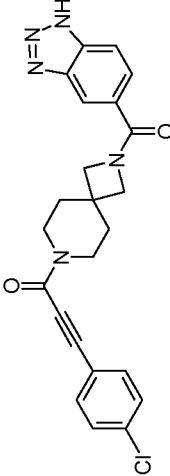
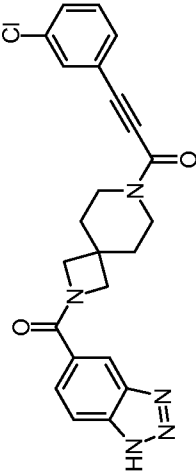
Table 5

No.	Systematic Name	Amine reagent	Carboxylic acid reagent	MS, m/e
6.1	6-(7-(3-(3,5-dichlorophenyl)propanoyl)-7-azaspiro[3.5]nonan-2-ylamino)benzo[d]oxazol-2(3H)-one 	6-(7-azaspiro[3.5]nonan-2-ylamino)-benzo[d]oxazol-2(3H)-one dihydrochloride (intermediate 1.11)	3-(3,5-dichlorophenyl)-propanoic acid	474.3 (M+H) ⁺
6.2	1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-2-(3,5-dichlorophenoxy)ethanone 	(1H-benzo[d][1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)	2-(3,5-dichloro-phenoxy)-acetic acid	474.4 (M+H) ⁺
6.3	(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)(3,5-dichlorophenyl)methanone 	(1H-benzo[d][1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)	3,5-dichlorobenzoic acid	444.4 (M+H) ⁺
6.4	6-(7-(E)-3-(3,5-dichloro-phenyl)-acryloyl]-2,7-diazaspiro[3.5]nonane-2-carbonyl]-3H-benzooxazol-2-one 	6-(2,7-diaza-spiro[3.5]nonane-2-carbonyl)-benzo[d]oxazol-2(3H)-one hydrochloride (intermediate 1.8)	(E)-3-(3,5-dichlorophenyl)acrylic acid	486.3 (M+H) ⁺

(continued)

No.	Systematic Name	Amine reagent	Carboxylic acid reagent	MS, m/e
6.5	<p data-bbox="320 1346 411 1834">(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)(trans-2-(3,5-difluorophenyl)cyclo-propyl)methanone</p> 	(1H-benzo[d]-[1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)	trans-2-(3,5-difluorophenyl)-cyclopropanecarboxylic acid (CAS-RN 705250-91-5)	452.5 (M+H) ⁺
6.6	<p data-bbox="692 1346 783 1834">(7-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[4.4]nonan-2-yl)(5-chloro-1H-indol-2-yl)methanone</p> 	(1H-benzo[d]-[1,2,3]triazol-5-yl)(2,7-diazaspiro[4.4]nonan-2-yl)methanone hydrochloride (intermediate 1.1)	5-chloro-1H-indole-2-carboxylic acid	449.5 (M+H) ⁺
6.7	<p data-bbox="1051 1346 1142 1834">(7-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[4.4]nonan-2-yl)(5-chlorobenzofuran-2-yl)methanone</p> 	(1H-benzo[d]-[1,2,3]triazol-5-yl)(2,7-diazaspiro[4.4]nonan-2-yl)methanone hydrochloride (intermediate 1.1)	5-chlorobenzofuran-2-carboxylic acid	450.5 (M+H) ⁺

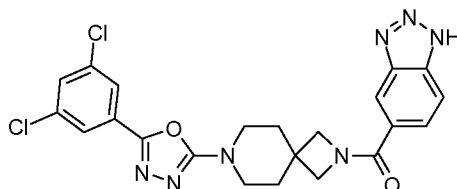
(continued)

No.	Systematic Name	Amine reagent	Carboxylic acid reagent	MS, m/e
6.8	<p>(E)-N-((1H-1,2,3-triazol-5-yl)methyl)-7-(3-(4-(trifluoromethoxy)phenyl)acryloyl)-7-azaspiro[3.5]nonane-2-carboxamide</p> 	N-((1H-1,2,3-triazol-5-yl)methyl)-7-azaspiro[3.5]nonane-2-carboxamide 2,2,2-trifluoroacetate (intermediate 1.24)	(E)-3-(4-(trifluoromethoxy)phenyl)acrylic acid	464.5 (M+H) ⁺
6.9	<p>1-(2-(1H-benzod[1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(4-chlorophenyl)prop-2-yn-1-one</p> 	(1H-benzod[1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)	3-(4-chlorophenyl)-propionic acid (CAS-RN 3240-10-6)	434.4 (M+H) ⁺
6.10	<p>1-(2-(1H-benzod[1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3-chlorophenyl)prop-2-yn-1-one</p> 	(1H-benzod[1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)	3-(3-chlorophenyl)-propionic acid (CAS-RN 7396-28-3)	434.4 (M+H) ⁺

Example 7

(1H-benzo[d][1,2,3]triazol-5-yl)(7-(5-(3,5-dichlorophenyl)-1,3,4-oxadiazol-2-yl)-2,7-diazaspiro[3.5]nonan-2-yl)methanone

[0251]



[0252] To a solution of 5-(3,5-dichlorophenyl)-1,3,4-oxadiazol-2(3H)-one (CAS-RN 129221-01-8; 50 mg, 216 μ mol) and N,N-diisopropylethylamine (140 mg, 1.08 mmol) in N,N-dimethylformamide (2.8 ml) was added (1H-benzo[d][1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2; 73.3 mg, 238 μ mol) at room temperature. Then after 5 min benzotriazol-1-yl-oxy-tris-(dimethylamino)-phosphonium hexafluorophosphate (107 mg, 238 μ mol) was added. The reaction mixture was heated at 50°C for 16 h and was then partitioned between water and ethyl acetate. The organic layer was washed with brine, dried over magnesium sulfate, filtered and evaporated. The residue was triturated in ethyl acetate/methanol 19:1 to produce the title compound (33 mg, 32%). White solid, MS: 484.5 (M+H)⁺.

[0253] The example in Table 6 was prepared according to example 7, replacing (1H-benzo[d][1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride and 5-(3,5-dichlorophenyl)-1,3,4-oxadiazol-2(3H)-one respectively by the corresponding amine reagent and oxadiazolone reagent described in Table 6.

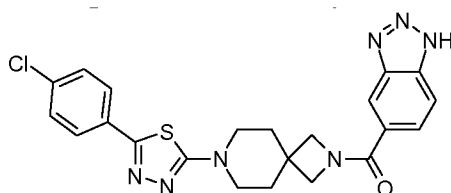
Table 6

No.	Systematic Name	Amine reagent	Oxadiazolone reagent	MS, m/e
7.1	(1H-benzo[d][1,2,3]triazol-5-yl)(7-(5-(4-chlorophenyl)-1,3,4-oxadiazol-2-yl)-2,7-diazaspiro[3.5]nonan-2-yl)methanone	(1H-benzo[d]-[1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)	5-(4-chlorophenyl)-1,3,4-oxadiazol-2(3H)-one (CAS-RN 1711-61-1)	450.5 (M+H) ⁺

Example 8

(1H-Benzo[d][1,2,3]triazol-5-yl)(7-(5-(4-chlorophenyl)-1,3,4-thiadiazol-2-yl)-2,7-diazaspiro[3.5]nonan-2-yl)methanone

[0254]

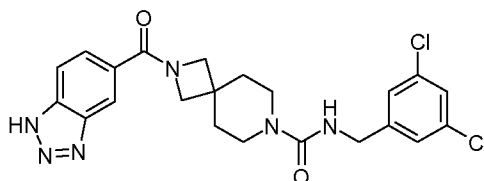


[0255] To a suspension of (1H-benzo[d][1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2; 40 mg, 130 μ mol) in toluene (3 ml) was added 1,8-diazabicyclo[5.4.0]undec-7-ene (79.1 mg, 520 μ mol) and 2-bromo-5-(4-chlorophenyl)-1,3,4-thiadiazole (53.7 mg, 195 μ mol). The reaction mixture was heated at reflux for 15 h and was then evaporated. After chromatography of the residue (silica gel; gradient dichloromethane to dichloromethane/methanol/25% aq. ammonia solution 90:10:0.25), the crude product was partitioned between ethyl acetate and 10% aq. citric acid solution. The organic layer was washed with sat. aq. sodium hydrogencarbonate solution and brine, dried over magnesium sulfate, filtered and evaporated to produce the title compound (27 mg, 45%). Light yellow foam, MS: 466.4 (M+H)⁺.

Example 9

2-(1H-Benzo[d][1,2,3]triazole-5-carbonyl)-N-(3,5-dichlorobenzyl)-2,7-diazaspiro[3.5]nonane-7-carboxamide

[0256]

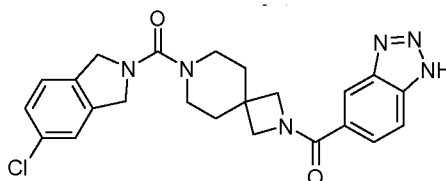


[0257] To a solution of (3,5-dichlorophenyl)methanamine (27.1 mg, 146 μ mol) in acetonitrile (2 ml) was added N,N'-carbonyldiimidazole (24.9 mg, 154 μ mol) at room temperature, then after 2 h triethylamine (59.2 mg, 585 μ mol) and (1H-benzo[d][1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2; 45 mg, 146 μ mol) were added. The light yellow suspension was heated at reflux for 30 min and was then partitioned between ethyl acetate and sat. aq. sodium hydrogencarbonate solution. The organic layer was washed with brine, dried over magnesium sulfate, filtered, and evaporated. Chromatography (silica gel; gradient dichloromethane/methanol/25% aq. ammonia solution 95:5:0.25 to 90:10:0.25) afforded the title compound (37 mg, 53%). White foam, MS: 473.1 (M+H)⁺.

Example 10

(2-(1H-Benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)(5-chloroisindolin-2-yl)methanone

[0258]



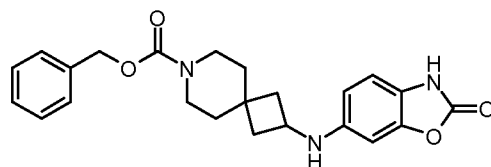
[0259] To a suspension of (1H-benzo[d][1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2; 40 mg, 130 μ mol) and N,N-diisopropylethylamine (50.4 mg, 390 μ mol) in dichloromethane (4 ml) was added 5-chloroisindoline-2-carbonyl chloride (CAS-RN 681483-91-0; 33.7 mg, 156 μ mol) at 0°C. After 1 h the ice-bath was removed and the light brown suspension was stirred at room temperature. Then after 16 h the reaction mixture was partitioned between ethyl acetate and water. The organic layer was washed with brine, dried over magnesium sulfate, filtered and evaporated. Chromatography (silica gel; gradient dichloromethane/methanol/25% aq. ammonia solution 95:5:0.25 to 90:10:0.25) afforded the title compound (37 mg, 63%). Light yellow foam, MS: 451.4 (M+H)⁺.

Example 11

Benzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-ylamino)-7-azaspiro[3.5]nonane-7-carboxylate

[0260]

EP 2 861 566 B1



5

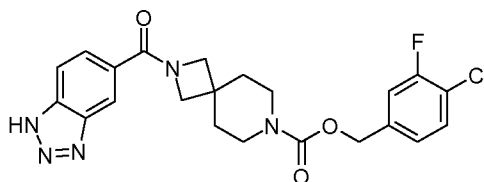
10 **[0261]** To a colorless, clear solution of 6-(7-azaspiro[3.5]nonan-2-ylamino)benzo[d]oxazol-2(3H)-one dihydrochloride (intermediate 1.11; 60 mg, 173 μmol) and sodium hydrogencarbonate (87.3 mg, 1.04 mmol, Eq: 6) in acetone (1 ml) and water (1.00 ml) was added benzyl chloroformate (31.1 mg, 173 μmol) at room temperature. Then after 16 h the reaction mixture was partitioned between sat. aq. sodium hydrogencarbonate solution and ethyl acetate. The organic layer was washed with brine, dried over magnesium sulfate, filtered, and evaporated. Chromatography (silica gel; gradient dichloromethane/methanol/25% aq. ammonia solution 95:5:0.25 to 90:10:0.25) afforded the title compound (7 mg, 10%). White foam, MS: 408.3 (M+H)⁺.

15

Example 12

4-Chloro-3-fluorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate

20 **[0262]**



25

30 **[0263]** To a solution of (4-chloro-3-fluorophenyl)methanol (18.3 mg, 114 μmol) in acetonitrile (2 ml) was added N,N'-carbonyldiimidazole (19.4 mg, 119 μmol) at room temperature. Then after 2 h triethylamine (46.0 mg, 455 μmol) and (1H-benzo[d][1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2; 35 mg, 114 μmol) were added. The reaction mixture was heated at reflux for 16 h and was then partitioned between ethyl acetate and sat. aq. sodium hydrogencarbonate solution. The organic layer was washed with brine, dried over magnesium sulfate, filtered, and evaporated. Chromatography (silica gel; gradient dichloromethane to dichloromethane/methanol/25% aq. ammonia solution 90:10:0.25) afforded the title compound (40 mg, 77%). White foam, MS:458.5 (M+H)⁺.

35

[0264] The examples in Table 7 were prepared according to example 12, replacing (1H-benzo[d][1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride and (4-chloro-3-fluorophenyl)methanol respectively by the corresponding amine reagent and benzyl alcohol reagent described in Table 7.

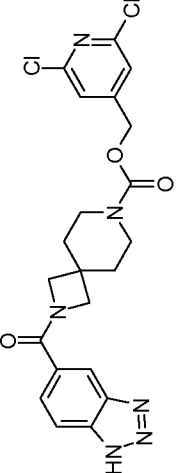
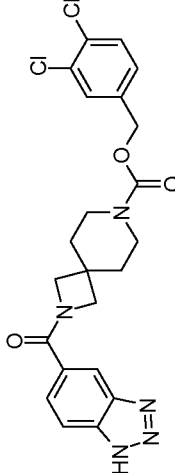
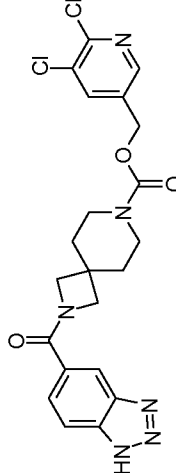
40

45

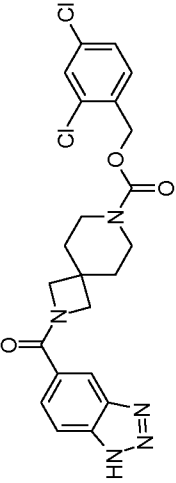
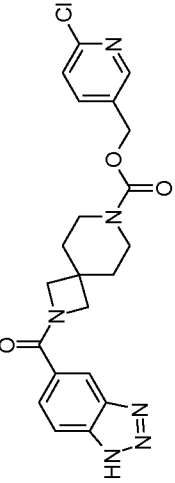
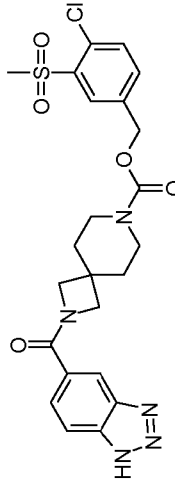
50

55

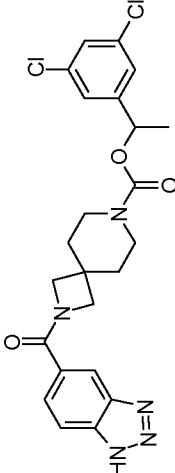
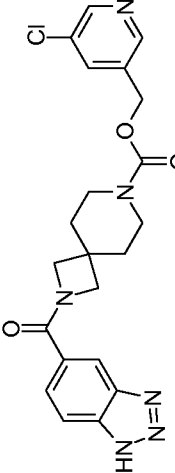
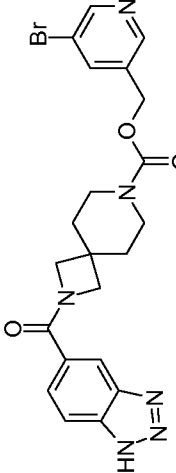
Table 7

No.	Systematic Name	Amine reagent	Benzyl alcohol reagent	MS, m/e
12.01	(2,6-dichloropyridin-4-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	(1H-benzo[d]-[1,2,3]triazol-5-yl)(2,7-diazaspiro [3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)	(2,6-dichloro-pyridin-4-yl)methanol	475.4 (M+H) ⁺
12.02	3,4-dichlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	(1H-benzo[d]-[1,2,3]triazol-5-yl)(2,7-diazaspiro [3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)	(3,4-dichlorophenyl)-methanol	474.4 (M+H) ⁺
12.03	(5,6-dichloropyridin-3-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	(1H-benzo[d]-[1,2,3]triazol-5-yl)(2,7-diazaspiro [3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)	(5,6-dichloro-pyridin-3-yl)methanol	475.4 (M+H) ⁺


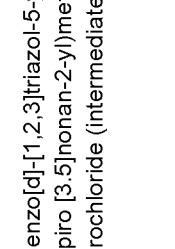
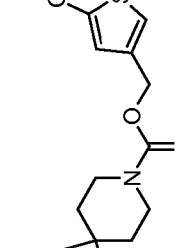
(continued)

No.	Systematic Name	Amine reagent	Benzyl alcohol reagent	MS, m/e
12.04	<p>2,4-dichlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate</p> 	<p>(1H-benzo[d]-[1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)</p>	<p>(2,4-dichlorophenyl)-methanol</p>	<p>474.4 (M+H)⁺</p>
12.05	<p>(6-chloropyridin-3-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate</p> 	<p>(1H-benzo[d]-[1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)</p>	<p>(6-chloro-pyridin-3-yl)methanol</p>	<p>441.5 (M+H)⁺</p>
12.06	<p>4-chloro-3-(methylsulfonyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate</p> 	<p>(1H-benzo[d]-[1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)</p>	<p>(4-chloro-3-(methylsulfonyl)phenyl)methanol (intermediate 2)</p>	<p>518.4 (M+H)⁺</p>

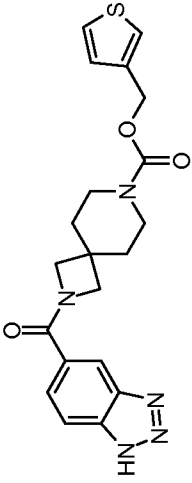
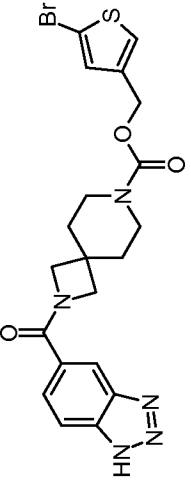
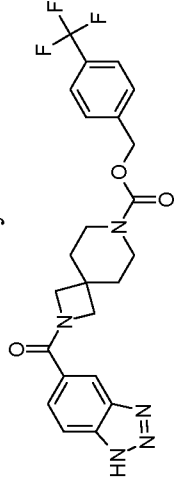
(continued)

No.	Systematic Name	Amine reagent	Benzyl alcohol reagent	MS, m/e
12.07	1-(3,5-dichlorophenyl)ethyl 2-(1H-benzodiazaspiro[3.5]nonane-7-carboxylate 	(1H-benzodiazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)	1-(3,5-dichlorophenyl)ethanol	488.4 (M+H) ⁺
12.08	(5-chloropyridin-3-yl)methyl 2-(1H-benzodiazaspiro[3.5]nonane-7-carboxylate 	(1H-benzodiazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)	(5-chloropyridin-3-yl)methanol	441.5 (M+H) ⁺
12.09	(5-bromopyridin-3-yl)methyl 2-(1H-benzodiazaspiro[3.5]nonane-7-carboxylate 	(1H-benzodiazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)	(5-bromopyridin-3-yl)methanol	485.4 (M+H) ⁺

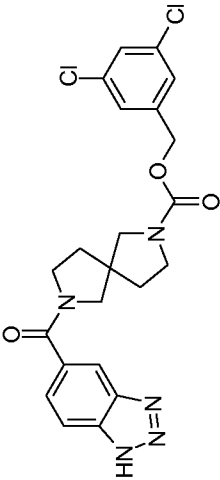
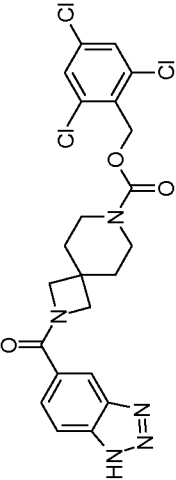
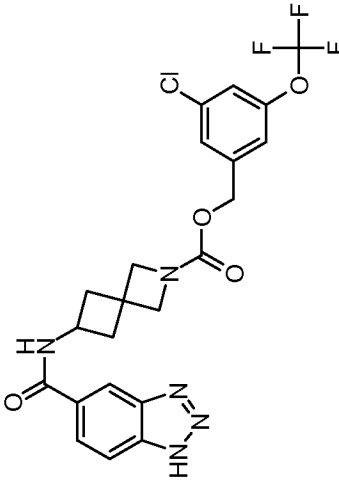
(continued)

No.	Systematic Name	Amine reagent	Benzyl alcohol reagent	MS, m/e
12.10	<p>(4,6-dichloropyridin-2-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate</p> 	<p>(1H-benzo[d][1,2,3]triazol-5-yl)(2,7-diazaspiro [3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)</p>	<p>(4,6-dichloro-pyridin-2-yl)methanol (CAS-RN 856163-79-6)</p>	<p>475.4 (M+H)⁺</p>
12.11	<p>3-chloro-4-fluorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate</p> 	<p>(1H-benzo[d][1,2,3]triazol-5-yl)(2,7-diazaspiro [3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)</p>	<p>(3-chloro-4-fluorophenyl)-methanol</p>	<p>458.4 (M+H)⁺</p>
12.12	<p>(5-chlorothiophen-3-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate</p> 	<p>(1H-benzo[d][1,2,3]triazol-5-yl)(2,7-diazaspiro [3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)</p>	<p>(5-chlorothiophen-3-yl)methanol</p>	<p>446.4 (M+H)⁺</p>

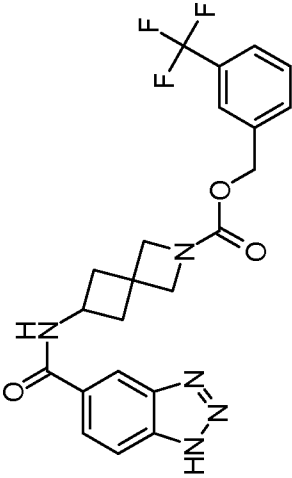
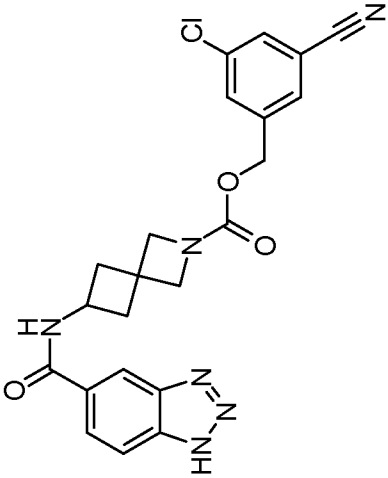
(continued)

No.	Systematic Name	Amine reagent	Benzyl alcohol reagent	MS, m/e
12.13	thiophen-3-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	(1H-benzo[d]-[1,2,3]triazol-5-yl)(2,7-diaza-spiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)	thiophen-3-yl)methanol	412.5 (M+H) ⁺
12.14	(5-bromothiophen-3-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	(1H-benzo[d]-[1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)	(5-bromothiophen-3-yl)methanol	490.4 (M+H) ⁺
12.15	4-(trifluoromethyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	(1H-benzo[d]-[1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)	(4-(trifluoromethyl)-phenyl)-methanol	474.5 (M+H) ⁺

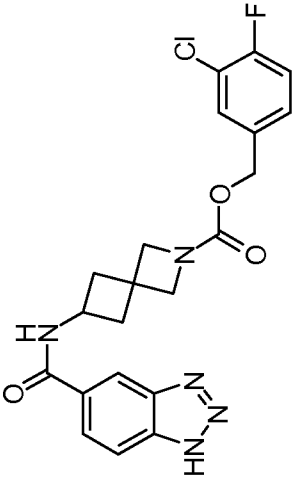
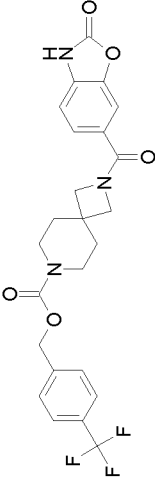
(continued)

No.	Systematic Name	Amine reagent	Benzyl alcohol reagent	MS, m/e
12.16	3,5-dichlorobenzyl 7-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[4.4]nonane-2-carboxylate 	(1H-benzo[d]-[1,2,3]triazol-5-yl)(2,7-diazaspiro [4.4]nonan-2-yl)methanone hydrochloride (intermediate 1.1)	(3,5-dichlorophenyl)-methanol	474.4 (M+H) ⁺
12.17	2,4,6-trichlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	(1H-benzo[d]-[1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)	(2,4,6-trichlorophenyl)-methanol	506.4 (M-H) ⁻
12.18	6-[(1H-benzotriazole-5-carbonyl)-amino]-2-azaspiro[3.3]heptane-2-carboxylic acid 3-chloro-5-trifluoromethoxy-benzyl ester 	N-(2-azaspiro[3.3]heptan-6-yl)-1H-benzo[d][1,2,3]triazole-5-carboxamide 2,2,2-trifluoroacetate (intermediate 1.5)	(3-chloro-5-(trifluoromethoxy)-phenyl)-methanol	508.6 (M-H) ⁻

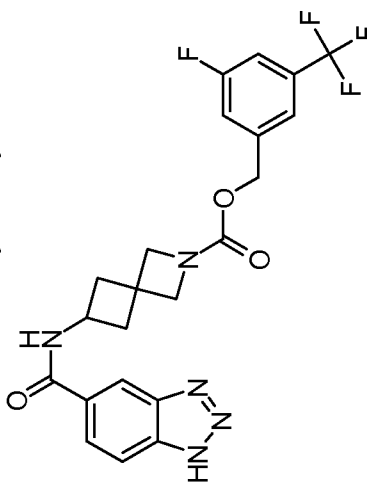
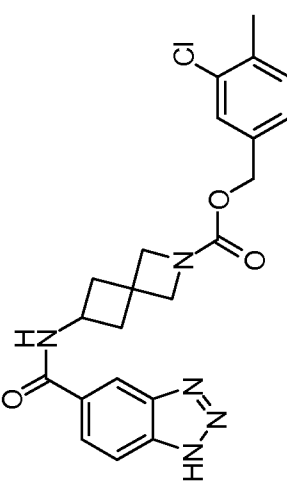
(continued)

No.	Systematic Name	Amine reagent	Benzyl alcohol reagent	MS, m/e
12.19	6-[(1H-benzotriazole-5-carbonyl)-amino]-2-azaspiro[3.3]heptane-2-carboxylic acid 3-trifluoromethylbenzyl ester 	N-(2-azaspiro[3.3]heptan-6-yl)-1H-benzo[d][1,2,3]triazole-5-carboxamide 2,2,2-trifluoroacetate (intermediate 1.5)	(3-(trifluoromethyl)-phenyl)-methanol	460.5 (M+H) ⁺
12.20	6-[(1H-benzotriazole-5-carbonyl)-amino]-2-azaspiro[3.3]heptane-2-carboxylic acid 3-chloro-5-cyanobenzyl ester 	N-(2-azaspiro[3.3]heptan-6-yl)-1H-benzo[d][1,2,3]triazole-5-carboxamide 2,2,2-trifluoroacetate (intermediate 1.5)	3-chloro-5-(hydroxymethyl)benzotrile (CAS-RN 1021871-35-1)	451.4 (M+H) ⁺

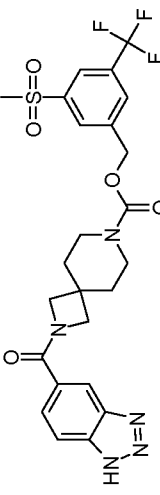
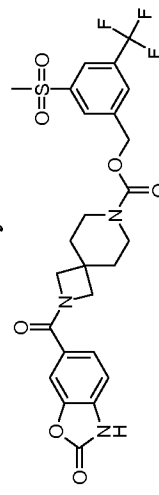
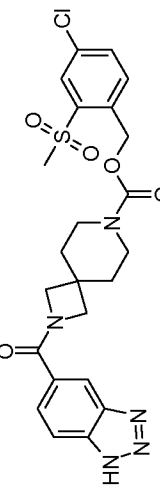
(continued)

No.	Systematic Name	Amine reagent	Benzyl alcohol reagent	MS, m/e
12.21	6-[(1H-benzotriazole-5-carbonyl)-amino]-2-azaspiro[3.3]heptane-2-carboxylic acid 3-chloro-4-fluorobenzyl ester 	N-(2-azaspiro[3.3]heptan-6-yl)-1H-benzo[d][1,2,3]triazole-5-carboxamide 2,2,2-trifluoroacetate (intermediate 1.5)	(3-chloro-4-fluorophenyl)-methanol	444.4 (M+H) ⁺
12.22	4-(trifluoromethyl)benzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	6-(2,7-diazaspiro[3.5]nonane-2-carbonyl)-benzo[d]oxazol-2(3H)-one hydrochloride (intermediate 1.8)	(4-(trifluoromethyl)-phenyl)-methanol	490.5 (M+H) ⁺

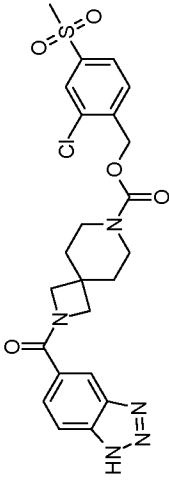
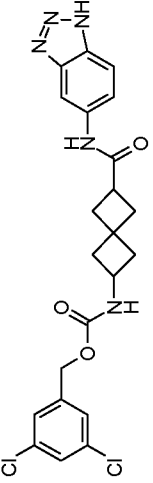
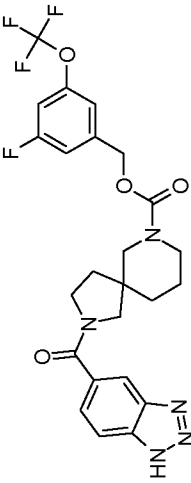
(continued)

No.	Systematic Name	Amine reagent	Benzyl alcohol reagent	MS, m/e
12.23	<p>6-[(1H-benzotriazole-5-carbonyl)-amino]-2-azaspiro[3.3]heptane-2-carboxylic acid 3-fluoro-5-trifluoromethyl-benzyl ester</p> 	<p>N-(2-azaspiro[3.3]heptan-6-yl)-1H-benzo[d][1,2,3]triazole-5-carboxamide 2,2,2-trifluoroacetate (intermediate 1.5)</p>	<p>(3-fluoro-5-(trifluoromethyl)-phenyl)-methanol</p>	<p>478.4 (M+H)⁺</p>
12.24	<p>6-[(1H-benzotriazole-5-carbonyl)-amino]-2-azaspiro[3.3]heptane-2-carboxylic acid 3-chloro-4-methylbenzyl ester</p> 	<p>N-(2-azaspiro[3.3]heptan-6-yl)-1H-benzo[d][1,2,3]triazole-5-carboxamide 2,2,2-trifluoroacetate (intermediate 1.5)</p>	<p>(3-chloro-4-methylphenyl)-methanol</p>	<p>440.4 (M+H)⁺</p>


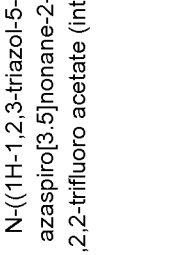
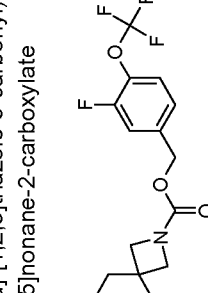
(continued)

No.	Systematic Name	Amine reagent	Benzyl alcohol reagent	MS, m/e
12.25	3-(methylsulfonyl)-5-(trifluoromethyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	(1H-benzo[d][1,2,3]triazol-5-yl)(2,7-diaza-spiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)	(3-(methylsulfonyl)-5-(trifluoromethyl)-phenyl)-methanol (CAS- RN 1003843-94-4)	552.4 (M+H) ⁺
12.26	3-(methylsulfonyl)-5-(trifluoromethyl)benzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	6-(2,7-diazaspiro[3.5]nonane-2-carbonyl)-benzo[d]oxazol-[d] 2(3H)-one hydrochloride (intermediate 1.8)	(3-(methylsulfonyl)-5-(trifluoromethyl)-phenyl)-methanol (CAS- RN 1003843-94-4)	568.4 (M+H) ⁺
12.27	4-chloro-2-(methylsulfonyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	(1H-benzo[d][1,2,3]triazol-5-yl)(2,7-diaza-spiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)	(4-chloro-2-(methylsulfonyl)-phenyl)-methanol (CAS- RN 773873-25-9)	518.3 (M+H) ⁺

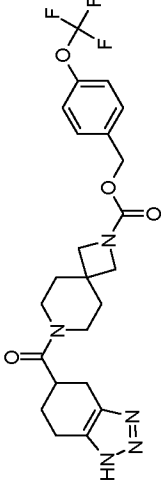
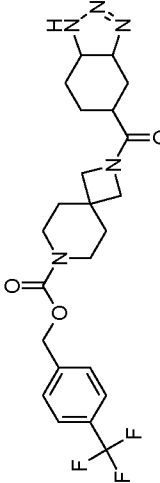
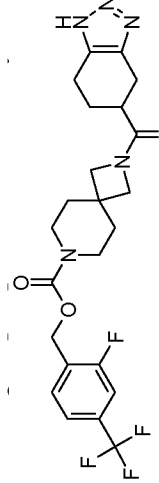
(continued)

No.	Systematic Name	Amine reagent	Benzyl alcohol reagent	MS, m/e
12.28	2-chloro-4-(methylsulfonyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	(1H-benzo[d]-[1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)	4-(methylsulfonyl)-phenyl)-methanol (CAS-RN 181300-40-3) (2-chloro-	518.4 (M+H) ⁺
12.29	3,5-dichlorobenzyl 6-(1H-benzo[d][1,2,3]triazol-5-yl)carbamoyl)spiro [3.3]heptan-2-ylcarbamate 	6-amino-N-(1H-benzo[d][1,2,3]triazol-5-yl)spiro[3.3]heptane-2-carboxamide 2,2,2-trifluoro acetate (intermediate 1.9)	(3,5-dichlorophenyl)-methanol	474.4 (M+H) ⁺
12.30	3-fluoro-5-(trifluoromethoxy)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[4.5]decane-7-carboxylate 	(1H-benzo[d]-[1,2,3]triazol-5-yl)(2,7-diazaspiro[4.5]decan-2-yl)methanone 2,2,2-trifluoro acetate (intermediate 1.4)	(3-fluoro-5-(trifluoromethoxy)-phenyl)-methanol	522.5 (M+H) ⁺

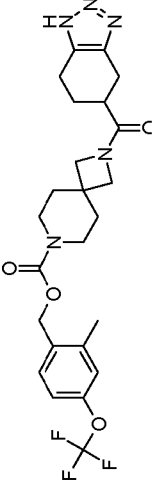
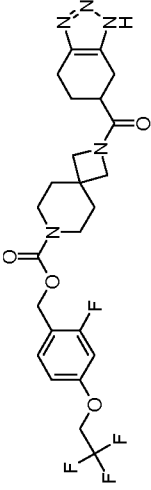
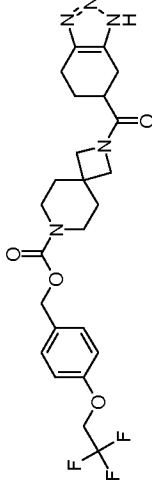
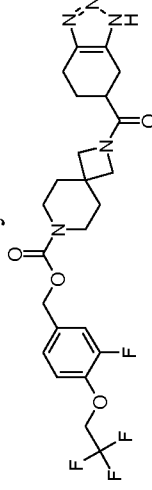
(continued)

No.	Systematic Name	Amine reagent	Benzyl alcohol reagent	MS, m/e
12.31	3-chloro-5-(methylsulfonyl)benzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-ylsulfonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	6-(2,7-diazaspiro[3.5]nonan-2-ylsulfonyl)-benzo[d]oxazol-2(3H)-one hydrochloride (intermediate 1.22)	5-(methylsulfonyl)-phenyl)-methanol (intermediate 2.1)	568.3 (M+H) ⁺
12.32	2-[(3H-[1,2,3]triazol-4-ylmethyl)-carbamoyl]-7-azaspiro[3.5]nonane-7-carboxylic acid 3,5-dichloro-benzyl ester 	N-((1H-1,2,3-triazol-5-yl)methyl)-7-azaspiro[3.5]nonane-2-carboxamide 2,2,2-trifluoro acetate (intermediate 1.24)	(3,5-dichlorophenyl)-methanol	452.5 (M+H) ⁺
12.33	3-fluoro-4-(trifluoromethoxy)benzyl 7-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-2-carboxylate 	2,7-diaza-spiro[3.5]nonan-7-yl(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-5-yl)methanone 2,2,2-trifluoro acetate (intermediate 1.26)	(3-fluoro-4-(trifluoromethoxy)-phenyl)-methanol (CAS-RN 886498-99-3)	512.5 (M+H) ⁺

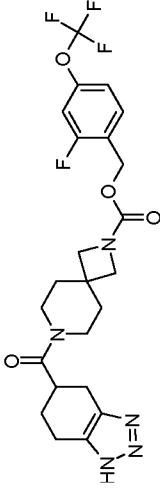
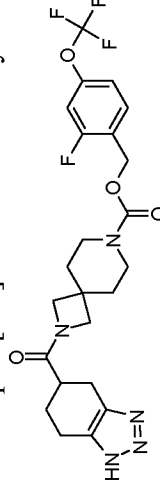
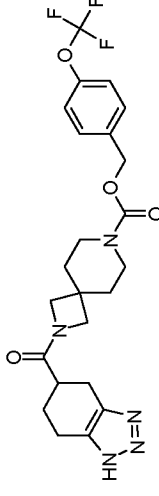
(continued)

No.	Systematic Name	Amine reagent	Benzyl alcohol reagent	MS, m/e
12.34	4-(trifluoromethoxy)benzyl 7-(4,5,6,7-tetrahydro-1H-benzod[1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-2-carboxylate 	2,7-diaza-spiro[3.5]nonan-2-yl(4,5,6,7-tetrahydro-1H-benzod[1,2,3]triazol-5-yl)methanone 2,2,2-trifluoro acetate (intermediate 1.26)	(4-(trifluoro-methoxy)-phenyl)-methanol	494.5 (M+H) ⁺
12.35	[4-(trifluoromethyl)phenyl]methyl 2-(3a,4,5,6,7,7a-hexahydro-1H-benzotriazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	2,7-diaza-spiro[3.5]nonan-2-yl(4,5,6,7-tetrahydro-1H-benzod[1,2,3]triazol-5-yl)methanone hydrochloride (intermediate 1.29)	(4-(trifluoromethyl)-phenyl)-methanol	478.6 (M+H) ⁺
12.36	[2-fluoro-4-(trifluoromethyl)phenyl]methyl 2-(4,5,6,7-tetrahydro-1H-benzotriazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	2,7-diaza-spiro[3.5]nonan-2-yl(4,5,6,7-tetrahydro-1H-benzod[1,2,3]triazol-5-yl)methanone hydrochloride (intermediate 1.29)	(2-fluoro-4-(trifluoromethyl)-phenyl)-methanol (CAS-RN 197239-49-9)	496.2 (M+H) ⁺

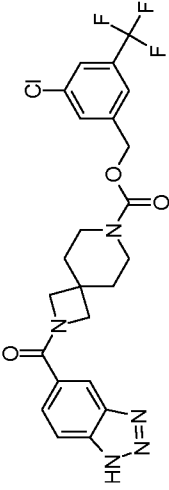
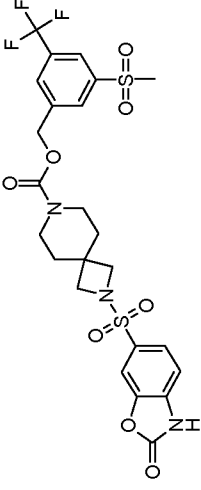
(continued)

No.	Systematic Name	Amine reagent	Benzyl alcohol reagent	MS, m/e
12.37	<p>[2-methyl-4-(trifluoromethoxy)-phenyl]methyl 2-(4,5,6,7-tetrahydro-1H-benzotriazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate</p> 	2,7-diaza-spiro[3.5]nonan-2-yl(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-5-yl)methanone hydrochloride (intermediate 1.29)	(2-methyl-4-(trifluoro-methoxy)-phenyl)-methanol (CAS-RN 261951-94-4)	508.2 (M+H) ⁺
12.38	<p>2-fluoro-4-(2,2,2-trifluoroethoxy)-benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate</p> 	2,7-diaza-spiro[3.5]nonan-2-yl(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-5-yl)methanone hydrochloride (intermediate 1.29)	(2-fluoro-4-(2,2,2-trifluoroethoxy)-phenyl)-methanol (CAS-RN 1240257-07-1)	526.8 (M+H) ⁺
12.39	<p>4-(2,2,2-trifluoroethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate</p> 	2,7-diaza-spiro[3.5]nonan-2-yl(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-5-yl)methanone hydrochloride (intermediate 1.29)	(4-(2,2,2-trifluoroethoxy)-phenyl)-methanol (CAS-RN 1020949-12-5)	508.6 (M+H) ⁺
12.40	<p>3-fluoro-4-(2,2,2-trifluoroethoxy)-benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate</p> 	2,7-diaza-spiro[3.5]nonan-2-yl(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-5-yl)methanone hydrochloride (intermediate 1.29)	(3-fluoro-4-(2,2,2-trifluoroethoxy)-phenyl)-methanol (CAS-RN 1039931-47-9)	526.6 (M+H) ⁺

(continued)

No.	Systematic Name	Amine reagent	Benzyl alcohol reagent	MS, m/e
12.41	2-fluoro-4-(trifluoromethoxy)benzyl 7-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-2-carboxylate 	2,7-diaza-spiro[3.5]nonan-7-yl(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-5-yl)methanone 2,2,2-trifluoro acetate (intermediate 1.26)	(2-fluoro-4-(trifluoromethoxy)-phenyl)-methanol (CAS-RN 1240257-07-1)	512.5 (M+H) ⁺
12.42	2-fluoro-4-(trifluoromethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	2,7-diaza-spiro[3.5]nonan-2-yl(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-5-yl)methanone hydrochloride (intermediate 1.29)	(2-fluoro-4-(trifluoromethoxy)-phenyl)-methanol (CAS-RN 1240257-07-1)	512.6 (M+H) ⁺
12.43	4-(trifluoromethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	2,7-diaza-spiro[3.5]nonan-2-yl(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-5-yl)methanone hydrochloride (intermediate 1.29)	(4-(trifluoro-methoxy)-phenyl)-methanol	494.5 (M+H) ⁺

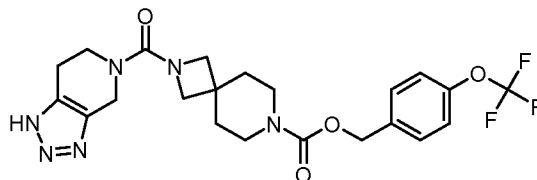
(continued)

No.	Systematic Name	Amine reagent	Benzyl alcohol reagent	MS, m/e
12.44	3-chloro-5-(trifluoromethyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	(1H-benzo[d][1,2,3]triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride (intermediate 1.2)	(3-chloro-5-(trifluorophenyl))-methanol	508.5 (M+H) ⁺
12.45	3-(methylsulfonyl)-5-(trifluoro-methyl)benzyl 2-(2-oxo-2,3-dihydro-benzo[d]oxazol-6-ylsulfonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate 	6-(2,7-diaza-spiro[3.5]nonan-2-ylsulfonyl)-benzo[d]oxazol-2(3H)-one hydrochloride (intermediate 1.22)	(3-(methylsulfonyl)-5-(trifluoromethyl)-phenyl)-methanol (CAS-RN 1003843-94-4)	602.4 (M-H) ⁻

Example 13

4-(Trifluoromethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-[1,2,3]triazolo[4,5-c]pyridine-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate

[0265]

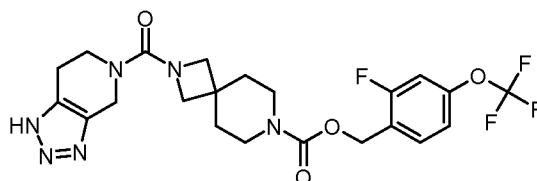


[0266] Sodium hydride dispersion (60% in mineral oil, 10.2 mg, 254 μmol) and sodium iodide (6.35 mg, 42.4 μmol) were added at room temperature to a solution of 4-(trifluoromethoxy)benzyl 4-(chloromethyl)-4-((4,5,6,7-tetrahydro-1H-[1,2,3]triazolo[4,5-c]pyridine-5-carboxamido)methyl)-piperidine-1-carboxylate (intermediate 3; 45 mg, 85 μmol) in N,N-dimethylformamide (2 mL). After 18 h the reaction mixture was partitioned between water and ethyl acetate, the organic layer was washed with brine, dried over sodium sulfate, filtered, and evaporated. The residue was purified by chromatography (silica gel; heptane-ethyl acetate gradient, followed by dichloromethane/methanol 19:1) to afford the title compound (13 mg, 30%). White foam, MS: 495.5 (M+H)⁺.

Example 13.1

2-Fluoro-4-(trifluoromethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-[1,2,3]triazolo[4,5-c]pyridine-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate

[0267]

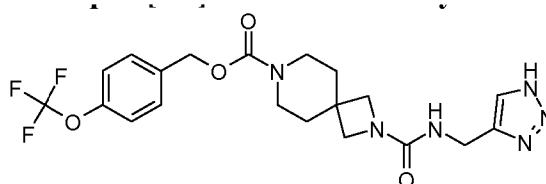


[0268] The title compound was produced in analogy to example 13 from 2-fluoro-4-(trifluoromethoxy)benzyl 4-(chloromethyl)-4-((4,5,6,7-tetrahydro-1H-[1,2,3]triazolo[4,5-c]pyridine-5-carboxamido)methyl)piperidine-1-carboxylate (intermediate 3.1). White foam, MS: 513.5 (M+H)⁺.

Example 14

[4-(Trifluoromethoxy)phenyl]methyl 2-((1H-triazol-4-ylmethyl)carbamoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate

[0269]



[0270] A solution of triphosgene (29 mg, 97 μmol) in ethyl acetate (5 mL) was added dropwise over a period of 5 min to a solution of 4-(trifluoromethoxy)benzyl 2,7-diazaspiro[3.5]nonane-7-carboxylate (intermediate 1.27; 67 mg, 195 μmol) in tetrahydrofuran (5 mL) at room temperature. The reaction mixture was heated at reflux for 2 h, then concentrated

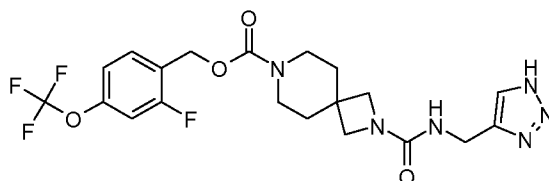
EP 2 861 566 B1

under vacuum. The residue was taken up in tetrahydrofuran (7 mL), then (1H-1,2,3-triazol-4-yl)methanamine hydrochloride (26.2 mg, 195 μ mol) and triethylamine (98.4 mg, 973 μ mol) were added at room temperature. After 15 h the reaction mixture was partitioned between water and ethyl acetate, the organic layer was dried over sodium sulfate, filtered, and evaporated. Chromatography (silica gel; dichloromethane-methanol gradient) produced the title compound (35 mg, 38%). White foam, MS: 469.2 (M+H)⁺.

Example 14.1

[2-Fluoro-4-(trifluoromethoxy)phenyl]methyl 2-((1H-triazol-4-yl)methyl)carbamoyl-2,7-diazaspiro[3.5]nonane-7-carboxylate

[0271]

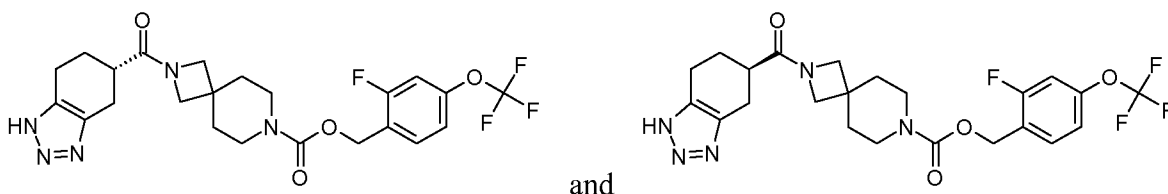


[0272] The title compound was produced in analogy to example 14 from 2-fluoro-4-(trifluoromethoxy)benzyl 2,7-diazaspiro[3.5]nonane-7-carboxylate (intermediate 1.28) and (1H-1,2,3-triazol-4-yl)methanamine hydrochloride. White foam, MS: 487.2 (M+H)⁺.

Examples 15A and 15B

(-)-2-Fluoro-4-(trifluoromethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate and (+)-2-fluoro-4-(trifluoromethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate

[0273]

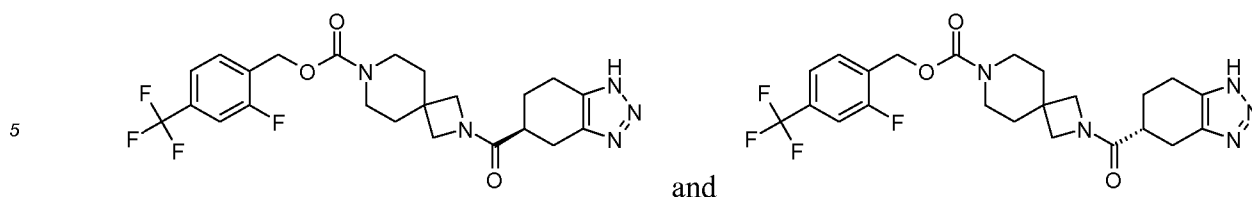


[0274] Racemic 2-fluoro-4-(trifluoromethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzotriazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate (example 12.36; 28 mg, 55 μ mol) was separated by preparative HPLC using a Chiralpak AD column as the stationary phase and heptane/ethanol 3:2 as the eluent. This produced the faster eluting (-)-enantiomer (example 15A; 9 mg, 31%, light yellow foam, MS: 512.5 (M+H)⁺) and the slower eluting (+)-enantiomer (example 15B, 10 mg, 34%, light yellow foam, MS: 512.5 (M+H)⁺).

Examples 16A and 16B

(S)-[2-Fluoro-4-(trifluoromethyl)phenyl]methyl 2-[4,5,6,7-tetrahydro-1H-benzotriazole-5-carbonyl]-2,7-diazaspiro[3.5]nonane-7-carboxylate and (R)-[2-fluoro-4-(trifluoromethyl)phenyl]methyl 2-[4,5,6,7-tetrahydro-1H-benzotriazole-5-carbonyl]-2,7-diazaspiro[3.5]nonane-7-carboxylate

[0275]



10 **[0276]** Racemic [2-fluoro-4-(trifluoromethyl)phenyl]methyl-2-[4,5,6,7-tetrahydro-1H-benzotriazole-5-carbonyl]-2,7-diazaspiro[3.5]nonane-7-carboxylate (example 12.36; 35 mg, 71 μmol) was separated by preparative HPLC using a Chiralpak AD column as the stationary phase and heptane/ethanol 3:2 as the eluent. This produced the faster eluting enantiomer (example 16A; 2 mg, 5%, light yellow foam, MS: 496.2 (M+H)⁺) and the slower eluting enantiomer (example 16B, 3 mg, 8%, light yellow foam, MS: 496.2 (M+H)⁺).

15 **Intermediates**

General procedure A: Amide coupling, method 1

20 **[0277]** To a solution of the spirocyclic amine (starting material 1, 1 mmol) in N,N-dimethylformamide (5 mL) were added the carboxylic acid (starting material 2, 1.05 mmol), 4-methylmorpholine (4 mmol), and O-(7-azabenzotriazol-1-yl)-N,N,N',N'-tetramethyluronium hexafluoro-phosphate (1.5 mmol). The reaction mixture was stirred for 18 h at ambient temperature and was then partitioned between ethyl acetate and 1 M aqueous hydrochloric acid solution. The organic layer was washed with brine, dried over magnesium sulfate, filtered and evaporated in vacuo. The residue was taken up in toluene, concentrated in vacuo, and chromatographed on silica gel, using a gradient of dichloromethane to dichloro-
25 methane/methanol/25% aq. ammonia solution 90:10:0.25 to afford the amide intermediate as colorless solid, foam or oil.

General procedure B: Ring closure reaction

30 **[0278]** To a light yellow suspension of the 4-amino-3-hydroxybenzamide derivative (1 mmol, obtained according to general procedure A) in tetrahydrofuran (8 mL) was added dropwise a solution of N,N'-carbonyldiimidazole (1.2 mmol) in tetrahydrofuran (4 mL). Then after 16 h the reaction mixture was partitioned between water and ethyl acetate. The organic layer was washed with brine, dried over magnesium sulfate, filtered and evaporated in vacuo. The residue was triturated in heptane/ethyl acetate 1:1 to produce the 2,3-dihydrobenzo[d]oxazole intermediate as a white solid.

35 **General procedure C: Amide coupling, method 2**

40 **[0279]** A solution of the carboxylic acid (starting material 1, 1 mmol), the amine (starting material 2, 1 mmol), 1-hydroxybenzotriazole hydrate (1.3 mmol) and 1-(3-dimethylaminopropyl)-3-ethylcarbodiimide hydrochloride (1.1 mmol) in N,N-dimethylformamide (6 mL) was stirred at room temperature for 16 hours and was then partitioned between water and ethyl acetate. The organic layer was washed with brine, dried over sodium sulfate, filtered and evaporated in vacuo. The residue was taken up in toluene, concentrated in vacuo, and chromatographed on silica gel, using a dichloromethane - methanol gradient, producing the amide intermediate as an off-white foam.

45 **General procedure D: Reductive amination**

50 **[0280]** To a light yellow solution of the ketone (starting material 1, 1 mmol) amine (starting material 2, 1 mmol) in tetrahydrofuran (5 mL) were added sodium triacetoxyborohydride (1.5 mmol) and acetic acid (1.5 mmol) at room temperature. Then after 15 h the reaction mixture was partitioned between sat. aq. sodium hydrogencarbonate solution and ethyl acetate. The organic layer was washed with brine, dried over magnesium sulfate, filtered, and evaporated. The residue was triturated with ethyl acetate/heptane 4:1 to produce the secondary amine intermediate as a white solid.

General procedure E: Carbamate synthesis, method 1

55 **[0281]** To a solution of the benzyl alcohol (starting material 2, 1 mmol) in dichloromethane (5 mL) was added N,N'-carbonyldiimidazole (1.05 mmol) at room temperature. The mixture was stirred for 3 h at ambient temperature, followed by addition of the spirocyclic amine (starting material 1, 1 mmol) and triethylamine (1 mmol). Then after 18 h the reaction mixture was partitioned between dichloromethane and brine. The organic layer was washed with brine, dried over magnesium sulfate, filtered and evaporated in vacuo. The residue was chromatographed on silica gel, using a heptane/ethyl acetate gradient, producing the carbamate intermediate as a white solid.

tane/ethyl acetate gradient, producing the benzyl carbamate intermediate as a colorless oil.

General procedure F: Carbamate synthesis, method 2

5 [0282] The chloroformate ester (starting material 2, 1.2 mmol) was added to a solution of the spirocyclic amine (starting material 1, 1 mmol) and N-ethyl-diisopropylamine (3 mmol) in dichloromethane (10 mL) at 0 °C. Then after 2 h the ice bath was removed and stirring was continued at room temperature. After 16 h the reaction mixture was partitioned between water and ethyl acetate. The organic layer was washed with brine, dried over sodium sulfate, filtered and evaporated in vacuo. The residue was chromatographed on silica gel, using a heptane - ethyl acetate gradient, producing the benzyl carbamate intermediate as a colorless oil.

General procedure G: N-Sulfonylation

15 [0283] To a solution or suspension of the spirocyclic amine (starting material 1, 1 mmol) and triethylamine (3 mmol) in tetrahydrofuran (5 mL) was added a solution of the sulfonyl chloride (starting material 2, 1.2 mmol) in tetrahydrofuran (1 mL) at 0°C. The ice bath was removed and then after 16 h the reaction mixture was partitioned between 1 M aq. hydrochloric acid solution and ethyl acetate. The organic layer was washed with sat. aq. sodium hydrogencarbonate solution and brine, dried over magnesium sulfate, filtered and evaporated. The residue was optionally triturated in heptane/ethyl acetate 1:1 to produce the sulfonamide intermediate.

General procedure H: Boc-deprotection, method 1

25 [0284] The tert-butyl carbamate product from general procedure A, B, C, D, E, F, or G (100 mg) was combined with hydrogen chloride solution (5M to 6M in 2-propanol, 1 mL) and was stirred at ambient temperature for 18 h. Then the reaction mixture was evaporated and the residue was precipitated from ethyl acetate to give intermediate 1 as the hydrochloride salt.

General procedure I: Boc-deprotection, method 2

30 [0285] Trifluoroacetic acid (10 mmol) was added at room temperature to a solution of the tert-butyl carbamate product from general procedure A, B, C, D, E, F, or G (1 mmol) in dichloromethane (10 mL). Then after 2 h the reaction mixture was concentrated in vacuo to produce intermediate 1 as the trifluoro acetate salt.

General procedure J: Boc-deprotection, method 3

35 [0286] Trifluoroacetic acid (10 mmol) was added at room temperature to a solution of the tert-butyl carbamate product from general procedure A, B, C, D, E, F, or G (1 mmol) in dichloromethane (10 mL). Then after 2 h the reaction mixture was partitioned between 2 M aq. sodium hydroxide solution and chloroform. The organic layer was dried over sodium sulfate, filtered and concentrated to produce intermediate 1 as the free base.

Intermediates 1

45 [0287] The intermediates 1.1-1.25 and 1.26 to 1.30 were prepared from starting material 1 and starting material 2 according to one or more of the general procedures A-G (step 1), followed by Boc-deprotection according to the general procedures H-J (step 2).

50

55

No.	Systematic Name	Starting material 1	Starting material 2	MS, m/e	General procedures	
					Step 1	Step 2
1.1	(1H-benzo[d][1,2,3]-triazol-5-yl)(2,7-diazaspiro[4.4]nonan-2-yl)methanone hydrochloride	2,7-diazaspiro[4.4]nonane-2-carboxylic acid tert-butyl ester (CAS-RN 236406-49-8)	1H-benzo[d][1,2,3]-triazole-5-carboxylic acid	272.4 (M+H) ⁺	A	H
1.2	(1H-benzo[d][1,2,3]-triazol-5-yl)(2,7-diazaspiro[3.5]nonan-2-yl)methanone hydrochloride	2,7-diazaspiro[3.5]nonane-7-carboxylic acid tert-butyl ester (CAS-RN 896464-16-7)	1H-benzo[d][1,2,3]-triazole-5-carboxylic acid	272.5 (M+H) ⁺	A	H
1.3	3-(3,5-dichlorophenyl)-1-(2,7-diazaspiro[3.5]nonan-7-yl)propan-1-one hydrochloride	tert-butyl 2,7-diazaspiro[3.5]nonane-2-carboxylate (CAS-RN 236406-55-6)	3-(3,5-dichlorophenyl)-propanoic acid	327.2 (M+H) ⁺	A	H
1.4	(1H-benzo[d][1,2,3]-triazol-5-yl)(2,7-diazaspiro[4.5]decan-2-yl)methanone 2,2,2-trifluoro acetate	tert-butyl 2,7-diazaspiro[4.5]decan-7-carboxylate (CAS-RN 236406-61-4)	1H-benzo[d][1,2,3]-triazole-5-carboxylic acid	286.5 (M+H) ⁺	A	I
1.5	N-(2-azaspiro[3.3]heptan-6-yl)-1H-benzo[d][1,2,3]triazole-5-carboxamide 2,2,2-trifluoro acetate	tert-butyl 6-amino-2-azaspiro[3.3]heptane-2-carboxylate (CAS-RN 1211586-09-2)	1H-benzo[d][1,2,3]-triazole-5-carboxylic acid	370.6 (M-H)	A	I
1.6	1-(6-amino-2-azaspiro[3.3]heptan-2-yl)-3-(3,5-dichlorophenyl)propan-1-one	tert-butyl 2-azaspiro[3.3]heptan-6-ylcarbamate (CAS-RN 1118786-85-8)	3-(3,5-dichlorophenyl)-propanoic acid	313.1 (M+H) ⁺	A	J
1.7	1-(6-amino-2-azaspiro[3.3]heptan-2-yl)-4-phenylbutan-1-one	tert-butyl 2-azaspiro[3.3]heptan-6-ylcarbamate (CAS-RN 1118786-85-8)	4-phenylbutanoic acid	259.1 (M+H) ⁺	A	J
1.8	6-(2,7-diazaspiro[3.5]nonane-2-carbonyl)-benzo[d]oxazol-2(3H)-one hydrochloride	2,7-diazaspiro[3.5]nonane-7-carboxylic acid tert-butyl ester (CAS-RN 896464-16-7)	4-amino-3-hydroxybenzoic acid	288.4 + (M+H)	A, then B	H
1.9	6-amino-N-(1H-benzo[d][1,2,3]triazol-5-yl)spiro[3.3]heptane-2-carboxamide 2,2,2-trifluoro acetate	6-(tert-butoxycarbonylamino)-spiro[3.3]heptane-2-carboxylic acid (CAS-RN 1087798-38-6)	1H-benzo[d][1,2,3]triazol-5-amine	272.4 (M+H) ⁺	C	I

(continued)

No.	Systematic Name	Starting material 1	Starting material 2	MS, m/e	General procedures	
					Step 1	Step 2
1.10	3,5-dichlorobenzyl 2,8-diazaspiro[4.5]decane-2-carboxylate hydrochloride	tert-butyl 2,8-diazaspiro[4.5]decane-8-carboxylate (CAS-RN 236406-39-6)	(3,5-dichlorophenyl)-methanol	343.4 (M+H) ⁺	E	H
1.11	6-(7-azaspiro[3.5]nonan-2-ylamino)-benzo[d]oxazol-2(3H)-one trihydro chloride	7-tert-butoxycarbonyl-7-azaspiro[3.5]nonan-2-one (CAS-RN 203661-69-2)	6-aminobenzo[d]oxazol-2(3H)-one	274.3 (M+H) ⁺	D	H
1.12	3,5-dichlorobenzyl 2-azaspiro[3.3]heptan-6-yl carbamate	tert-butyl 6-amino-2-azaspiro[3.3]heptane-2-carboxylate (CAS-RN 1211586-09-2)	(3,5-dichlorophenyl)-methanol	315.4 (M+H) ⁺	E	J
1.13	3,5-dichlorobenzyl 2,7-diazaspiro[3.5]nonane-2-carboxylate hydrochloride	2,7-diazaspiro[3.5]nonane-7-carboxylic acid tert-butyl ester (CAS-RN 896464-16-7)	(3,5-dichlorophenyl)-methanol	329.4 (M+H) ⁺	E	H
1.14	3,5-dichlorobenzyl 2,6-diazaspiro[3.4]octane-6-carboxylate hydrochloride	2,6-diazaspiro[3.4]octane-2-carboxylic acid tert-butyl ester (CAS-RN 885270-84-8)	(3,5-dichlorophenyl)-methanol	315.4 (M+H) ⁺	E	H
1.15	3-chloro-5-(methylsulfonyl)benzyl 2,7-diazaspiro[3.5]nonane-7-carboxylate hydrochloride	tert-butyl 2,7-diazaspiro[3.5]nonane-2-carboxylate (CAS-RN 236406-55-6)	(3-chloro-5-(methylsulfonyl)-phenyl)methanol (intermediate 2.1)	373.4 (M+H) ⁺	E	H
1.16	3-chlorobenzyl 2,7-diazaspiro[3.5]nonane-7-carboxylate hydrochloride	tert-butyl 2,7-diazaspiro[3.5]nonane-2-carboxylate (CAS-RN 236406-55-6)	(3-chlorophenyl)-methanol	295.3 (M+H) ⁺	E	H
1.17	4-chlorobenzyl 2,7-diazaspiro[3.5]nonane-7-carboxylate hydrochloride	tert-butyl 2,7-diazaspiro[3.5]nonane-2-carboxylate (CAS-RN 236406-55-6)	(3-chlorophenyl)-methanol	295.3 (M+H) ⁺	E	H
1.18	3,5-dichlorobenzyl 2,7-diazaspiro[3.5]nonane-7-carboxylate hydrochloride	tert-butyl 2,7-diazaspiro[3.5]nonane-2-carboxylate (CAS-RN 236406-55-6)	(3,5-dichlorophenyl)-methanol	329.1 (M+H) ⁺	E	H

(continued)

No.	Systematic Name	Starting material 1	Starting material 2	MS, m/e	General procedures	
					Step 1	Step 2
1.19	3,5-dichlorobenzyl 6-amino-2-azaspiro[3.3]heptane-2-carboxylate	tert-butyl 2-azaspiro[3.3]heptan-6-ylcarbamate (CAS-RN 1118786-85-8)	3,5-dichlorobenzyl carbonochloridate (CAS-RN 1175526-48-3)	315.4 (M+H) ⁺	F	J
1.20	benzyl 2-azaspiro[3.3]heptan-6-ylcarbamate	tert-butyl 6-amino-2-azaspiro[3.3]heptane-2-carboxylate (CAS-RN 1211586-09-2)	benzyl chloroformate	247.3 (M+H) ⁺	F	J
1.21	benzyl 6-amino-2-azaspiro[3.3]heptane-2-carboxylate	tert-butyl 2-azaspiro[3.3]heptan-6-ylcarbamate (CAS-RN 1118786-85-8)	benzyl chloroformate	247.2 (M+H) ⁺	F	J
1.22	6-(2,7-diazaspiro[3.5]nonan-2-ylsulfonyl)-benzo[d]oxazol-2(3H)-one hydrochloride	2,7-diazaspiro[3.5]nonane-7-carboxylic acid tert-butyl ester (CAS-RN 896464-16-7)	2-oxo-2,3-dihydrobenzo[d]oxazol-6-sulfonyl chloride	360.3 (M+H) ⁺	G	H
1.23	3-fluoro-5-(trifluoro-methoxy)benzyl 2,7-diazaspiro[4.5]decane-2-carboxylate 2,2,2-trifluoro acetate	tert-butyl 2,7-diazaspiro[4.5]decane-7-carboxylate (CAS-RN 236406-61-4)	5-(3-fluoro-(3-trifluoromethoxy)-phenyl)methanol	377.5 (M+H) ⁺	E	I
1.24	N-((1H-1,2,3-triazol-5-yl)methyl)-7-azaspiro[3.5]nonane-2-carboxamide 2,2,2-trifluoro acetate	7-(tert-butoxycarbonyl)-7-azaspiro[3.5]nonane-2-carboxylic acid (CAS-RN 873924-12-0)	(1H-1,2,3-triazol-4-yl)methanamine hydrochloride	250.5 (M+H) ⁺	C	I
1.25	7-(3-chlorophenethyl-sulfonyl)-2,7-diazaspiro[3.5]nonane	tert-butyl 2,7-diazaspiro[3.5]nonane-2-carboxylate (CAS-RN 236406-55-6)	2-(3-chlorophenyl)-ethanesulfonyl chloride	329.4 (M+H) ⁺	G	J
1.26	2,7-diazaspiro[3.5]nonan-7-yl-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-5-yl)methanone 2,2,2-trifluoro acetate	tert-butyl 2,7-diazaspiro[3.5]nonane-2-carboxylate (CAS-RN 236406-55-6)	4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carboxylic acid (CAS-RN 33062-47-4)	276.5 (M+H) ⁺	A	I
1.27	4-(trifluoromethoxy)benzyl 2,7-diazaspiro[3.5]nonane-7-carboxylate	tert-butyl 2,7-diazaspiro[3.5]nonane-2-carboxylate (CAS-RN 236406-55-6)	(4-(trifluoro-methoxy)phenyl)-methanol	345.1 (M+H) ⁺	E	J

5
10
15
20
25
30
35
40
45
50
55

(continued)

No.	Systematic Name	Starting material 1	Starting material 2	MS, m/e	General procedures	
					Step 1	Step 2
1.28	2-fluoro-4-(trifluoromethoxy)-benzyl 2,7-diaza-spiro[3.5]nonane-7-carboxylate	tert-butyl 2,7-diaza-spiro[3.5]nonane-2-carboxylate (CAS-RN 236406-55-6)	(2-fluoro-4-(trifluoromethoxy)-phenyl)methanol (CAS-RN)	363.5 (M+H) ⁺	E	J
1.29	2,7-diaza-spiro[3.5]nonan-2-yl(4,5,6,7-tetrahydro-1H-benzotriazol-5-yl)methanone hydrochloride	2,7-diaza-spiro[3.5]nonane-7-carboxylic acid tert-butyl ester (CAS-RN 896464-16-7)	4,5,6,7-tetrahydro-1H-benzotriazol-5-carboxylic acid (CAS-RN 33062-47-4)	276.5 (M+H) ⁺	A	H
1.30	1-(2,7-diazaspiro[3.5]nonan-7-yl)-3-(4-(trifluoromethoxy)-phenyl)propan-1-one	tert-butyl 2,7-diaza-spiro[3.5]nonane-2-carboxylate (CAS-RN 236406-55-6)	3-(4-(trifluoromethoxy)-phenyl)propanoic acid	343.5 (M+H) ⁺	A	J

Intermediate 2**(4-Chloro-3-(methylsulfonyl)phenyl)methanol**

5 **[0288]** To a solution of 4-chloro-3-(methylsulfonyl)benzoic acid (500 mg, 2.13 mmol) in tetrahydrofuran (5 ml) was added slowly borane-tetrahydrofuran complex solution (1 M in tetrahydrofuran, 5.33 ml, 5.33 mmol) at 0°C. The ice-bath was removed after 2 h and the reaction mixture was stirred at room temperature overnight. After careful addition of methanol (4 mL), the reaction mixture was evaporated. The residue was partitioned between water and ethyl acetate. The organic layer was washed with brine, dried over magnesium sulfate, filtered and evaporated. Chromatography (silica gel; gradient ethyl acetate/heptane 1:1 to ethyl acetate) afforded the title compound (455 mg, 97%). Colourless gum, MS: 238.0 (M+NH₄)⁺.

Intermediate 2.1**(3-Chloro-5-(methylsulfonyl)phenyl)methanol**

15 **[0289]** The title compound was produced in analogy to intermediate 2 from 3-chloro-5-(methylsulfonyl)-benzoic acid (CAS-RN 151104-63-1). White solid, MS: 221.1 (M+H)⁺.

Intermediate 3**4-(Trifluoromethoxy)benzyl 4-(chloromethyl)-4-((4,5,6,7-tetrahydro-1H-[1,2,3]triazolo[4,5-c]pyridine-5-carboxamido)methyl)piperidine-1-carboxylate**

25 **[0290]** Triethylamine (20.3 mg, 200 μmol) and N,N'-disuccinimidyl carbonate (51.3 mg, 200 μmol) were added to a solution of (4-(trifluoromethoxy)phenyl)methanol (38.5 mg, 200 μmol) in acetonitrile (4 mL) at room temperature. After 3½ h N-((4-(chloromethyl)piperidin-4-yl)methyl)-6,7-dihydro-1H-[1,2,3]triazolo[4,5-c]pyridine-5(4H)-carboxamide hydrochloride (intermediate 4; 70 mg, 200 μmol) and triethylamine (40.6 mg, 401 μmol) were added, then after 65 h the reaction mixture was partitioned between water and ethyl acetate. The organic layer was washed with brine, dried over sodium sulfate, filtered, and evaporated. The crude material was purified by flash chromatography (silica gel, heptane-ethyl acetate gradient, then dichloromethane/methanol 19:1) to produce the title compound (50 mg, 46%). White solid, MS: 531.5 (M+H)⁺.

Intermediate 3.1**2-Fluoro-4-(trifluoromethoxy)benzyl 4-(chloromethyl)-4-((4,5,6,7-tetrahydro-1H-[1,2,3]triazolo[4,5-c]pyridine-5-carboxamido)methyl)piperidine-1-carboxylate**

35 **[0291]** The title compound was produced in analogy to intermediate 3 from N-((4-(chloromethyl)-piperidin-4-yl)methyl)-6,7-dihydro-1H-[1,2,3]triazolo[4,5-c]pyridine-5(4H)-carboxamide hydrochloride (intermediate 4) and (2-fluoro-4-(trifluoromethoxy)phenyl)methanol (CAS-RN 1240257-07-1). White solid, MS: 549.5 (M+H)⁺.

Intermediate 4**N-((4-(Chloromethyl)piperidin-4-yl)methyl)-6,7-dihydro-1H-[1,2,3]triazolo[4,5-c]pyridine-5(4H)-carboxamide hydrochloride****Step 1: tert-butyl 2-(chlorocarbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate**

45 **[0292]** To a colourless solution of tert-butyl 2,7-diazaspiro[3.5]nonane-7-carboxylate (CAS-RN 896464-16-7; 300 mg, 1.33 mmol) and pyridine (315 mg, 3.98 mmol) in dichloromethane (6 mL) was added dropwise over a period of 5 min a solution of triphosgene (157 mg, 530 μmol) in dichloromethane (3 mL) at 0°C. After 30 minutes the ice bath was removed and the mixture was warmed up to room temperature over 2 hours. The reaction mixture was partitioned between 2 M aq. hydrochloric acid solution and ethyl acetate, the organic layer was washed with brine, dried over sodium sulfate, filtered, and evaporated to produce the title compound (290 mg, 72%), which was directly used in the next step.

EP 2 861 566 B1

Step 2: tert-Butyl 2-(4,5,6,7-tetrahydro-1H-[1,2,3]triazolo[4,5-c]pyridine-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate

5 [0293] To a colourless solution of 4,5,6,7-tetrahydro-1H-[1,2,3]triazolo[4,5-c]pyridine (CAS-RN 706757-05-3; 123 mg, 987 μ mol) and N,N-diisopropylethylamine (255 mg, 1.97 mmol) in N,N-dimethylformamide (4 mL) was added a solution of tert-butyl 2-(chlorocarbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate (285 mg, 987 μ mol) in dichloromethane (8 mL) dropwise over a period of 10 minutes at room temperature. After 18 h the reaction mixture was partitioned between dichloromethane and sat. aq. ammonium chloride solution. The organic layer was washed with brine, dried over sodium sulfate, filtered, and evaporated. Chromatography (silica gel; heptane-ethyl acetate gradient, then dichloromethane/methanol 19:1) produced the title compound (212 mg, 56%). Light yellow foam, MS: 321.5 (M+H-isobutene)⁺.

Step 3: N-((4-(Chloromethyl)piperidin-4-yl)methyl)-6,7-dihydro-1H-[1,2,3]triazolo[4,5-c]pyridine-5(4H)-carboxamide hydrochloride

15 [0294] Hydrogen chloride solution (5-6 M in 2-propanol, 2.4 mL, 12 mmol) was added at room temperature to a solution of tert-butyl 2-(4,5,6,7-tetrahydro-1H-[1,2,3]triazolo[4,5-c]pyridine-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate (208 mg, 553 μ mol) in 2-propanol (4 mL). After 3½ h the reaction mixture was evaporated, and the residue was taken up in ethyl acetate (5 mL) and ethanol (3 drops), then after 30 min the precipitate was collected by filtration and dried to produce the title compound (200 mg, 100%). White solid, MS: 313.5 (M+H)⁺.

Intermediate 5

3-Isopropyl-4-(2-oxo-2-(2,7-diazaspiro[3.5]nonan-7-yl)ethoxy)benzotrile

25 Step 1: tert-Butyl 7-(2-bromoacetyl)-2,7-diazaspiro[3.5]nonane-2-carboxylate

30 [0295] To a suspension of tert-butyl 2,7-diazaspiro[3.5]nonane-2-carboxylate (CAS-RN 236406-55-6; 500 mg, 2.21 mmol) and triethylamine (291 mg, 2.87 mmol) in dichloromethane (15 mL) was added 2-bromoacetyl chloride (348 mg, 2.21 mmol), then the reaction mixture was allowed to reach room temperature over 16 h and partitioned between ice water and ethyl acetate. The organic layer was washed with brine, dried over sodium sulfate, filtered, and evaporated. The crude material was purified by flash chromatography (silica gel; heptane-ethyl acetate gradient) to produce the title compound (531 mg, 68%). Light brown gum, MS: 247.4 (M-Me₃COCO+H)⁺.

Step 2: tert-Butyl 7-(2-(4-cyano-2-isopropylphenoxy)acetyl)-2,7-diazaspiro[3.5]nonane-2-carboxylate

35 [0296] Caesium carbonate (375 mg, 1.15 mmol) was added at room temperature to a solution of tert-butyl 7-(2-bromoacetyl)-2,7-diazaspiro[3.5]nonane-2-carboxylate (200 mg, 576 μ mol) and 4-hydroxy-3-isopropylbenzotrile (CAS-RN 46057-54-9; 92.8 mg, 576 μ mol) in N,N-dimethylformamide (5 mL). After 18 h the reaction mixture was partitioned between water and ethyl acetate, the organic layer was washed with brine, dried over sodium sulfate, filtered, and evaporated. The crude material was purified by flash chromatography (silica gel, heptane-ethyl acetate gradient) to produce the title compound (197 mg, 78%). White foam, MS: 372.6 (M-isobutene+H)⁺.

Step 3: 3-Isopropyl-4-(2-oxo-2-(2,7-diazaspiro[3.5]nonan-7-yl)ethoxy)benzotrile

45 [0297] Trifluoroacetic acid (500 mg, 4.4 mmol) was added dropwise to a solution of tert-butyl 7-(2-(4-cyano-2-isopropylphenoxy)acetyl)-2,7-diazaspiro[3.5]nonane-2-carboxylate (188 mg, 440 μ mol) in dichloromethane (5 mL). After 4 h the reaction mixture was basified with sat. aq. sodium hydrogencarbonate solution and extracted with ethyl acetate. The organic layer was washed with brine, dried over sodium sulfate, filtered, and evaporated to afford the title compound (69 mg, 47%). Light yellow foam, MS: 328.6 (M+H)⁺.

Intermediate 5.1

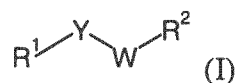
2-(4-Chloro-2-isopropylphenoxy)-1-(2,7-diazaspiro[3.5]nonan-7-yl)ethanone

55 [0298] The title compound was produced in analogy to intermediate 5, replacing 4-hydroxy-3-isopropylbenzotrile in step 2 by 4-chloro-2-isopropylphenol. Light yellow gum, MS: 337.5 (M+H)⁺.

Claims

1. Compounds of formula (I)

5



10

wherein

15

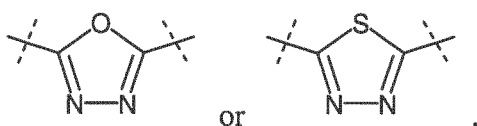
R¹ is alkyl, haloalkyl, cycloalkyl, substituted phenyl, substituted phenylalkyl, substituted phenoxyalkyl, substituted phenylcycloalkyl, substituted phenylalkenyl, substituted phenylalkynyl, substituted pyridinyl, substituted pyridinylalkyl, substituted pyridinylalkenyl, substituted pyridinylalkynyl, substituted thiophenyl, substituted thiophenylalkyl, substituted thiophenylalkenyl, substituted thiophenylalkynyl, substituted 2,3-dihydro-1H-indol-2-yl, substituted 1H-indol-2-yl or substituted benzofuran-2-yl, wherein substituted phenyl, substituted phenylalkyl, substituted phenoxyalkyl, substituted phenylcycloalkyl, substituted phenylalkenyl, substituted phenylalkynyl, substituted pyridinyl, substituted pyridinylalkyl, substituted pyridinylalkenyl, substituted pyridinylalkynyl, substituted thiophenyl, substituted thiophenylalkyl, substituted thiophenylalkenyl, substituted thiophenylalkynyl, substituted 2,3-dihydro-1H-indol-2-yl, substituted 1H-indol-2-yl and substituted benzofuran-2-yl are substituted with R⁸, R⁹ and R¹⁰

20

R² is $-(CR^4R^5)_n-R^3$, $-C(O)-R^3$, $-S(O)_2-R^3$ or $-C(O)-NR^6R^3$;

Y is $-OC(O)-$, $-NR^{14}C(O)-$, $-C(O)-$, $-S(O)_2-$,

25

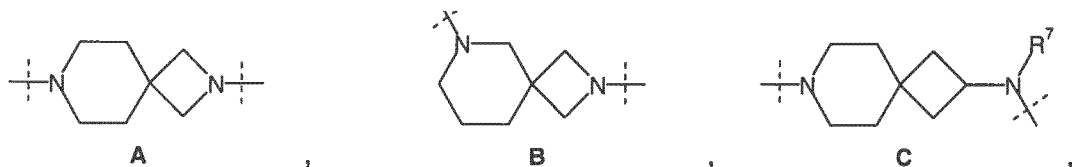


30

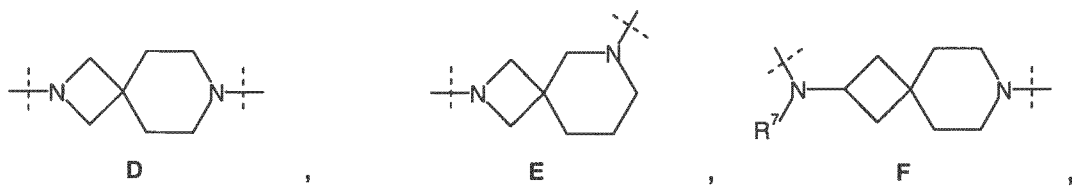
wherein in case R¹ is substituted phenylalkenyl, substituted pyridinylalkenyl or substituted thiophenylalkenyl, then Y is not $-OC(O)-$;

W is selected from one of the following ring systems: GB / 22.07.2015

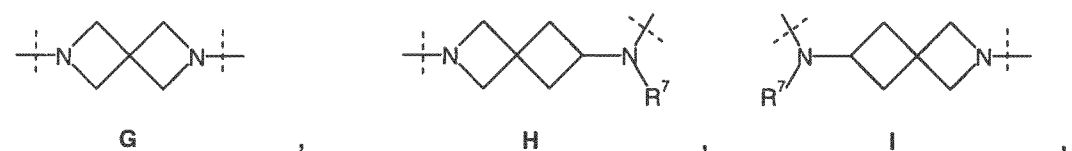
35



40



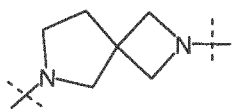
45



50

55

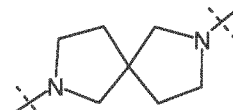
5



J



K

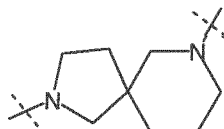


L

10



M



N

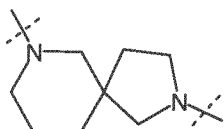


O

15



P



Q



R

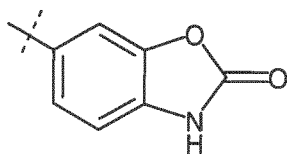
20

and

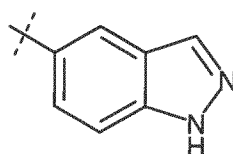
;

wherein in case W is the ring system O, then R² is -C(O)-NR⁶R³;
R³ is selected from the following groups

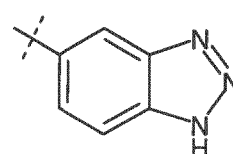
25



S

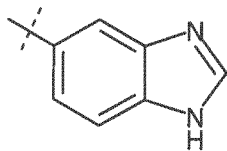


T

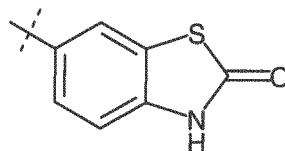


U

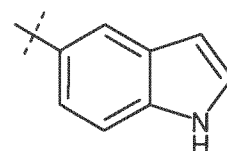
30



V



X

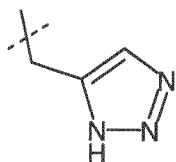


Z

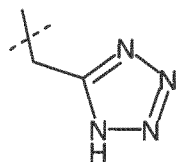
35

40

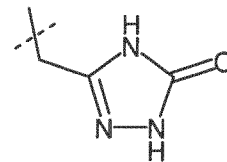
45



AA



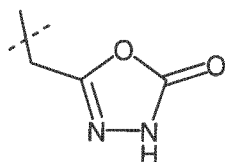
AB



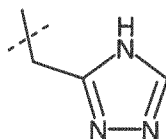
AC

50

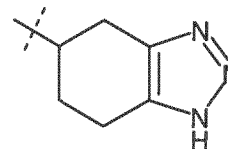
55



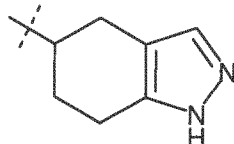
AD



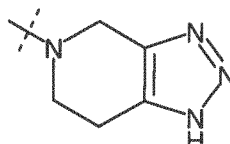
AE



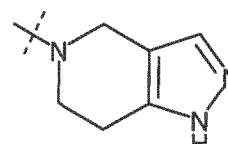
AF



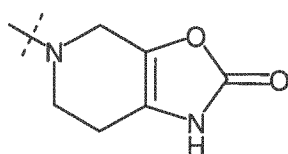
AG



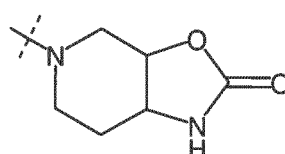
AH



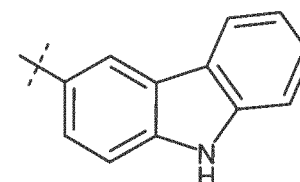
AI



AJ



AK



AL

R⁴ and R⁵ are independently selected from H, halogen, alkyl and cycloalkyl;

R⁶, R⁷ and R¹⁴ are independently selected from H, alkyl and cycloalkyl;

R⁸, R⁹, and R¹⁰ are independently selected from H, alkyl, hydroxyalkyl, haloalkyl, cycloalkyl, cycloalkylalkyl, cycloalkylalkoxy, cycloalkoxy, cycloalkoxyalkyl, cycloalkylalkoxyalkyl, alkoxy, alkoxyalkyl, haloalkoxy, haloalkoxyalkyl, alkoxyalkoxy, alkoxyalkoxyalkyl, halogen, hydroxy, cyano, alkylsulfonyl, cycloalkylsulfonyl, substituted aminosulfonyl, substituted amino and substituted aminoalkyl, wherein substituted aminosulfonyl, substituted amino and substituted aminoalkyl are substituted on the nitrogen atom with one to two substituents independently selected from hydrogen, alkyl, cycloalkyl, cycloalkylalkyl, hydroxyalkyl, alkoxyalkyl, alkylcarbonyl and cycloalkylcarbonyl;

n is zero, 1, 2 or 3;

or pharmaceutically acceptable salts.

2. A compound according to claim 1, wherein R¹ is substituted phenyl, substituted phenylalkyl, substituted phenoxyalkyl, substituted phenylcycloalkyl, substituted phenylalkenyl, substituted phenylalkynyl, substituted pyridinylalkyl, substituted thiophenylalkyl, substituted 2,3-dihydro-1H-isoindol-2-yl, substituted 1H-indol-2-yl or substituted benzofuran-2-yl, wherein substituted phenyl, substituted phenylalkyl, substituted phenoxyalkyl, substituted phenylcycloalkyl, substituted phenylalkenyl, substituted pyridinylalkyl, substituted thiophenylalkyl, substituted 2,3-dihydro-1H-isoindol-2-yl, substituted 1H-indol-2-yl and substituted benzofuran-2-yl are substituted with R⁸, R⁹ and R¹⁰.
3. A compound according to any one of claims 1 to 2, wherein R² is -C(O)-R³.
4. A compound according to any one of claims 1 to 3, wherein Y is -OC(O)- and R¹ is not substituted phenylalkenyl, substituted pyridinylalkenyl or substituted thiophenylalkenyl.
5. A compound according to any one of claims 1 to 4, wherein W is the ring system A.
6. A compound according to any one of claims 1 to 5, wherein R³ is selected from the groups S, U and AF.
7. A compound selected from

3,5-dichlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 4-chlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 3-chlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 5 1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3,5-dichlorophenyl)propan-1-one;
 1-(2-(4-amino-3-hydroxybenzoyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3,5-dichlorophenyl)propan-1-one;
 3,5-dichlorobenzyl 2-(4-amino-3-hydroxybenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 6-[(1H-benzotriazole-5-carbonyl)-amino]-2-aza-spiro[3.3]heptane-2-carboxylic acid benzyl ester;
 10 N-(2-(4-phenylbutanoyl)-2-azaspiro[3.3]heptan-6-yl)-1H-benzo[d][1,2,3]triazole-5-carboxamide;
 3-chloro-5-(methylsulfonyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 [2-(1H-benzotriazole-5-carbonyl)-2-aza-spiro[3.3]hept-6-yl]-carbamic acid benzyl ester;
 N-(2-(3-(3,5-dichlorophenyl)propanoyl)-2-azaspiro[3.3]heptan-6-yl)-1H-benzo[d][1,2,3]triazole-5-carboxamide;
 15 ide;
 [2-(1H-benzotriazole-5-carbonyl)-2-aza-spiro[3.3]hept-6-yl]-carbamic acid 3,5-dichloro-benzyl ester;
 6-[(1H-benzotriazole-5-carbonyl)-amino]-2-aza-spiro[3.3]heptane-2-carboxylic acid 3,5-dichloro-benzyl ester;
 3,5-dichlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,6-diazaspiro[3.4]octane-6-carboxylate;
 3,5-dichlorobenzyl 7-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-2-carboxylate;
 20 3,5-dichlorobenzyl 6-(4-amino-3-hydroxybenzamide)-2-azaspiro[3.3]heptane-2-carboxylate;
 3-chloro-5-(methylsulfonyl)benzyl 2-(4-sulfamoylbenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 3-chloro-5-(methylsulfonyl)benzyl 2-(3-sulfamoylbenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 3,5-dichlorobenzyl 8-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,8-diazaspiro[4.5]decane-2-carboxylate;
 25 3-fluoro-5-(trifluoromethoxy)benzyl 7-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[4.5]decane-2-carboxylate;
 (1H-benzotriazol-5-yl)-{7-[2-(3-chloro-phenyl)-ethanesulfonyl]-2,7-diaza-spiro[3.5]non-2-yl}-methanone;
 3,5-dichlorobenzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,6-diazaspiro[3.4]octane-6-carboxylate;
 3-chloro-5-(methylsulfonyl)benzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 30 7-(2-oxo-2,3-dihydro-benzooxazole-6-carbonyl)-2,7-diaza-spiro[3.5]nonane-2-carboxylic acid 3,5-dichloro-benzyl ester;
 3,5-dichlorobenzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-ylsulfonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 2-oxo-2,3-dihydro-benzooxazole-6-sulfonic acid [2-(4-phenyl-butyl)-2-aza-spiro[3.3]hept-6-yl]-amide;
 benzyl 6-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-sulfonamido)-2-azaspiro[3.3]heptane-2-carboxylate;
 35 2-oxo-2,3-dihydro-benzooxazole-6-sulfonic acid {2-[3-(3,5-dichloro-phenyl)-propionyl]-2-aza-spiro[3.3]hept-6-yl}-amide;
 3,5-dichlorobenzyl 6-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-sulfonamido)-2-azaspiro[3.3]heptane-2-carboxylate;
 [2-(2-oxo-2,3-dihydro-benzooxazole-6-sulfonyl)-2-aza-spiro[3.3]hept-6-yl]-carbamic acid 3,5-dichloro-benzyl ester;
 40 3-chloro-5-(methylsulfonyl)benzyl 2-(2-oxo-2,3-dihydrobenzo[d]thiazol-6-ylsulfonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 3,5-dichlorobenzyl 2-((2-oxo-2,3-dihydrobenzo[d]oxazol-6-yl)methyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 45 3,5-dichlorobenzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 6-(7-(3-(3,5-dichlorophenyl)propanoyl)-2,7-diazaspiro[3.5]nonane-2-carbonyl)benzo[d]oxazol-2(3H)-one;
 6-[(2-oxo-2,3-dihydro-benzooxazole-6-carbonyl)-amino]-2-aza-spiro[3.3]heptane-2-carboxylic acid 3,5-dichloro-benzyl ester;
 50 (E)-1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3,5-dichlorophenyl)prop-2-en-1-one;
 6-(7-(3-(3,5-dichlorophenyl)propanoyl)-7-azaspiro[3.5]nonan-2-ylamino)benzo[d]oxazol-2(3H)-one;
 1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-2-(3,5-dichlorophenoxy)ethanone;
 (2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)(3,5-dichlorophenyl)methanone;
 55 6-[7-((E)-3-(3,5-dichloro-phenyl)-acryloyl)-2,7-diaza-spiro[3.5]nonane-2-carbonyl]-3H-benzooxazol-2-one;
 (2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)(trans-2-(3,5-difluorophenyl)cyclopropyl)methanone;
 (7-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[4.4]nonan-2-yl)(5-chloro-1H-indol-2-yl)methanone;

EP 2 861 566 B1

(7-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[4.4]nonan-2-yl)(5-chlorobenzofuran-2-yl)methanone;
(E)-N-((1H-1,2,3-triazol-5-yl)methyl)-7-(3-(4-(trifluoromethoxy)phenyl)acryloyl)-7-azaspiro[3.5]nonane-2-carboxamide;
5 (1H-benzo[d][1,2,3]triazol-5-yl)(7-(5-(3,5-dichlorophenyl)-1,3,4-oxadiazol-2-yl)-2,7-diazaspiro[3.5]nonan-2-yl)methanone;
(1H-benzo[d][1,2,3]triazol-5-yl)(7-(5-(4-chlorophenyl)-1,3,4-oxadiazol-2-yl)-2,7-diazaspiro[3.5]nonan-2-yl)methanone;
10 (1H-benzo[d][1,2,3]triazol-5-yl)(7-(5-(4-chlorophenyl)-1,3,4-thiadiazol-2-yl)-2,7-diazaspiro[3.5]nonan-2-yl)methanone;
2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-N-(3,5-dichlorobenzyl)-2,7-diazaspiro[3.5]nonane-7-carboxamide;
(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)(5-chloroisindolin-2-yl)methanone;
benzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-ylamino)-7-azaspiro[3.5]nonane-7-carboxylate;
15 4-chloro-3-fluorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
(2,6-dichloropyridin-4-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
3,4-dichlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
(5,6-dichloropyridin-3-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
20 2,4-dichlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
(6-chloropyridin-3-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
4-chloro-3-(methylsulfonyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
25 1-(3,5-dichlorophenyl)ethyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
(5-chloropyridin-3-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
(5-bromopyridin-3-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
30 (4,6-dichloropyridin-2-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
3-chloro-4-fluorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
(5-chlorothiophen-3-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
35 thiophen-3-ylmethyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
(5-bromothiophen-3-yl)methyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
4-(trifluoromethyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
40 3,5-dichlorobenzyl 7-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[4.4]nonane-2-carboxylate;
2,4,6-trichlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
6-[(1H-benzotriazole-5-carbonyl)-amino]-2-aza-spiro[3.3]heptane-2-carboxylic acid 3-chloro-5-trifluoromethoxy-benzyl ester;
6-[(1H-benzotriazole-5-carbonyl)-amino]-2-aza-spiro[3.3]heptane-2-carboxylic acid 3-trifluoromethyl-benzyl ester;
45 6-[(1H-benzotriazole-5-carbonyl)-amino]-2-aza-spiro[3.3]heptane-2-carboxylic acid 3-chloro-5-cyano-benzyl ester;
6-[(1H-benzotriazole-5-carbonyl)-amino]-2-aza-spiro[3.3]heptane-2-carboxylic acid 3-chloro-4-fluoro-benzyl ester;
50 4-(trifluoromethyl)benzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
6-[(1H-benzotriazole-5-carbonyl)-amino]-2-aza-spiro[3.3]heptane-2-carboxylic acid 3-fluoro-5-trifluoromethyl-benzyl ester;
6-[(1H-benzotriazole-5-carbonyl)-amino]-2-aza-spiro[3.3]heptane-2-carboxylic acid 3-chloro-4-methyl-benzyl ester;
55 3-(methylsulfonyl)-5-(trifluoromethyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
3-(methylsulfonyl)-5-(trifluoromethyl)benzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diaza-

spiro[3.5]nonane-7-carboxylate;
 4-chloro-2-(methylsulfonyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 2-chloro-4-(methylsulfonyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 3,5-dichlorobenzyl 6-(1H-benzo[d][1,2,3]triazol-5-ylcarbamoyl)spiro[3.3]heptan-2-ylcarbamate;
 3-fluoro-5-(trifluoromethoxy)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[4.5]decane-7-carboxylate;
 3-chloro-5-(methylsulfonyl)benzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-ylsulfonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 2-[(3H-[1,2,3]triazol-4-ylmethyl)-carbamoyl]-7-aza-spiro[3.5]nonane-7-carboxylic acid 3,5-dichloro-benzyl ester;

and pharmaceutically acceptable salts thereof.

8. A compound selected from

4-(trifluoromethoxy)benzyl 2-(4-sulfamoylbenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 2-fluoro-4-(trifluoromethoxy)benzyl 2-(4-sulfamoylbenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(4-(trifluoromethoxy)phenyl)propan-1-one;
 3-isopropyl-4-(2-oxo-2-(2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)ethoxy)benzotriazole;
 1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-2-(4-chloro-2-isopropylphenoxy)ethanone;
 2-(4-chloro-2-isopropylphenoxy)-1-(2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)ethanone;
 1-(2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(4-(trifluoromethoxy)phenyl)propan-1-one;
 1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3-chlorophenyl)prop-2-yn-1-one;
 1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(4-chlorophenyl)prop-2-yn-1-one;
 3-fluoro-4-(trifluoromethoxy)benzyl 7-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-2-carboxylate;
 4-(trifluoromethoxy)benzyl 7-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-2-carboxylate;
 [4-(trifluoromethyl)phenyl]methyl 2-(3a,4,5,6,7,7a-hexahydro-1H-benzotriazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 [2-fluoro-4-(trifluoromethyl)phenyl]methyl 2-(4,5,6,7-tetrahydro-1H-benzotriazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 [2-methyl-4-(trifluoromethoxy)phenyl]methyl 2-(4,5,6,7-tetrahydro-1H-benzotriazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 2-fluoro-4-(2,2,2-trifluoroethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 4-(2,2,2-trifluoroethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 3-fluoro-4-(2,2,2-trifluoroethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 2-fluoro-4-(trifluoromethoxy)benzyl 7-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-2-carboxylate;
 2-fluoro-4-(trifluoromethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 4-(trifluoromethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 3-chloro-5-(trifluoromethyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 3-(methylsulfonyl)-5-(trifluoromethyl)benzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-ylsulfonyl)-2,7-diaza-

spiro[3.5]nonane-7-carboxylate;
 4-(trifluoromethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-[1,2,3]triazolo[4,5-c]pyridine-5-carbonyl)-2,7-diaza-
 spiro[3.5]nonane-7-carboxylate;
 2-fluoro-4-(trifluoromethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-[1,2,3]triazolo[4,5-c]pyridine-5-carbonyl)-2,7-diaza-
 spiro[3.5]nonane-7-carboxylate;
 [4-(trifluoromethoxy)phenyl]methyl 2-((1H-triazol-4-ylmethyl)carbamoyl)-2,7-diazaspiro[3.5]nonane-7-carboxy-
 late;
 [2-fluoro-4-(trifluoromethoxy)phenyl]methyl 2-((1H-triazol-4-ylmethyl)carbamoyl)-2,7-diazaspiro[3.5]nonane-7-
 carboxylate;
 (-)-2-fluoro-4-(trifluoromethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-
 spiro[3.5]nonane-7-carboxylate;
 (+)-2-fluoro-4-(trifluoromethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-
 spiro[3.5]nonane-7-carboxylate;
 [2-fluoro-4-(trifluoromethyl)phenyl]methyl 2-[4,5,6,7-tetrahydro-1H-benzotriazole-5-carbonyl]-2,7-diaza-
 spiro[3.5]nonane-7-carboxylate (enantiomer A);
 [2-fluoro-4-(trifluoromethyl)phenyl]methyl 2-[4,5,6,7-tetrahydro-1H-benzotriazole-5-carbonyl]-2,7-diaza-
 spiro[3.5]nonane-7-carboxylate (enantiomer B);

and pharmaceutically acceptable salts thereof.

9. A compound according to any one of claims 1 to 8, selected from

3,5-dichlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 3-chloro-5-(methylsulfonyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-car-
 boxylate;
 3-chloro-5-(methylsulfonyl)benzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]non-
 ane-7-carboxylate;
 3,5-dichlorobenzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxy-
 late;
 (E)-1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3,5-dichlorophenyl)prop-2-
 en-1-one;
 3-(methylsulfonyl)-5-(trifluoromethyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]non-
 ane-7-carboxylate;
 [2-methyl-4-(trifluoromethoxy)phenyl]methyl 2-(4,5,6,7-tetrahydro-1H-benzotriazole-5-carbonyl)-2,7-diaza-
 spiro[3.5]nonane-7-carboxylate;
 (+)-2-fluoro-4-(trifluoromethoxy)benzyl 2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-
 spiro[3.5]nonane-7-carboxylate;

and pharmaceutically acceptable salts thereof.

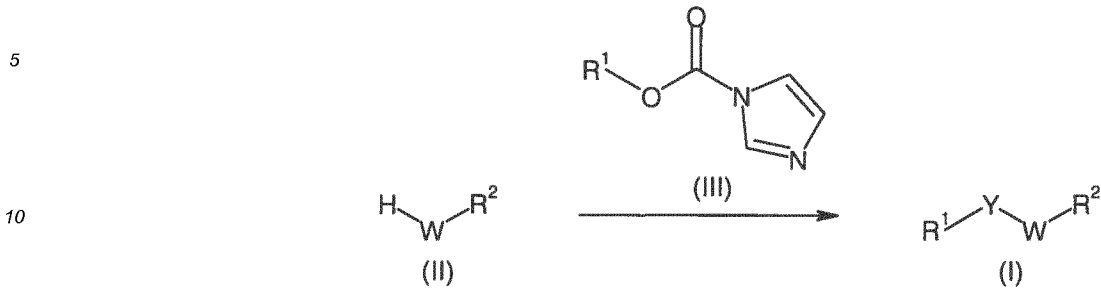
10. A compound according to any one of claims 1 to 6 and 8, selected from

3,5-dichlorobenzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate;
 3-chloro-5-(methylsulfonyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-car-
 boxylate;
 3-chloro-5-(methylsulfonyl)benzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]non-
 ane-7-carboxylate;
 3,5-dichlorobenzyl 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxy-
 late;
 (E)-1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3,5-dichlorophenyl)prop-2-
 en-1-one;
 3-(methylsulfonyl)-5-(trifluoromethyl)benzyl 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]non-
 ane-7-carboxylate;

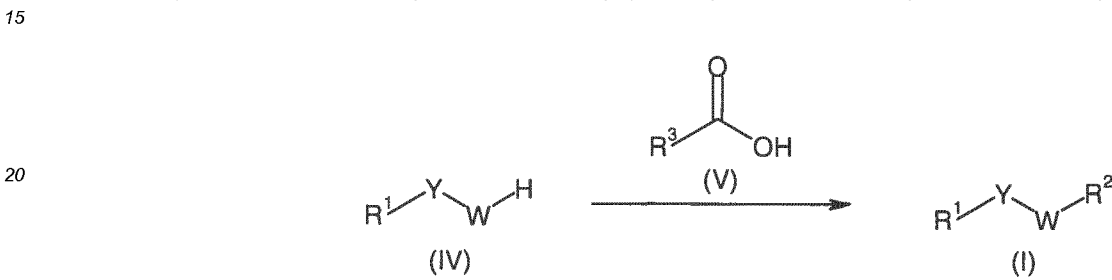
and pharmaceutically acceptable salts thereof.

11. A process to prepare a compound according to any one of claims 1 to 10 comprising

a) the reaction of a compound of formula (II) in the presence of a compound of formula (III); or



b) the reaction of a compound of formula (IV) in the presence of a compound of formula (V);



25 wherein in step a) R¹, R² and W are as defined in claim 1, Y is -C(O)-, and wherein in step b) R¹ and Y are as defined in claim, W is A, B, C, D, E, F, G, H, I, J, K, L, M, N, P or Q and R² is -C(O)-R³.

12. A compound according to any one of claims 1 to 10 for use as therapeutically active substance.

30 13. A pharmaceutical composition comprising a compound according to any one of claims 1 to 10 and a therapeutically inert carrier.

35 14. A compound according to any one of claims 1 to 10 for use in the treatment or prophylaxis of renal conditions, liver conditions, inflammatory conditions, conditions of the nervous system, fibrotic diseases and acute and chronic organ transplant rejection.

15. A compound according to any one of claims 1 to 10, when manufactured according to a process of claim 11.

40 **Patentansprüche**

1. Verbindungen der Formel (I)



wobei

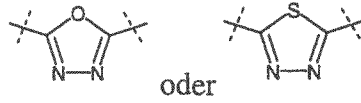
50 R¹ Alkyl, Halogenalkyl, Cycloalkyl, substituiertes Phenyl, substituiertes Phenylalkyl, substituiertes Phenoxyalkyl, substituiertes Phenylcycloalkyl, substituiertes Phenylalkenyl, substituiertes Phenylalkinyl, substituiertes Pyridinyl, substituiertes Pyridinylalkyl, substituiertes Pyridinylalkenyl, substituiertes Pyridinylalkinyl, substituiertes Thiophenyl, substituiertes Thiophenylalkyl, substituiertes Thiophenylalkenyl, substituiertes Thiophenylalkinyl, substituiertes 2,3-Dihydro-1H-indol-2-yl, substituiertes 1H-Indol-2-yl oder substituiertes Benzofuran-2-yl ist, wobei substituiertes Phenyl, substituiertes Phenylalkyl, substituiertes Phenoxyalkyl, substituiertes Phenylcycloalkyl, substituiertes Phenylalkenyl, substituiertes Phenylalkinyl, substituiertes Pyridinyl, substituiertes Pyridinylalkyl, substituiertes Pyridinylalkenyl, substituiertes Pyridinylalkinyl, substituiertes Thiophenyl, substituiertes Thiophenylalkyl, substituiertes Thiophenylalkenyl, substituiertes Thiophenylalkinyl, substituiertes 2,3-Dihydro-1H-

55

EP 2 861 566 B1

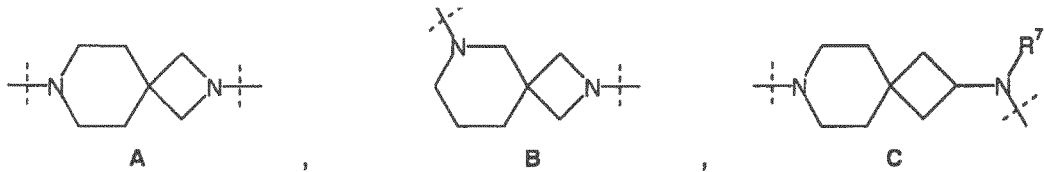
isoindol-2-yl, substituiertes 1H-Indol-2-yl und substituiertes Benzofuran-2-yl mit R⁸, R⁹ und R¹⁰ substituiert sind;
 R² für -(CR⁴R⁵)_n-R³, -C(O)-R³, -S(O)₂-R³ oder -C(O)-NR⁶R³ steht;
 Y für -OC(O)-, -NR¹⁴C(O)-, -C(O)-, -S(O)₂-,

5

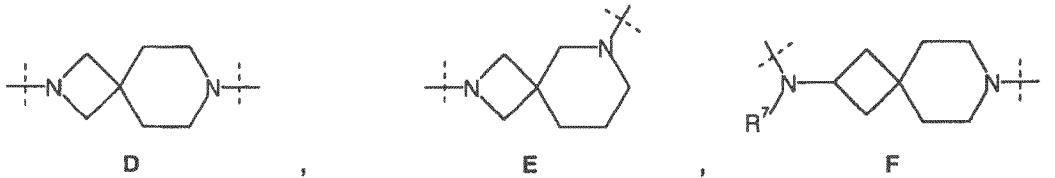


steht, wobei für den Fall, dass R¹ substituiertes Phenylalkenyl, substituiertes Pyridinylalkenyl oder substituiertes Thiophenylalkenyl ist, Y nicht -OC(O)- ist;
 W ausgewählt ist aus einem der folgenden Ringsysteme:

15

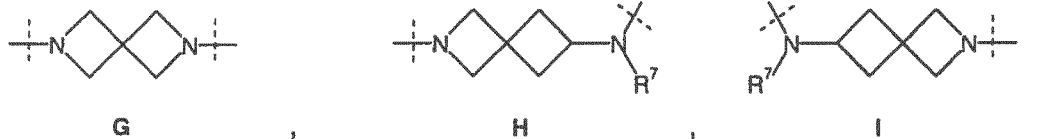


20



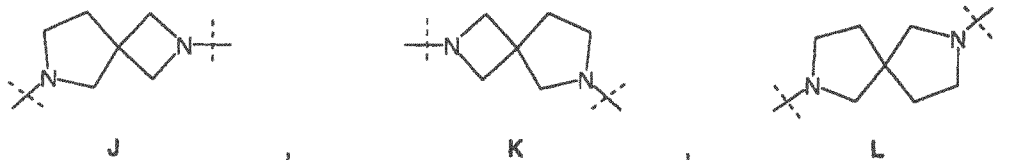
25

30

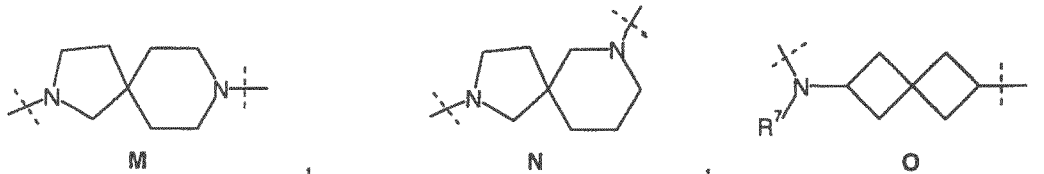


35

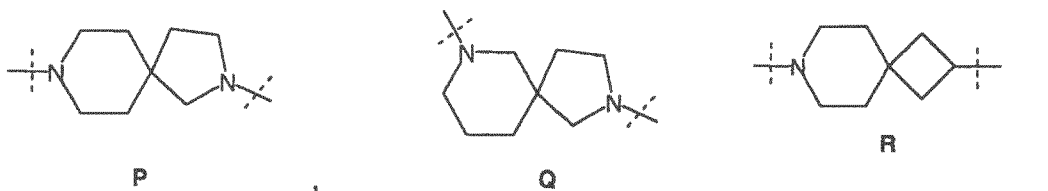
40



45



50



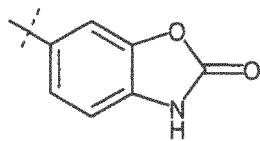
55

und

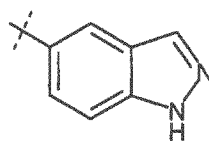
EP 2 861 566 B1

wobei für den Fall, dass W das Ringsystem O darstellt, R² gleich -C(O)-NR⁶R³ ist;
R³ ausgewählt ist aus den folgenden Gruppen

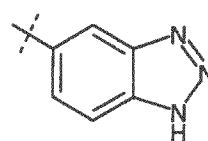
5



S

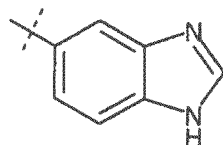


T

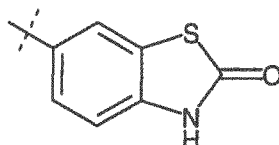


U

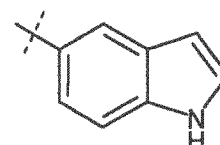
10



V



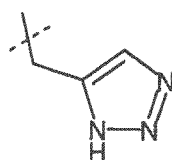
X



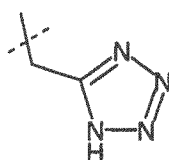
Z

15

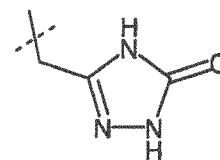
20



AA



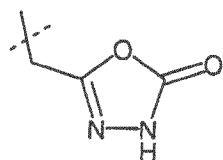
AB



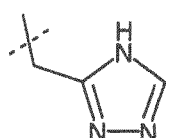
AC

25

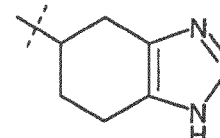
30



AD



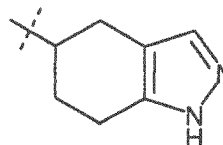
AE



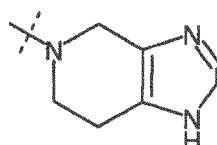
AF

35

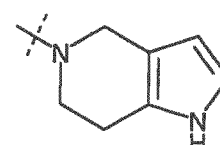
40



AG



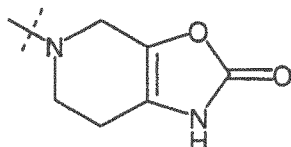
AH



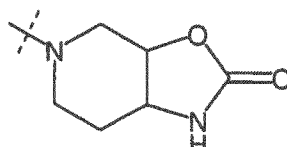
AI

45

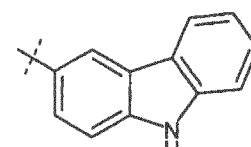
50



AJ



AK



AL

55

und

R⁴ und R⁵ unabhängig ausgewählt sind aus H, Halogen, Alkyl und Cycloalkyl;

EP 2 861 566 B1

R⁶, R⁷ und R¹⁴ unabhängig ausgewählt sind aus H, Alkyl und Cycloalkyl;

R⁸, R⁹ und R¹⁰ unabhängig ausgewählt sind aus H, Alkyl, Hydroxalkyl, Halogenalkyl, Cycloalkyl, Cycloalkylalkyl, Cycloalkylalkoxy, Cycloalkoxy, Cycloalkoxyalkyl, Cycloalkylalkoxyalkyl, Alkoxy, Alkoxyalkyl, Halogenalkoxy, Halogenalkoxyalkyl, Alkoxyalkoxy, Alkoxyalkoxyalkyl, Halogen, Hydroxy, Cyano, Alkylsulfonyl, Cycloalkylsulfonyl, substituiertem Aminosulfonyl, substituiertem Amino und substituiertem Aminoalkyl, wobei substituiertes Aminosulfonyl, substituiertes Amino und substituiertes Aminoalkyl an dem Stickstoffatom mit ein bis zwei Substituenten unabhängig ausgewählt aus Wasserstoff, Alkyl, Cycloalkyl, Cycloalkylalkyl, Hydroxyalkyl, Alkoxyalkyl, Alkylcarbonyl und Cycloalkylcarbonyl substituiert sind;

n null, 1, 2 oder 3 ist;

oder pharmazeutisch verträgliche Salze.

2. Eine Verbindung gemäß Anspruch 1, wobei R¹ substituiertes Phenyl, substituiertes Phenylalkyl, substituiertes Phenoxyalkyl, substituiertes Phenylcycloalkyl, substituiertes Phenylalkenyl, substituiertes Phenylalkinyl, substituiertes Pyridinylalkyl, substituiertes Thiophenylalkyl, substituiertes 2,3-Dihydro-1H-isoindol-2-yl, substituiertes 1H-Indol-2-yl oder substituiertes Benzofuran-2-yl ist, wobei substituiertes Phenyl, substituiertes Phenylalkyl, substituiertes Phenoxyalkyl, substituiertes Phenylcycloalkyl, substituiertes Phenylalkenyl, substituiertes Pyridinylalkyl, substituiertes Thiophenylalkyl, substituiertes 2,3-Dihydro-1H-isoindol-2-yl, substituiertes 1H-Indol-2-yl und substituiertes Benzofuran-2-yl mit R⁸, R⁹ und R¹⁰ substituiert sind.

3. Eine Verbindung gemäß einem der Ansprüche 1 bis 2, wobei R² für -C(O)-R³ steht.

4. Eine Verbindung gemäß einem der Ansprüche 1 bis 3, wobei Y für -OC(O)- steht und R¹ kein substituiertes Phenylalkenyl, substituiertes Pyridinylalkenyl oder substituiertes Thiophenylalkenyl darstellt.

5. Eine Verbindung gemäß einem der Ansprüche 1 bis 4, wobei W das Ringsystem A ist.

6. Eine Verbindung gemäß einem der Ansprüche 1 bis 5, wobei R³ ausgewählt ist aus den Gruppen S, U und AF.

7. Eine Verbindung ausgewählt aus

3,5-Dichlorbenzyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;

Benzyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;

4-Chlorbenzyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;

3-Chlorbenzyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;

1-(2-(1H-Benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3,5-dichlorphenyl)propan-1-on;

1-(2-(4-Amino-3-hydroxybenzoyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3,5-dichlorphenyl)propan-1-on;

3,5-Dichlorbenzyl-2-(4-amino-3-hydroxybenzoyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;

6-[(1H-Benzotriazol-5-carbonyl)-amino]-2-aza-spiro[3.3]heptan-2-carbonsäurebenzyl ester;

N-(2-(4-Phenylbutanoyl)-2-azaspiro[3.3]heptan-6-yl)-1H-benzo[d][1,2,3]triazol-5-carboxamid;

3-Chlor-5-(methylsulfonyl)benzyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;

[2-(1H-Benzotriazol-5-carbonyl)-2-aza-spiro[3.3]hept-6-yl]-carbaminsäurebenzylester;

N-(2-(3-(3,5-Dichlorphenyl)propanoyl)-2-azaspiro[3.3]heptan-6-yl)-1H-benzo[d][1,2,3]triazol-5-carboxamid;

[2-(1H-Benzotriazol-5-carbonyl)-2-aza-spiro[3.3]hept-6-yl]-carbaminsäure-3,5-dichlorbenzylester;

6-[(1H-Benzotriazol-5-carbonyl)-amino]-2-aza-spiro[3.3]heptan-2-carbonsäure-3,5-dichlorbenzylester;

3,5-Dichlorbenzyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,6-diazaspiro[3.4]oktan-6-carboxylat;

3,5-Dichlorbenzyl-7-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-2-carboxylat;

3,5-Dichlorbenzyl-6-(4-amino-3-hydroxybenzamido)-2-azaspiro[3.3]heptan-2-carboxylat;

3-Chlor-5-(methylsulfonyl)benzyl-2-(4-sulfamoylbenzoyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;

3-Chlor-5-(methylsulfonyl)benzyl-2-(3-sulfamoylbenzoyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;

3,5-Dichlorbenzyl-8-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,8-diazaspiro[4.5]decan-2-carboxylat;

3-Fluor-5-(trifluormethoxy)benzyl-7-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[4.5]decan-2-carboxylat;

(1H-Benzotriazol-5-yl)-{7-[2-(3-chlorphenyl)ethansulfonyl]-2,7-diaza-spiro[3.5]non-2-yl}-methanon;

3,5-Dichlorbenzyl-2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-carbonyl)-2,6-diazaspiro[3.4]oktan-6-carboxylat;

3-Chlor-5-(methylsulfonyl)benzyl-2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;

7-(2-Oxo-2,3-dihydro-benzooxazol-6-carbonyl)-2,7-diaza-spiro[3.5]nonan-2-carbon-säure-3,5-dichlor-benzy-
 lester;
 3,5-Dichlorbenzyl-2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-ylsulfonyl)-2,7-diazaspiro-[3.5]nonan-7-carboxylat;
 2-Oxo-2,3-dihydro-benzooxazol-6-sulfonsäure-[2-(4-phenyl-butryl)-2-aza-spiro[3.3]hept-6-yl]-amid;
 5 Benzyl-6-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-sulfonamido)-2-azaspiro[3.3]heptan-2-carboxylat;
 2-Oxo-2,3-dihydro-benzooxazol-6-sulfonsäure-[2-[3-(3,5-dichlor-phenyl)-propionyl]-2-aza-spiro[3.3]hept-6-
 yl]-amid;
 3,5-Dichlorbenzyl-6-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-sulfonamido)-2-azaspiro-[3.3]heptan-2-carboxylat;
 10 [2-(2-Oxo-2,3-dihydro-benzooxazol-6-sulfonyl)-2-aza-spiro[3.3]hept-6-yl]-carbamid-säure-3,5-dichlor-benzy-
 lester;
 3-Chlor-5-(methylsulfonyl)benzyl-2-(2-oxo-2,3-dihydrobenzo[d]thiazol-6-ylsulfonyl)-2,7-diazaspiro[3.5]nonan-
 7-carboxylat;
 3,5-Dichlorbenzyl-2-((2-oxo-2,3-dihydrobenzo[d]oxazol-6-yl)methyl)-2,7-diazaspiro-[3.5]nonan-7-carboxylat;
 3,5-Dichlorbenzyl-2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-carbonyl)-2,7-diazaspiro-[3.5]nonan-7-carboxylat;
 15 6-(7-(3-(3,5-Dichlorphenyl)propanoyl)-2,7-diazaspiro[3.5]nonan-2-carbonyl)benzo[d]-oxazol-2(3H)-on;
 6-[(2-Oxo-2,3-dihydro-benzooxazol-6-carbonyl)-amino]-2-aza-spiro[3.3]heptan-2-carbonsäure-3,5-dichlor-
 benzylester;
 (E)-1-(2-(1H-Benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3,5-dichlorphenyl)prop-2-en-
 1-on;
 20 6-(7-(3-(3,5-Dichlorphenyl)propanoyl)-7-azaspiro[3.5]nonan-2-ylamino)benzo[d]oxazol-2(3H)-on;
 1-(2-(1H-Benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-2-(3,5-dichlorphenoxy)ethanon;
 (2-(1H-Benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)(3,5-dichlor-phenyl)methanon;
 6-{7-[(E)-3-(3,5-Dichlor-phenyl)-acryloyl]-2,7-diaza-spiro[3.5]nonan-2-carbonyl}-3H-benzooxazol-2-on;
 (2-(1H-Benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)(trans-2-(3,5-difluorphenyl)cyclopro-
 25 pyl)methanon;
 (7-(1H-Benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[4.4]nonan-2-yl)(5-chlor-1H-indol-2-yl)methanon;
 (7-(1H-Benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[4.4]nonan-2-yl)(5-chlorbenzo-furan-2-yl)methanon;
 (E)-N-((1H-1,2,3-Triazol-5-yl)methyl)-7-(3-(4-(trifluormethoxy)phenyl)acryloyl)-7-azaspiro[3.5]nonan-2-carbo-
 xamid;
 30 (1H-Benzo[d][1,2,3]triazol-5-yl)(7-(5-(3,5-dichlorphenyl)-1,3,4-oxadiazol-2-yl)-2,7-diazaspiro[3.5]nonan-2-
 yl)methanon;
 (1H-Benzo[d][1,2,3]triazol-5-yl)(7-(5-(4-chlorphenyl)-1,3,4-oxadiazol-2-yl)-2,7-diazaspiro[3.5]nonan-2-yl)me-
 thanon;
 (1H-Benzo[d][1,2,3]triazol-5-yl)(7-(5-(4-chlorphenyl)-1,3,4-thiadiazol-2-yl)-2,7-diazaspiro[3.5]nonan-2-yl)me-
 35 thanon;
 2-(1H-Benzo[d][1,2,3]triazol-5-carbonyl)-N-(3,5-dichlorbenzyl)-2,7-diazaspiro-[3.5]nonan-7-carboxamid;
 (2-(1H-Benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)(5-chloriso-indolin-2-yl)methanon;
 Benzyl-2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-ylamino)-7-azaspiro[3.5]nonan-7-carboxylat;
 4-Chlor-3-fluorbenzyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro-[3.5]nonan-7-carboxylat;
 40 (2,6-Dichlorpyridin-4-yl)methyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxy-
 lat;
 3,4-Dichlorbenzyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
 (5,6-Dichlorpyridin-3-yl)methyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diaza-spiro[3.5]nonan-7-carboxy-
 45 lat;
 2,4-Dichlorbenzyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
 (6-Chlorpyridin-3-yl)methyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diaza-spiro[3.5]nonan-7-carboxylat;
 4-Chlor-3-(methylsulfonyl)benzyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diaza-spiro[3.5]nonan-7-carbo-
 xylat;
 1-(3,5-Dichlorphenyl)ethyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diaza-spiro[3.5]nonan-7-carboxylat;
 50 (5-Chlorpyridin-3-yl)methyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diaza-spiro[3.5]nonan-7-carboxylat;
 (5-Brompyridin-3-yl)methyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diaza-spiro[3.5]nonan-7-carboxylat;
 (4,6-Dichlorpyridin-2-yl)methyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diaza-spiro[3.5]nonan-7-carboxy-
 lat;
 3-Chlor-4-fluorbenzyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro-[3.5]nonan-7-carboxylat;
 55 (5-Chlorthiophen-3-yl)methyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diaza-spiro[3.5]nonan-7-carboxylat;
 Thiophen-3-ylmethyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diaza-spiro[3.5]nonan-7-carboxylat;
 (5-Bromthiophen-3-yl)methyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diaza-spiro[3.5]nonan-7-carboxylat;
 4-(Trifluormethyl)benzyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diaza-spiro[3.5]nonan-7-carboxylat;

EP 2 861 566 B1

3,5-Dichlorbenzyl-7-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[4.4]nonan-2-carboxylat;
2,4,6-Trichlorbenzyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
6-[(1H-Benzotriazol-5-carbonyl)-amino]-2-aza-spiro[3.3]heptan-2-carbonsäure-3-chlor-5-trifluormethoxy-benzylester;
5 6-[(1H-Benzotriazol-5-carbonyl)-amino]-2-aza-spiro[3.3]heptan-2-carbonsäure-3-trifluor-methyl-benzylester;
6-[(1H-Benzotriazol-5-carbonyl)-amino]-2-aza-spiro[3.3]heptan-2-carbonsäure-3-chlor-5-cyano-benzylester;
6-[(1H-Benzotriazol-5-carbonyl)-amino]-2-aza-spiro[3.3]heptan-2-carbonsäure-3-chlor-4-fluor-benzylester;
4-(Trifluormethyl)benzyl-2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
10 6-[(1H-Benzotriazol-5-carbonyl)-amino]-2-aza-spiro[3.3]heptan-2-carbonsäure-3-fluor-5-trifluormethyl-benzylester;
6-[(1H-Benzotriazol-5-carbonyl)-amino]-2-aza-spiro[3.3]heptan-2-carbonsäure-3-chlor-4-methyl-benzylester;
3-(Methylsulfonyl)-5-(trifluormethyl)benzyl-2-(1H-benzo[d][1,2,3-triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
15 3-(Methylsulfonyl)-5-(trifluormethyl)benzyl-2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
4-Chlor-2-(methylsulfonyl)benzyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
2-Chlor-4-(methylsulfonyl)benzyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
20 3,5-Dichlorbenzyl-6-(1H-benzo[d][1,2,3]triazol-5-ylcarbamoyl)spiro[3.3]heptan-2-ylcarbamoyl;
3-Fluor-5-(trifluormethoxy)benzyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[4.5]decan-7-carboxylat;
3-Chlor-5-(methylsulfonyl)benzyl-2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-ylsulfonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
25 2-[(3H-[1,2,3]Triazol-4-ylmethyl)-carbamoyl]-7-aza-spiro[3.5]nonan-7-carbonsäure-3,5-dichlor-benzylester;

und pharmazeutisch verträgliche Salze davon.

30 8. Eine Verbindung ausgewählt aus

4-(Trifluormethoxy)benzyl-2-(4-sulfamoylbenzoyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
2-Fluor-4-(trifluormethoxy)benzyl-2-(4-sulfamoylbenzoyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
1-(2-(1H-Benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(4-(trifluormethoxy)phenyl)propan-1-on;
35 3-Isopropyl-4-(2-oxo-2-(2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)ethoxy)benzimidazol;
1-(2-(1H-Benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-2-(4-chlor-2-isopropylphenoxy)ethanon;
40 2-(4-Chlor-2-isopropylphenoxy)-1-(2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)ethanon;
1-(2-(4,5,6,7-Tetrahydro-1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(4-(trifluormethoxy)phenyl)propan-1-on;
1-(2-(1H-Benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3-chlorphenyl)prop-2-in-1-on;
45 1-(2-(1H-Benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(4-chlorphenyl)prop-2-in-1-on;
3-Fluor-4-(trifluormethoxy)benzyl-7-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-2-carboxylat;
4-(Trifluormethoxy)benzyl-7-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-2-carboxylat;
50 [4-(Trifluormethyl)phenyl]methyl-2-(3a,4,5,6,7,7a-hexahydro-1H-benzotriazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
[2-Fluor-4-(trifluormethyl)phenyl]methyl-2-(4,5,6,7-tetrahydro-1H-benzotriazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
[2-Methyl-4-(trifluormethoxy)phenyl]methyl-2-(4,5,6,7-tetrahydro-1H-benzotriazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
55 2-Fluor-4-(2,2,2-trifluoroethoxy)benzyl-2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-6-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
4-(2,2,2-Trifluoroethoxy)benzyl-2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-6-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;

EP 2 861 566 B1

- ro[3.5]nonan-7-carboxylat;
3-Fluor-4-(2,2,2-trifluoroethoxy)benzyl-2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-6-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
2-Fluor-4-(trifluormethoxy)benzyl-7-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-2-carboxylat;
2-Fluor-4-(trifluormethoxy)benzyl-2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
4-(Trifluormethoxy)benzyl-2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
3-Chlor-5-(trifluormethyl)benzyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
3-(Methylsulfonyl)-5-(trifluormethyl)benzyl-2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-ylsulfonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
4-(Trifluormethoxy)benzyl-2-(4,5,6,7-tetrahydro-1H-[1,2,3]triazolo[4,5-c]pyridin-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
2-Fluor-4-(trifluormethoxy)benzyl-2-(4,5,6,7-tetrahydro-1H-[1,2,3]triazolo[4,5-c]-pyridin-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
[4-(Trifluormethoxy)phenyl]methyl-2-((1H-triazol-4-ylmethyl)carbamoyl)-2,7-diaza-spiro[3.5]nonan-7-carboxylat;
[2-Fluor-4-(trifluormethoxy)phenyl]methyl-2-((1H-triazol-4-ylmethyl)carbamoyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
(-)-2-Fluor-4-(trifluormethoxy)benzyl-2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
(+)-2-Fluor-4-(trifluormethoxy)benzyl-2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
[2-Fluor-4-(trifluormethyl)phenyl]methyl-2-[4,5,6,7-tetrahydro-1H-benzotriazol-5-carbonyl]-2,7-diazaspiro[3.5]nonan-7-carboxylat (Enantiomer A);
[2-Fluor-4-(trifluormethyl)phenyl]methyl-2-[4,5,6,7-tetrahydro-1H-benzotriazol-5-carbonyl]-2,7-diazaspiro[3.5]nonan-7-carboxylat (Enantiomer B);

und pharmazeutisch verträgliche Salze davon.

9. Eine Verbindung gemäß einem der Ansprüche 1 bis 8, ausgewählt aus

- 3,5-Dichlorbenzyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
3-Chlor-5-(methylsulfonyl)benzyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
3-Chlor-5-(methylsulfonyl)benzyl-2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
3,5-Dichlorbenzyl-2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
(E)-1-(2-(1H-Benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3,5-dichlorphenyl)prop-2-en-1-on;
3-(Methylsulfonyl)-5-(trifluormethyl)benzyl-2-(1H-benzo[d][1,2,3-triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
[2-Methyl-4-(trifluormethoxy)phenyl]methyl-2-(4,5,6,7-tetrahydro-1H-benzotriazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
(+)-2-Fluor-4-(trifluormethoxy)benzyl-2-(4,5,6,7-tetrahydro-1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;

und pharmazeutisch verträgliche Salze davon.

10. Eine Verbindung gemäß einem der Ansprüche 1 bis 6 und 8, ausgewählt aus

- 3,5-Dichlorbenzyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
3-Chlor-5-(methylsulfonyl)benzyl-2-(1H-benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;
3-Chlor-5-(methylsulfonyl)benzyl-2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-carbonyl)-2,7-diazaspiro[3.5]nonan-7-carboxylat;

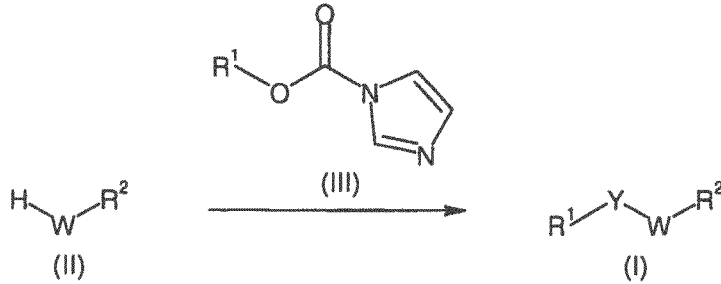
EP 2 861 566 B1

3,5-Dichlorbenzyl-2-(2-oxo-2,3-dihydrobenzo[d]oxazol-6-carbonyl)-2,7-diazaspiro-[3.5]nonan-7-carboxylat;
(E)-1-(2-(1H-Benzo[d][1,2,3]triazol-5-carbonyl)-2,7-diazaspiro[3.5]nonan-7-yl)-3-(3,5-dichlorphenyl)prop-2-en-1-on;
3-(Methylsulfonyl)-5-(trifluormethyl)benzyl-2-(1H-benzo[d][1,2,3-triazol-5-carbonyl) 2,7-diazaspiro[3.5]nonan-7-carboxylat;

und pharmazeutisch verträgliche Salze davon.

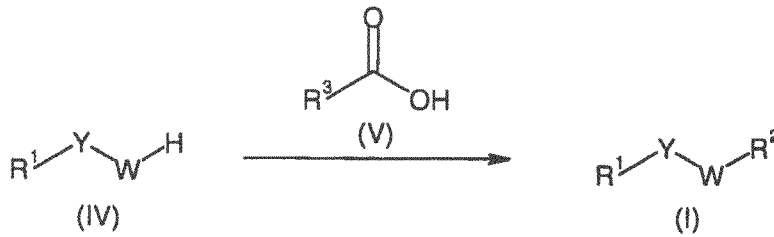
11. Ein Verfahren zur Herstellung einer Verbindung gemäß einem der Ansprüche 1 bis 10, umfassend

a) die Umsetzung einer Verbindung der Formel (II) in Gegenwart einer Verbindung der Formel (III);



oder

b) die Umsetzung einer Verbindung der Formel (IV) in Gegenwart einer Verbindung der Formel (V);



wobei in Schritt a) R¹, R² und W wie in Anspruch 1 definiert sind, Y für -C(O)- steht und wobei in Schritt b) R¹ und Y wie in Anspruch definiert sind, W für A, B, C, D, E, F, G, H, I, J, K, L, M, N, P oder Q steht und R² für -C(O)-R³ steht.

12. Eine Verbindung gemäß einem der Ansprüche 1 bis 10 zur Verwendung als therapeutischer Wirkstoff.

13. Ein Arzneimittel, umfassend eine Verbindung gemäß einem der Ansprüche 1 bis 10 und einen therapeutisch inerten Träger.

14. Eine Verbindung gemäß einem der Ansprüche 1 bis 10 zur Verwendung bei der Behandlung oder Vorbeugung von Nierenzuständen, Leberzuständen, entzündlichen Zuständen, Zuständen des Nervensystems, fibrotischen Erkrankungen und akuter und chronischer Organtransplantatabstoßung.

15. Eine Verbindung gemäß einem der Ansprüche 1 bis 10, wenn gemäß dem Verfahren nach Anspruch 11 hergestellt.

Revendications

1. Composés de formule (I)

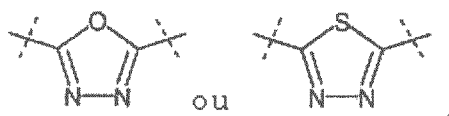


dans laquelle :

R¹ représente un groupe alkyle, halogénoalkyle, cycloalkyle, phényle substitué, phénylalkyle substitué, phénoxyalkyle substitué, phénylcycloalkyle substitué, phénylalcényle substitué, phénylalcynyle substitué, pyridinyle substitué, pyridinylalkyle substitué, pyridinylalcényle substitué, pyridinylalcynyle substitué, thiophényle substitué, thiophénylalkyle substitué, thiophénylalcényle substitué, thiophénylalcynyle substitué, 2,3-dihydro-1H-isoindeole-2-yle substitué, 1H-indole-2-yle substitué ou benzofurane-2-yle substitué, lesdits groupes phényle substitué, phénylalkyle substitué, phénoxyalkyle substitué, phénylcycloalkyle substitué, phénylalcényle substitué, phénylalcynyle substitué, pyridinyle substitué, pyridinylalkyle substitué, pyridinylalcényle substitué, pyridinylalcynyle substitué, thiophényle substitué, thiophénylalkyle substitué, thiophénylalcényle substitué, thiophénylalcynyle substitué, 2,3-dihydro-1H-isoindeole-2-yle substitué, 1H-indole-2-yle substitué et benzofurane-2-yle substitué étant substitués avec R⁸, R⁹ et R¹⁰;

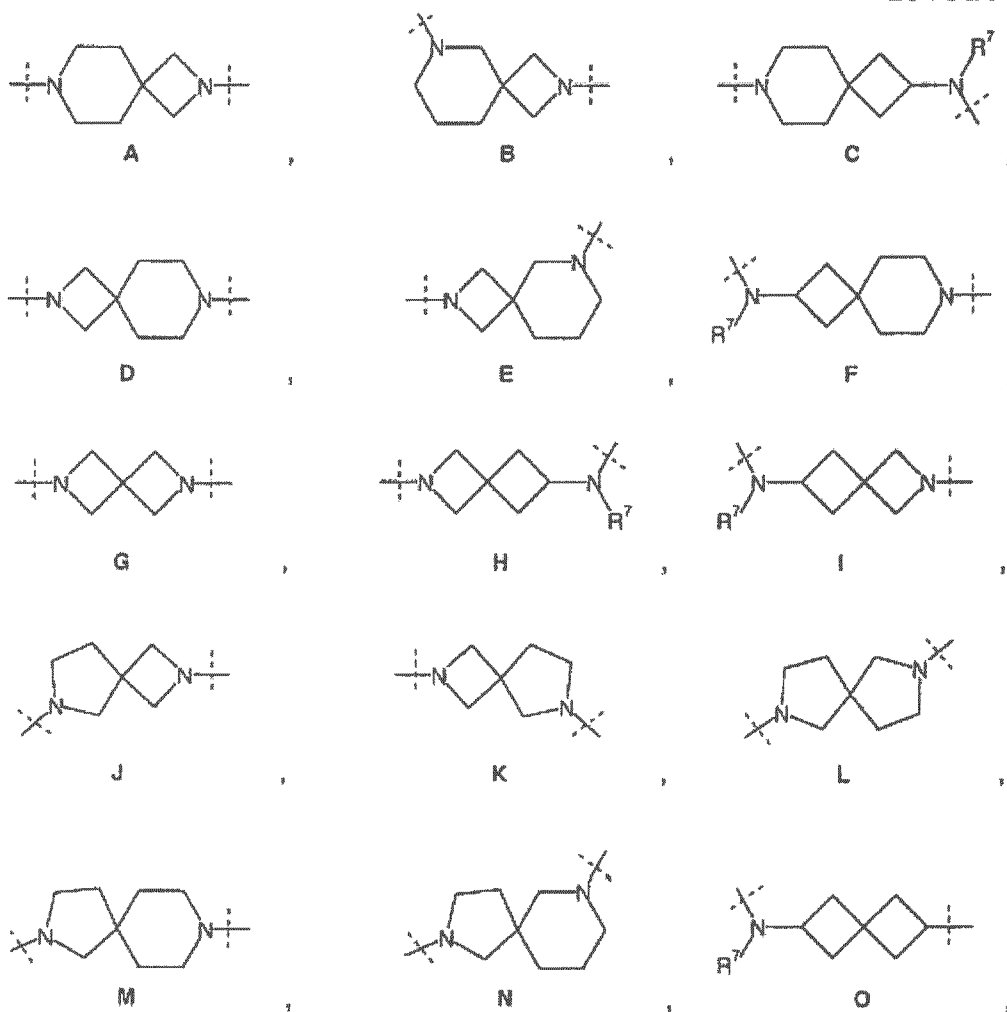
R² représente un groupe -(CR⁴R⁵)_n-R³, C(O)-R³, -S(O)₂-R³ ou -C(O)-NR⁶R³ ;

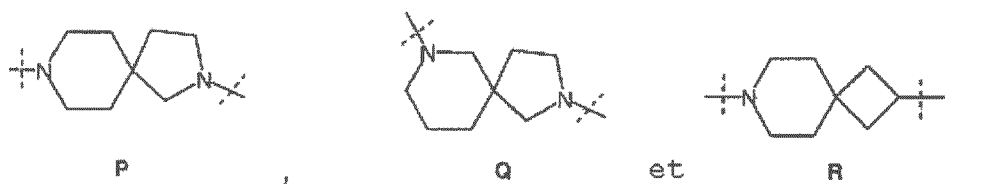
Y représente un groupe-OC(O)-, -NR¹⁴C(O)-, -C(O)-, -S(O)₂-,



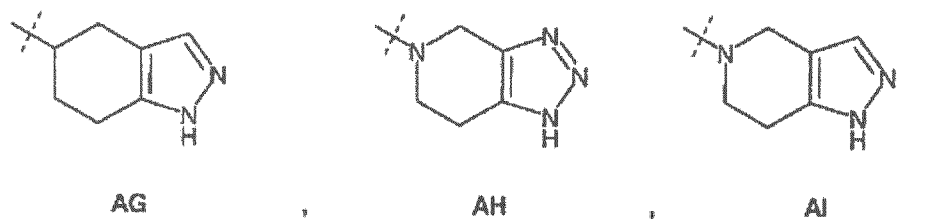
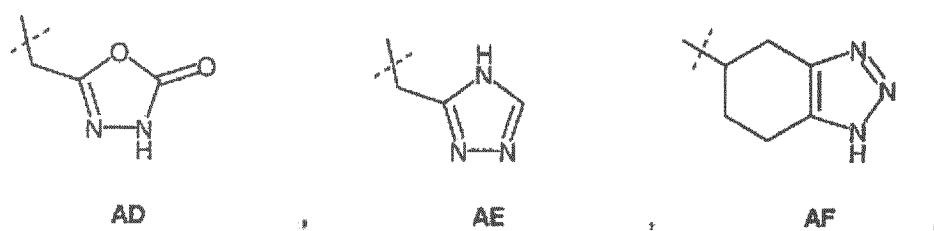
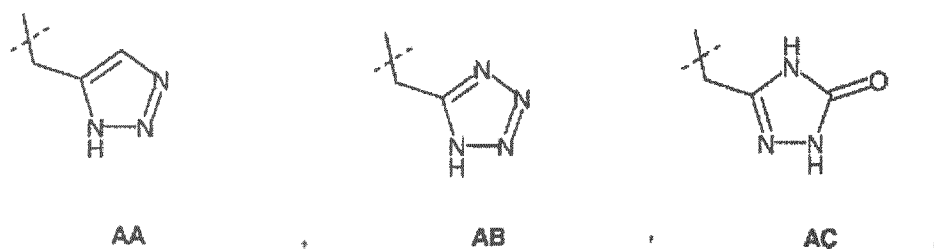
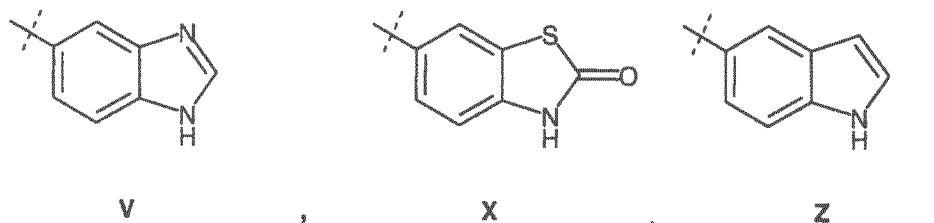
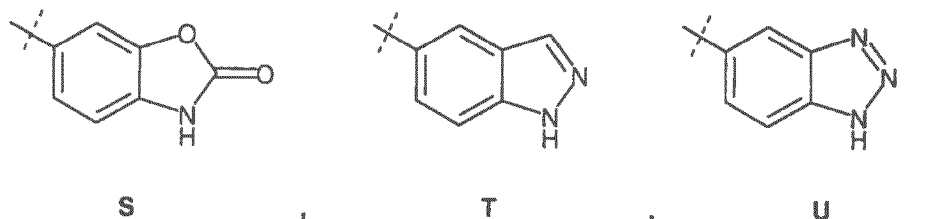
où, dans le cas où R¹ représente un groupe phénylalcényle substitué, pyridinylalcényle substitué ou thiophénylalcényle substitué, alors Y ne représente pas un groupe -OC(O)- ;

W est choisi parmi l'un des systèmes cycliques suivants :

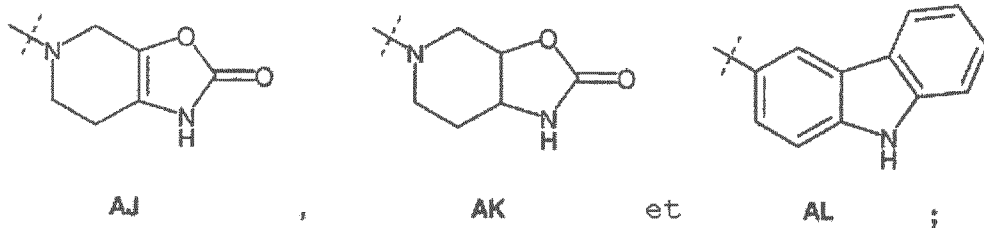




où, dans le cas où W représente le système cyclique O, alors R² représente un groupe -C(O)-NR⁶R³ ;
 R³ est choisi parmi les groupes suivants :



55



R⁴ et R⁵ sont choisis indépendamment entre H, des groupes halogéno, alkyle et cycloalkyle ;
 R⁶, R⁷ et R¹⁴ sont choisis indépendamment entre H, des groupes alkyle et cycloalkyle ;
 R⁸, R⁹ et R¹⁰ sont choisis indépendamment entre H, des groupes alkyle, hydroxyalkyle, halogénoalkyle, cycloalkyle, cycloalkylalkyle, cycloalkylalkoxy, cycloalkoxy, cycloalkoxyalkyle, cycloalkylalkoxyalkyle, alkoxy, alkoxyalkyle, halogénoalkoxy, halogénoalkoxyalkyle, alkoxyalkoxy, alkoxyalkoxyalkyle, halogéno, hydroxy, cyano, alkylsulfonyle, cycloalkylsulfonyl, aminosulfonyle substitué, amino substitué et aminoalkyle substitué, lesdits groupes aminosulfonyle substitué, amino substitué et aminoalkyle substitué étant substitués sur l'atome d'azote avec 1 ou 2 substituants choisis indépendamment entre des substituants hydrogène, alkyle, cycloalkyle, cycloalkylalkyle, hydroxyalkyle, alkoxyalkyle, alkylcarbonyle et cycloalkylcarbonyle ;
 n est égal à 0, 1, 2 ou 3 ;

ou leurs sels pharmaceutiquement acceptables.

2. Composé suivant la revendication 1, dans lequel R¹ représente un groupe phényle substitué, phénylalkyle substitué, phénoxyalkyle substitué, phénylcycloalkyle substitué, phénylalcényle substitué, phénylalcynyle substitué, pyridinylalkyle substitué, thiophénylalkyle substitué, 2,3-dihydro-1H-isoindole-2-yle substitué, 1H-indole-2-yle substitué ou benzofurane-2-yle substitué, lesdits groupes phényle substitué, phénylalkyle substitué, phénoxyalkyle substitué, phénylcycloalkyle substitué, phénylalcényle substitué, pyridinylalkyle substitué, thiophénylalkyle substitué, 2,3-dihydro-1H-isoindole-2-yle substitué, 1H-indole-2-yle substitué et benzofurane-2-yle substitué étant substitués avec R⁸, R⁹ et R¹⁰.
3. Composé suivant l'une quelconque des revendications 1 et 2, dans lequel R² représente un groupe -C(O)-R³.
4. Composé suivant l'une quelconque des revendications 1 à 3, dans lequel Y représente un groupe -OC(O)- et R¹ ne représente pas un groupe phénylalcényle substitué, pyridinylalcényle substitué ou thiophénylalcényle substitué.
5. Composé suivant l'une quelconque des revendications 1 à 4, dans lequel W représente le système cyclique A.
6. Composé suivant l'une quelconque des revendications 1 à 5, dans lequel R³ est choisi entre les groupes S, U et AF.
7. Composé choisi entre :

le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de 3,5-dichlorobenzyle ;
 le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de benzyle ;
 le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de 4-chlorobenzyle ;
 le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de 3-chlorobenzyle ;
 la 1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-yl)-3-(3,5-dichlorophényl)propane-1-one ;
 la 1-(2-(4-amino-3-hydroxybenzoyl)-2,7-diazaspiro[3.5]nonane-7-yl)-3-(3,5-dichlorophényl)propane-1-one ;
 le 2-(4-amino-3-hydroxybenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 3,5-dichlorobenzyle ;
 l'ester benzylique d'acide 6-[(1H-benzotriazole-5-carbonyl)-amino]-2-aza-spiro[3.3]heptane-2-carboxylique ;
 le N-(2-(4--phénylbutanoyl)-2-azaspiro[3.3]heptane-6-yl)-1H-benzo[d][1,2,3]triazole-5-carboxamide ;
 le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de 3-chloro-5-(méthylsulfonyl)-benzyle ;
 l'ester benzylique d'acide [2-(1H-benzotriazole-5-carbonyl)-2-aza-spiro[3.3]hept-6-yl]-carbamique ;
 le N-(2-(3-(3,5-dichlorophényl)propanoyl)-2-azaspiro[3.3]heptane-6-yl)-1H-benzo[d][1,2,3]triazole-5-carboxamide ;
 l'ester 3,5-dichlorobenzyle d'acide [2-(1H-benzo-triazole-5-carbonyl)-2-aza-spiro[3.3]hept-6-yl]-carbamique ;

l'ester 3,5-dichlorobenzyle d'acide 6-[(1H-benzo-triazole-5-carbonyl)-amino]-2-aza-spiro[3.3]heptane-2-carboxylique ;

le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,6-diaza-spiro[3.4]octane-6-carboxylate de 3,5-dichlorobenzyle ;

le 7-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-2-carboxylate de 3,5-dichlorobenzyle ;

le 6-(4-amino-3-hydroxybenzamido)-2-azaspiro[3.3]heptane-2-carboxylate de 3,5-dichlorobenzyle ;

le 2-(4-sulfamoylbenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 3-chloro-5-(méthylsulfonyl)benzyle ;

le 2-(3-sulfamoylbenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 3-chloro-5-(méthylsulfonyl)benzyle ;

le 8-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,8-diaza-spiro[4.5]décane-2-carboxylate de 3,5-dichlorobenzyle ;

le 7-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[4.5]décane-2-carboxylate de 3-fluoro-5-(trifluorométhoxy)benzyle ;

la (1H-benzotriazole-5-yl)-{7-[2-(3-chlorophényl)-éthane-sulfonyl]-2,7-diaza-spiro[3.5]non-2-yl}-méthanone ;

le 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,6-diazaspiro[3.4]octane-6-carboxylate de 3,5-dichlorobenzyle ;

le 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 3-chloro-5-(méthyl-sulfonyl)benzyle ;

l'ester 3,5-dichlorobenzyle d'acide 7-(2-oxo-2,3-dihydro-benzooxazole-6-carbonyl)-2,7-diaza-spiro[3.5]nonane-2-carboxylique ;

le 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-ylsulfonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 3,5-dichlorobenzyle ;

le [2-(4-phényl-butyryl)-2-aza-spiro[3.3]hept-6-yl]-amide d'acide 2-oxo-2,3-dihydro-benzooxazole-6-sulfonique ;

le 6-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-sulfonamido)-2-azaspiro[3.3]heptane-2-carboxylate de benzyle ;

le {2-[3-(3,5-dichlorophényl)-propionyl]-2-aza-spiro-[3.3]hept-6-yl}-amide d'acide 2-oxo-2,3-dihydro-benzooxazole-6-sulfonique ;

le 6-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-sulfonamido)-2-azaspiro[3.3]heptane-2-carboxylate de 3,5-dichlorobenzyle ;

l'ester 3,5-dichlorobenzyle d'acide [2-(2-oxo-2,3-dihydro-benzooxazole-6-sulfonyl)-2-aza-spiro[3.3]hept-6-yl]-carbamique ;

le 2-(2-oxo-2,3-dihydrobenzo[d]thiazole-6-ylsulfonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 3-chloro-5-(méthyl-sulfonyl)benzyle ;

le 2-((2-oxo-2,3-dihydrobenzo[d]oxazole-6-yl)méthyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 3,5-dichlorobenzyle ;

le 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 3,5-dichlorobenzyle ;

la 6-(7-(3-(3,5-dichlorophényl)propanoyl)-2,7-diazaspiro-[3.5]nonane-2-carbonyl)benzo[d]oxazole-2(3H)-one ;

l'ester 3,5-dichlorobenzyle d'acide 6-[(2-oxo-2,3-dihydro-benzooxazole-6-carbonyl)-amino]-2-aza-spiro[3.3]-heptane-2-carboxylique ;

la (E)-1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-yl)-3-(3,5-dichlorophényl)prop-2-ène-1-one ;

la 6-(7-(3-(3,5-dichlorophényl)propanoyl)-7-azaspiro-[3.5]nonane-2-ylamino)benzo[d]oxazole-2(3H)-one ;

la 1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-yl)-2-(3,5-dichlorophénoxy)éthanone ;

la (2-(1H-benzo[d][2,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-yl)(3,5-dichlorophényl)méthanone ;

la 6-{7-[(E)-3-(3,5-dichlorophényl)-acryloyl]-2,7-diaza-spiro[3.5]nonane-2-carbonyl}-3H-benzooxazole-2-one ;

la (2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-yl)(trans-2-(3,5-difluorophényl)cyclopropyl)-méthanone ;

la (7-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[4.4]nonane-2-yl)(5-chloro-1H-indole-2-yl)méthanone ;

la (7-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[4.4]nonane-2-yl)(5-chlorobenzofurane-2-yl)méthanone ;

le (E)-N-((1H-1,2,3-triazol_e-5-yl)méthyl)-7-(3-(4-(trifluorométhoxy)phényl)acryloyl)-7-azaspiro[3.5]nonane-2-carboxamide ;

la (1H-benzo[d][1,2,3]triazole-5-yl)(7-(5-(3,5-dichloro-phényl)-1,3,4-oxadiazole-2-yl)-2,7-diazaspiro[3.5]nonane-2-yl)méthanone ;

la (1H-benzo[d][1,2,3]triazole-5-yl)(7-(5-(4-chloro-phényl)-1,3,4-oxadiazole-2-yl)-2,7-diazaspiro[3.5]nonane-2-yl)méthanone ;

la (1H-benzo[d][1,2,3]triazole-5-yl)(7-(5-(4-chloro-phényl)-1,3,4-thiadiazole-2-yl)-2,7-diazaspiro[3.5]nonane-2-yl)méthanone ;

- le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-N-(3,5-dichlorobenzyl)-2,7-diazaspiro [3.5]nonane-7-carboxamide ;
- la (2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-yl)(5-chloroisindoline-2-yl)méthanone ;
- 5 le 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-ylamino)-7-azaspiro[3.5]nonane-7-carboxylate de benzyle ;
- le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de 4-chloro-3-fluorobenzyle ;
- le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de (2,6-dichloropyridine-4-yl)méthyle ;
- 10 le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7--carboxylate de 3,4-dichlorobenzyle ;
- le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de (5,6-dichloropyridine-3-yl)méthyle ;
- le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de 2,4-dichlorobenzyle ;
- 15 le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de (6-chloropyridine-3-yl)-méthyle ;
- le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de 4-chloro-3-(méthylsulfonyl)-benzyle ;
- le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de 1-(3,5-dichlorophényl)-éthyle ;
- 20 le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7--carboxylate de (5-chloropyridine-3-yl)-méthyle ;
- le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de (5-bromopyridine-3-yl)-méthyle ;
- 25 le (2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de (4,6-dichloropyridine-2-yl)méthyle ;
- le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de 3-chloro-4-fluorobenzyle ;
- le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de (5-chlorothiophène-3-yl)-méthyle ;
- 30 le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de thiophène-3-yl)méthyle ;
- le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de (5-bromothiophène-3-yl)-méthyle ;
- 35 le 2-(1H-benzo[d][1,2,3]triazole-5--carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de 4-(trifluorométhyl)-benzyle ;
- le 7-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[4.4]nonane-2-carboxylate de 3,5-dichlorobenzyle ;
- le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7--carboxylate de 2,4,6-trichlorobenzyle ;
- 40 l'ester 3-chloro-5-trifluorométhoxy-benzyle d'acide 6-[(1H-benzotriazole-5-carbonyl)-amino]-2-azaspiro[3.3]heptane-2-carboxylique ;
- l'ester 3-trifluorométhyl-benzyle d'acide 6-[(1H-benzotriazole-5-carbonyl)-amino]-2-azaspiro[3.3]heptane-2-carboxylique ;
- 45 l'ester 3-chloro-5-cyano-benzyle d'acide 6-[(1H-benzotriazole-5-carbonyl)-amino]-2-azaspiro[3.3]heptane-2-carboxylique ;
- l'ester 3-chloro-4-fluoro-benzyle d'acide 6-[(1H-benzotriazole-5-carbonyl)-amino]-2-azaspiro[3.3]heptane-2-carboxylique ;
- le 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 4-(trifluorométhyl)-benzyle ;
- 50 l'ester 3-fluoro-5-trifluorométhyl-benzyle d'acide 6-[(1H-benzotriazole-5-carbonyl)-amino]-2-azaspiro[3.3]heptane-2-carboxylique ;
- l'ester 3-chloro-4-méthyl-benzyle d'acide 6-[(1H-benzotriazole-5-carbonyl)-amino]-2-azaspiro[3.3]heptane-2-carboxylique ;
- 55 le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de 3-(méthylsulfonyl)-5-(trifluorométhyl)benzyle ;
- le 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 3-(méthylsulfonyl)-5-(trifluorométhyl)benzyle ;
- le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de 4-chloro-

2-(méthylsulfonyl)-benzyle ;
 le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de 2-chloro-4-(méthylsulfonyl)-benzyle ;
 le 6-(1H-benzo[d][1,2,3]triazole-5-ylcarbamoyl)spiro-[3.3]heptane-2-ylcarbamate de 3,5-dichlorobenzyle ;
 le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[4.5]décane-7-carboxylate de 3-fluoro-5-(trifluorométhoxy)benzyle ;
 le 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-ylsulfonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 3-chloro-5-(méthyl-sulfonyl)benzyle ;
 l'ester 3,5-dichloro-benzylrique d'acide 2-[(3H-[1,2,3]-triazole-4-ylméthyl)-carbamoyl]-7-aza-spiro[3.5]nonane-7-carboxylique ;

et ses sels pharmaceutiquement acceptables.

8. Composé choisi entre :

le 2-(4-sulfamoylbenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 4-(trifluorométhoxy)benzyle ;
 le 2-(4-sulfamoylbenzoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 2-fluoro-4-(trifluorométhoxy)benzyle ;
 la 1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-yl)-3-(4-(trifluorométhoxy)phényl)propane-1-one ;
 le 3-isopropyl-4-(2-oxo-2-(4,5,6,7-tétrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-yl)éthoxybenzylamine ;
 la 1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-yl)-2-(4-chloro-2-isopropylphénoxy)-éthanone ;
 la 2-(4-chloro-2-isopropylphénoxy)-1-(2-(4,5,6,7-tétra-hydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-yl)éthanone ;
 la 1-(2-(4,5,6,7-tétrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-yl)-3-(4-(trifluorométhoxy)phényl)propane-1-one ;
 la 1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-yl)-3-(3-chlorophényl)prop-2-yn-1-one ;
 la 1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-yl)-3-(4-chlorophényl)prop-2-yn-1-one ;
 le 7-(4,5,6,7-tétrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-2-carboxylate de 3-fluoro-4-(trifluorométhoxy)benzyle ;
 le 7-(4,5,6,7-tétrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-2-carboxylate de 4-(trifluorométhoxy)benzyle ;
 le 2-(3a,4,5,6,7,7a-hexahydro-1H-benzotriazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de [4-(trifluoro-méthyl)phényl]méthyle ;
 le 2-(4,5,6,7-tétrahydro-1H-benzotriazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de [2-fluoro-4-(trifluorométhyl)phényl]méthyle ;
 le 2-(4,5,6,7-tétrahydro-1H-benzotriazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de [2-méthyl-4-(trifluorométhoxy)phényl]méthyle ;
 le 2-(4,5,6,7-tétrahydro-1H-benzo[d][1,2,3]triazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 2-fluoro-4-(2,2,2-trifluoroéthoxy)benzyle ;
 le 2-(4,5,6,7-tétrahydro-1H-benzo[d][1,2,3]triazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 4-(2,2,2-trifluoroéthoxy)benzyle ;
 le 2-(4,5,6,7-tétrahydro-1H-benzo[d][1,2,3]triazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 3-fluoro-4-(2,2,2-trifluoroéthoxy)benzyle ;
 le 7-(4,5,6,7-tétrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-2-carboxylate de 2-fluoro-4-(trifluorométhoxy)benzyle ;
 le 2-(4,5,6,7-tétrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 2-fluoro-4-(trifluorométhoxy)benzyle ;
 le 2-(4,5,6,7-tétrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 4-(trifluorométhoxy)benzyle ;
 le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de 3-chloro-5-(trifluorométhyl)-benzyle ;
 le 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-ylsulfonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 3-(méthyl-sulfonyl)-5-(trifluorométhyl)benzyle ;
 le 2-(4,5,6,7-tétrahydro-1H-[1,2,3]triazolo[4,5-c]pyridine-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate

de 4-(trifluorométhoxy)benzyle ;
 le 2-(4,5,6,7-tétrahydro-1H-[1,2,3]triazolo[4,5-c]pyridine-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate
 de 2-fluoro-4-(trifluorométhoxy)benzyle ;
 le 2-((1H-triazole-4-ylméthyl)carbamoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de
 5 [4-(trifluorométhoxy)phényl]-méthyle ;
 le 2-((1H-triazole-4-ylméthyl)carbamoyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de [2-fluoro-
 4-(trifluorométhoxy)-phényl]méthyle ;
 le 2-(4,5,6,7-tétrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de (-)-
 10 2-fluoro-4-(trifluorométhoxy)benzyle ;
 le 2-(4,5,6,7-tétrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de
 (+)-2-fluoro-4-(trifluorométhoxy)benzyle ;
 le 2-[4,5,6,7-tétrahydro-1H-benzotriazole-5-carbonyl]-2,7-diazaspiro[3.5]nonane-7-carboxylate de [2-fluoro-
 4-(trifluorométhyl)phényl]méthyle (énantiomère A) ;
 le 2-[4,5,6,7-tétrahydro-1H-benzotriazole-5-carbonyl]-2,7-diazaspiro[3.5]nonane-7-carboxylate de [2-fluoro-
 15 4-(trifluorométhyl)phényl]méthyle (énantiomère B) ;

et ses sels pharmaceutiquement acceptables.

9. Composé suivant l'une quelconque des revendications 1 à 8, choisi entre :

20 le 2-(1H-benzo[d][1,2,3]triazole-5--carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de 3,5-
 dichlorobenzyle ;
 le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de 3-chloro-
 5 5-(méthylsulfonyl)-benzyle ;
 le 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 3-chloro-
 25 5-(méthyl-sulfonyl)benzyle ;
 le 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 3,5-
 dichlorobenzyle ;
 la (E)-1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-yl)-3-(3,5-dichlorophé-
 30 nyl)prop-2-ène-1-one ;
 le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de 3-(méthylsulfonyl)-
 5-(trifluorométhyl)benzyle ;
 le 2-(4,5,6,7-tétrahydro-1H-benzotriazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de [2-méthyl-
 4-(trifluorométhoxy)phényl]méthyle ;
 le 2-(4,5,6,7-tétrahydro-1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de
 35 (+)-2-fluoro-4-(trifluorométhoxy)benzyle ;

et ses sels pharmaceutiquement acceptables.

40 10. Composé suivant l'une quelconque des revendications 1 à 6 et 8, choisi entre :

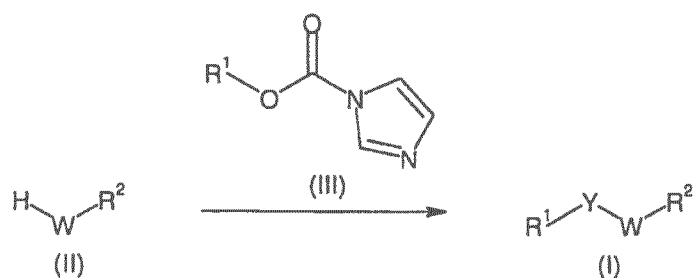
le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de 3,5-dichlorobenzyle ;
 le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de 3-chloro-
 5 5-(méthylsulfonyl)-benzyle ;
 le 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 3-chloro-
 5-(méthyl-sulfonyl)benzyle ;
 le 2-(2-oxo-2,3-dihydrobenzo[d]oxazole-6-carbonyl)-2,7-diazaspiro[3.5]nonane-7-carboxylate de 3,5-
 dichlorobenzyle ;
 la (E)-1-(2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diazaspiro[3.5]nonane-7-yl)-3-(3,5-dichlorophé-
 50 nyl)prop-2-ène-1-one ;
 le 2-(1H-benzo[d][1,2,3]triazole-5-carbonyl)-2,7-diaza-spiro[3.5]nonane-7-carboxylate de 3-(méthylsulfonyl)-
 5-(trifluorométhyl)benzyle ;

et ses sels pharmaceutiquement acceptables.

55 11. Procédé pour préparer un composé suivant l'une quelconque des revendications 1 à 10, comprenant

a) la réaction d'un composé de formule (II) en présence d'un composé de formule (III) :

5

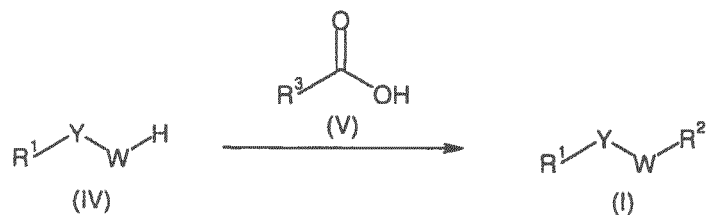


10

ou

b) la réaction d'un composé de formule (IV) en présence d'un composé de formule (V) :

15



20

où, dans l'étape a), R¹, R² et W sont tels que définis dans la revendication 1, Y représente un groupe -C(O)- et où, dans l'étape b) R¹ et Y sont tels que définis dans la revendication , W représente A, B, C, D, E, F, G, H, I, J, K, L, M, N, P ou Q et R² représente un groupe -C(O)-R³.

25

12. Composé suivant l'une quelconque des revendications 1 à 10, pour une utilisation comme substance thérapeutiquement active.
13. Composition pharmaceutique comprenant un composé suivant l'une quelconque des revendications 1 à 10 et un support thérapeutiquement inerte.
14. Composé suivant l'une quelconque des revendications 1 à 10, pour une utilisation dans le traitement ou la prophylaxie d'affections rénales, d'affections hépatiques, d'affections inflammatoires, d'affections du système nerveux, de maladies fibrotiques ainsi que du rejet aigu et du rejet chronique d'organes transplantés.
15. Composé suivant l'une quelconque des revendications 1 à 10, lorsqu'il est produit par un procédé suivant la revendication 11.

40

45

50

55

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Non-patent literature cited in the description

- *Org. Lett.*, 2008, vol. 10, 1755 [0126] [0170]
- *J Immunol Methods*, 1996, vol. 194 (19), 1-199 [0217]
- **FERGUSON et al.** *Org Lett*, 2006, vol. 8 (10), 2023 [0219]

Az EP 2 861 566 lajstromszámú európai szabadalom igénypontjainak magyar fordítása:

1. (I) képletű vegyületek:



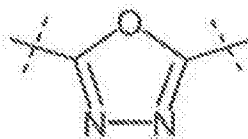
vagy gyógyászatilag elfogadható sóik,

ahol

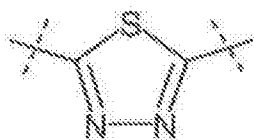
R^1 jelentése alkil-, halogénalkil-, cikloalkil-, helyettesített fenil-, helyettesített fenilalkil-, helyettesített fenoxialkil-, helyettesített fenilcikloalkil-, helyettesített fenilalkenil-, helyettesített fenilalkinil-, helyettesített piridinil-, helyettesített piridinilalkil-, helyettesített piridinilalkenil-, helyettesített piridinilalkinil-, helyettesített tiofenil-, helyettesített tiofenilalkil-, helyettesített tiofenilalkenil-, helyettesített tiofenilalkinil-, helyettesített 2,3-dihidro-1H-izozindol-2-il-, helyettesített 1H-indol-2-il- vagy helyettesített benzofurán-2-il-csoport, ahol a helyettesített fenil-, helyettesített fenilalkil-, helyettesített fenoxialkil-, helyettesített fenilcikloalkil-, helyettesített fenilalkenil-, helyettesített fenilalkinil-, helyettesített piridinil-, helyettesített piridinilalkil-, helyettesített piridinilalkenil-, helyettesített piridinilalkinil-, helyettesített tiofenil-, helyettesített tiofenilalkil-, helyettesített tiofenilalkenil-, helyettesített tiofenilalkinil-, helyettesített 2,3-dihidro-1H-izozindol-2-il-, helyettesített 1H-indol-2-il- és a helyettesített benzofurán-2-il-csoport helyettesített R^8 , R^9 és R^{10} csoporttal;

R^2 jelentése $-(CR^4R^5)_n-R^3$, $-C(O)-R^3$, $-S(O)_2-R^3$ vagy $-C(O)-NR^6R^3$ csoport;

Y jelentése $-OC(O)-$, $-NR^{14}C(O)-$, $-C(O)-$, $-S(O)_2-$,



vagy

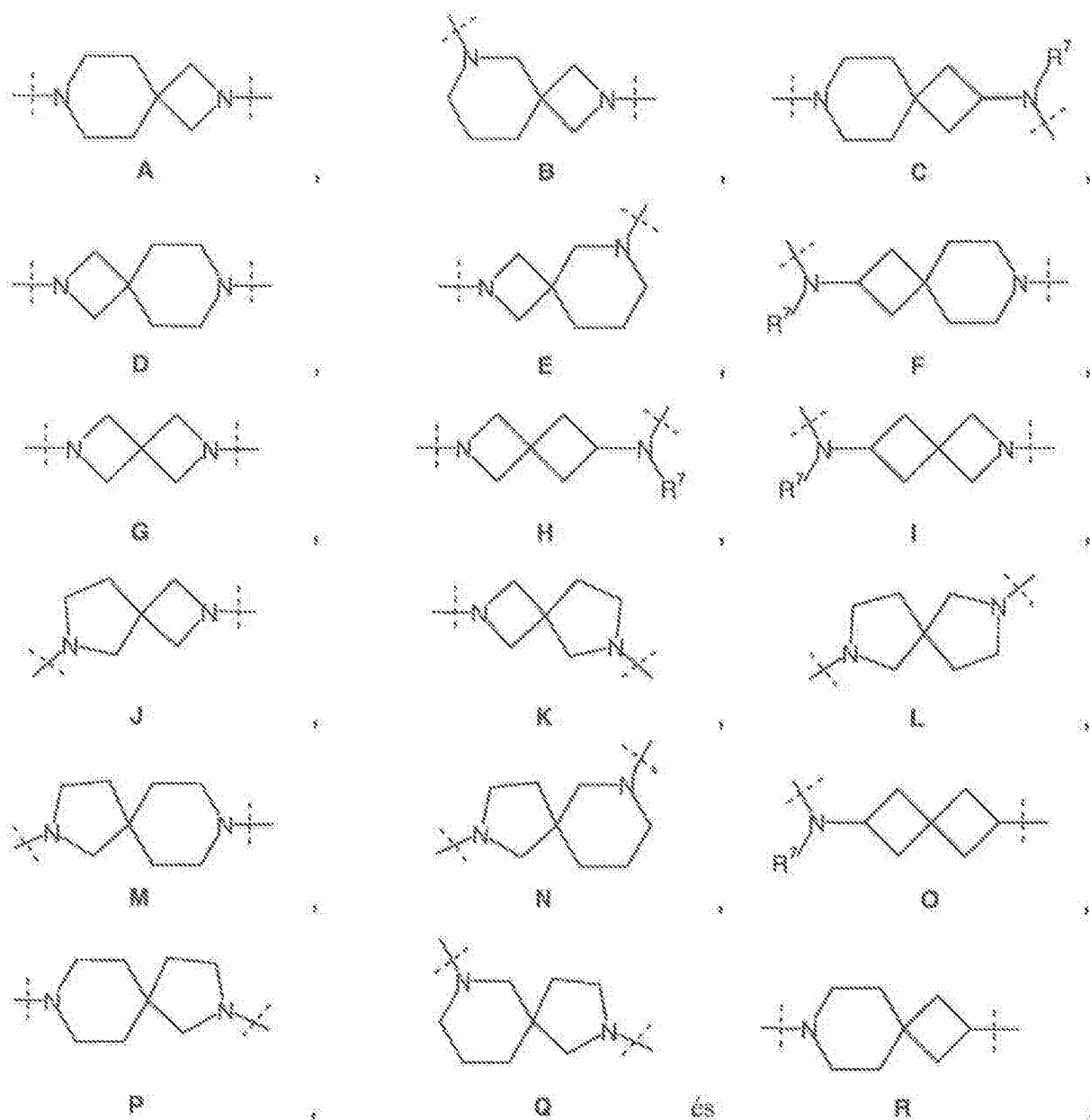


csoport, ahol amikor R^1 jelentése helyettesített fenilalkenil-,

helyettesített piridinilalkenil- vagy helyettesített tiofenilalkenilcsoport, akkor Y

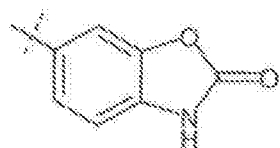
jelentése nem $-OC(O)-$ csoport;

W jelentését a következő gyűrűrendszerek közül választjuk:

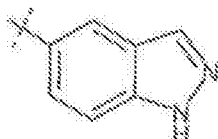


ahol amikor W jelentése az O gyűrűrendszer, akkor R^2 jelentése $-C(O)-NR^6R^3$ csoport;

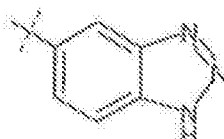
R^3 jelentését a következő csoportok közül választjuk:



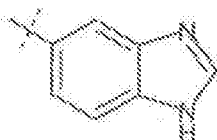
S



T



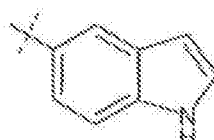
U



V



X



Z



AA



AB



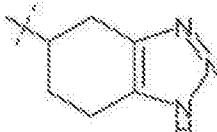
AC



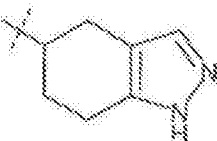
AD



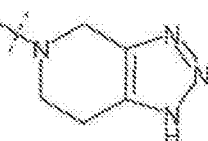
AE



AF



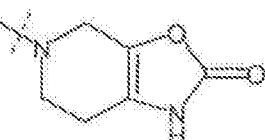
AG



AH



AI



AJ



AK



AL

R^4 és R^5 jelentését függetlenül választjuk a H, halogén, alkil- és a cikloalkilcsoport közül;

R^6 , R^7 és R^{14} jelentését függetlenül választjuk a H, alkil- és a cikloalkilcsoport közül;

R^8 , R^9 és R^{10} jelentését függetlenül választjuk a H, alkil-, hidroxialkil-, halogénalkil-, cikloalkil-, cikloalkilalkil-, cikloalkilalkoxi-, cikloalkoxi-, cikloalkoxialkil-, cikloalkilalkoxialkil-, alkoxi-, alkoxialkil-, halogénalkoxi-, halogénalkoxialkil-, alkoxialkoxi-, alkoxialkoxialkil-, halogén, hidroxí-, ciano-, alkilszulfonil-, cikloalkilszulfonil-, helyettesített aminoszulfonil-, helyettesített amino- és a helyettesített aminoalkilcsoport közül, ahol a helyettesített aminoszulfonil-, helyettesített amino- és a helyettesített aminoalkilcsoport helyettesített a nitrogénatomon egy-két szubsztituenssel, amelye(ke)t függetlenül választunk a hidrogén, alkil-, cikloalkil-, cikloalkilalkil-, hidroxialkil-, alkoxialkil-, alkilkarbonil- és a cikloalkilkarbonilcsoport közül;

n jelentése nulla, 1, 2 vagy 3.

2. Az 1. igénypont szerinti vegyület, ahol R^1 jelentése helyettesített fenil-, helyettesített fenilalkil-, helyettesített fenoxialkil-, helyettesített fenilcikloalkil-, helyettesített fenilalkenil-, helyettesített fenilalkinil-, helyettesített piridinilalkil-, helyettesített tiofenilalkil-, helyettesített 2,3-dihidro-1H-izoindol-2-il-, helyettesített 1H-indol-2-il- vagy helyettesített benzofurán-2-il-csoport, ahol a helyettesített fenil-, helyettesített fenilalkil-, helyettesített fenoxialkil-, helyettesített fenilcikloalkil-, helyettesített fenilalkenil-, helyettesített piridinilalkil-, helyettesített tiofenilalkil-, helyettesített 2,3-dihidro-1H-izoindol-2-il-, helyettesített 1H-indol-2-il- és a helyettesített benzofurán-2-il-csoport helyettesített R^8 , R^9 és R^{10} csoporttal.

3. Az 1-2. igénypontok bármelyike szerinti vegyület, ahol R^2 jelentése $-C(O)-R^3$ csoport.

4. Az 1-3. igénypontok bármelyike szerinti vegyület, ahol Y jelentése $-OC(O)-$ csoport, és R^1 jelentése nem helyettesített fenilalkenil-, helyettesített piridinilalkenil- vagy helyettesített tiofenilalkenilcsoport.

5. Az 1-4. igénypontok bármelyike szerinti vegyület, ahol W jelentése az A gyűrűrendszer.

6. Az 1-5. igénypontok bármelyike szerinti vegyület, ahol R³ jelentését az S, U és AF csoportok közül választjuk.

7. Vegyület, amelyet a következők közül választunk:

3,5-diklórbenzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

benzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

4-klórbenzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

3-klórbenzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

1-(2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-il)-3-(3,5-diklórfenil)propán-1-on;

1-(2-(4-amino-3-hidroxibenzoil)-2,7-diazaspiro[3.5]nonán-7-il)-3-(3,5-diklórfenil)propán-1-on;

3,5-diklórbenzil-2-(4-amino-3-hidroxibenzoil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

6-[(1H-benzotriazol-5-karbonil)-amino]-2-aza-spiro[3.3]heptán-2-karbonsav-benzil-észter;

N-(2-(4-fenilbutanoil)-2-azaspiro[3.3]heptán-6-il)-1H-benzo[d][1,2,3]triazol-5-karboxamid;

3-klór-5-(metilszulfonil)benzil 2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

[2-(1H-benzotriazol-5-karbonil)-2-aza-spiro[3.3]hept-6-il]-karbaminsav-benzil-észter;

N-(2-(3-(3,5-diklórfenil)propanoil)-2-azaspiro[3.3]heptán-6-il)-1H-benzo[d][1,2,3]triazol-5-karboxamid;

[2-(1H-benzotriazol-5-karbonil)-2-aza-spiro[3.3]hept-6-il]-karbaminsav-3,5-diklórbenzil-észter;

6-[(1H-benzotriazol-5-karbonil)-amino]-2-aza-spiro[3.3]heptán-2-karbonsav-3,5-diklór-benzil-észter;

3,5-diklórbenzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,6-diazaspiro[3.4]oktán-6-karboxilát

3,5-diklórbenzil-7-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-2-karboxilát;

3,5-diklórbenzil-6-(4-amino-3-hidroxibenzamido)-2-azaspiro[3.3]heptán-2-karboxilát;

3-klór-5-(metilszulfonil)benzil-2-(4-szulfamoilbenzoi)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

3-klór-5-(metilszulfonil)benzil-2-(3-szulfamoilbenzoi)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

3,5-diklórbenzil-8-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,8-diazaspiro[4.5]dekán-2-karboxilát;

3-fluor-5-(trifluormetoxi)benzil-7-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[4.5]dekán-2-karboxilát;

(1H-benzotriazol-5-il)-(7-[2-(3-klór-fenil)-etánszulfonil]-2,7-diaza-spiro[3.5]non-2-il)-metanon;

3,5-diklórbenzil-2-(2-oxo-2,3-dihidrobenzo[d]oxazol-6-karbonil)-2,6-diazaspiro[3.4]oktán-6-karboxilát;

3-klór-5-(metilszulfonil)benzil-2-(2-oxo-2,3-dihidrobenzo[d]oxazol-6-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

7-(2-oxo-2,3-dihidro-benzooxazol-6-karbonil)-2,7-diaza-spiro[3.5]nonán-2-karbonsav-3,5-diklórbenzil-észter;

3,5-diklórbenzil-2-(2-oxo-2,3-dihidrobenzo[d]oxazol-6-ilszulfonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

2-oxo-2,3-dihidro-benzooxazol-6-szulfonsav-[2-(4-fenil-butiril)-2-azaspiro[3.3]hept-6-il]-amid;

benzil-6-(2-oxo-2,3-dihidrobenzo[d]oxazol-6-szulfonamido)-2-azaspiro[3.3]heptán-2-karboxilát;

2-oxo-2,3-dihidro-benzooxazol-6-szulfonsav-{2-[3-(3,5-diklór-fenil)-propionil]-2-azaspiro[3.3]hept-6-il}-amid;

3,5-diklórbenzil-6-(2-oxo-2,3-dihidrobenzo[d]oxazol-6-szulfonamido)-2-azaspiro[3.3]heptán-2-karboxilát;

[2-(2-oxo-2,3-dihidro-benzooxazol-6-szulfonil)-2-azaspiro[3.3]hept-6-il]-karbaminsav-3,5-diklór-benzil-észter;

3-klór-5-(metilszulfonil)benzil-2-(2-oxo-2,3-dihidrobenzo[d]thiazol-6-ilszulfonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

3,5-diklórbenzil-2-((2-oxo-2,3-dihidrobenzo[d]oxazol-6-il)metil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

3,5-diklórbenzil-2-(2-oxo-2,3-dihidrobenzo[d]oxazol-6-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

6-(7-(3-(3,5-diklórfenil)propanoil)-2,7-diazaspiro[3.5]nonán-2-karbonil)benzo[d]oxazol-2(3H)-on;

6-[(2-oxo-2,3-dihidro-benzooxazol-6-karbonil)-amino]-2-aza-spiro[3.3]heptán-2-karbonsav-3,5-diklór-benzil-észter;

(E)-1-(2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-il)-3-(3,5-diklórfenil)prop-2-én-1-on;

6-(7-(3-(3,5-diklórfenil)propanoil)-7-azaspiro[3.5]nonán-2-ilamino)benzo[d]oxazol-2(3H)-on;

1-(2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-il)-2-(3,5-diklórfenoxi)etanon;

(2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-il)(3,5-diklórfenil)metanon;

6-[7-[(E)-3-(3,5-diklór-fenil)-akrilóil]-2,7-diaza-spiro[3.5]nonán-2-karbonil]-3H-benzooxazol-2-on;

(2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-il)(transz-2-(3,5-difluorfenil)ciklopropil)metanon;

(7-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[4.4]nonán-2-il)(5-klór-1H-indol-2-il)metanon;

(7-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[4.4]nonán-2-il)(5-klórbenzofurán-2-il)metanon;

(E)-N-((1H-1,2,3-triazol-5-il)metil)-7-(3-(4-(trifluormetoxi)fenil)akrilóil)-7-azaspiro[3.5]nonán-2-karboxamid;

(1H-benzo[d][1,2,3]triazol-5-il)(7-(5-(3,5-diklórfenil)-1,3,4-oxadiazol-2-il)-2,7-diazaspiro[3.5]nonán-2-il)metanon;

(1H-benzo[d][1,2,3]triazol-5-il)(7-(5-(4-klórfenil)-1,3,4-oxadiazol-2-il)-2,7-diazaspiro[3.5]nonán-2-il)metanon;

(1H-benzo[d][1,2,3]triazol-5-il)(7-(5-(4-klórfenil)-1,3,4-thiadiazol-2-il)-2,7-diazaspiro[3.5]nonán-2-il)metanon;

2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-N-(3,5-diklórbenzil)-2,7-diazaspiro[3.5]nonán-7-karboxamid;

(2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-ii)(5-klórizoindolin-2-ii)metanon;

benzil-2-(2-oxo-2,3-dihidrobenzo[d]oxazol-6-iiamino)-7-azaspiro[3.5]nonán-7-karboxilát;

4-klór-3-fluorbenzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

(2,6-diklórpíridin-4-ii)metil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

3,4-diklórbenzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

(5,6-diklórpíridin-3-ii)metil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

2,4-diklórbenzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

(6-klórpíridin-3-ii)metil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

4-klór-3-(metilszulfonil)benzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

1-(3,5-diklórfenil)etil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

(5-klórpíridin-3-ii)metil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

(5-brómpíridin-3-ii)metil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

(4,6-diklórpíridin-2-ii)metil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

3-klór-4-fluorbenzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

(5-klórtiofén-3-ii)metil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

tiofén-3-ii)metil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

(5-brómtiofén-3-ii)metil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

- 4-(trifluormetil)benzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;
- 3,5-diklórbenzil-7-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[4.4]nonán-2-karboxilát;
- 2,4,6-triklórbenzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;
- 6-[(1H-benzotriazol-5-karbonil)-amino]-2-aza-spiro[3.3]heptán-2-karbonsav-3-klór-5-trifluormetoxi-benzil-észter;
- 6-[(1H-benzotriazol-5-karbonil)-amino]-2-aza-spiro[3.3]heptán-2-karbonsav-3-trifluormetil-benzil-észter;
- 6-[(1H-benzotriazol-5-karbonil)-amino]-2-aza-spiro[3.3]heptán-2-karbonsav-3-klór-5-ciano-benzil-észter;
- 6-[(1H-benzotriazol-5-karbonil)-amino]-2-aza-spiro[3.3]heptán-2-karbonsav-3-klór-4-fluor-benzil-észter;
- 4-(trifluormetil)benzil-2-(2-oxo-2,3-dihidrobenczo[d]oxazol-6-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;
- 6-[(1H-benzotriazol-5-karbonil)-amino]-2-aza-spiro[3.3]heptán-2-karbonsav-3-fluor-5-trifluormetil-benzil-észter;
- 6-[(1H-benzotriazol-5-karbonil)-amino]-2-aza-spiro[3.3]heptán-2-karbonsav-3-klór-4-metil-benzil-észter;
- 3-(metilszulfonil)-5-(trifluormetil)benzil 2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;
- 3-(metilszulfonil)-5-(trifluormetil)benzil 2-(2-oxo-2,3-dihidrobenczo[d]oxazol-6-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;
- 4-klór-2-(metilszulfonil)benzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;
- 2-klór-4-(metilszulfonil)benzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;
- 3,5-diklórbenzil-6-(1H-benzo[d][1,2,3]triazol-5-ilkarbamoil)spiro[3.3]heptán-2-ilkarbamát;
- 3-fluor-5-(trifluormetoxi)benzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[4.5]dekán-7-karboxilát;
- 3-klór-5-(metilszulfonil)benzil-2-(2-oxo-2,3-dihidrobenczo[d]oxazol-6-ilszulfonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

2-[(3H-[1,2,3]triazol-4-ilmetil)-karbamoil]-7-aza-spiro[3.5]nonán-7-karbonsav-3,5-diklór-benzil-észter;

és gyógyászatilag elfogadható sóik.

8. Vegyület, amelyet a következők közül választunk:

4-(trifluormetoxi)benzil-2-(4-szulfamoilbenzoi)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

2-fluor-4-(trifluormetoxi)benzil-2-(4-szulfamoilbenzoi)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

1-(2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-il)-3-(4-(trifluormetoxi)fenil)propán-1-on;

3-izopropil-4-(2-oxo-2-(2-(4,5,6,7-tetrahidro-1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-il)etoxi)benzoniitril;

1-(2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-il)-2-(4-klór-2-izopropilfenoxi)etanon;

2-(4-klór-2-izopropilfenoxi)-1-(2-(4,5,6,7-tetrahidro-1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-il)etanon;

1-(2-(4,5,6,7-tetrahidro-1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-il)-3-(4-(trifluormetoxi)fenil)propán-1-on;

1-(2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-il)-3-(3-klórfenil)prop-2-in-1-on;

1-(2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-il)-3-(4-klórfenil)prop-2-in-1-on;

3-fluor-4-(trifluormetoxi)benzil-7-(4,5,6,7-tetrahidro-1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-2-karboxilát;

4-(trifluormetoxi)benzil-7-(4,5,6,7-tetrahidro-1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-2-karboxilát;

[4-(trifluormetil)fenil]metil-2-(3a,4,5,6,7,7a-hexahidro-1H-benzotriazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

[2-fluor-4-(trifluormetil)fenil]metil-2-(4,5,6,7-tetrahidro-1H-benzotriazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

[2-metil-4-(trifluormetoxi)fenil]metil-2-(4,5,6,7-tetrahidro-1H-benzotriazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

2-fluor-4-(2,2,2-trifluoretóxi)benzil-2-(4,5,6,7-tetrahidro-1H-benzo[d][1,2,3]triazol-6-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

4-(2,2,2-trifluoretóxi)benzil-2-(4,5,6,7-tetrahidro-1H-benzo[d][1,2,3]triazol-6-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

3-fluor-4-(2,2,2-trifluoretóxi)benzil-2-(4,5,6,7-tetrahidro-1H-benzo[d][1,2,3]triazol-6-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

2-fluor-4-(trifluormetóxi)benzil-7-(4,5,6,7-tetrahidro-1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-2-karboxilát;

2-fluor-4-(trifluormetóxi)benzil-2-(4,5,6,7-tetrahidro-1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

4-(trifluormetóxi)benzil-2-(4,5,6,7-tetrahidro-1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

3-klór-5-(trifluormetil)benzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

3-(metilszulfonil)-5-(trifluormetil)benzil-2-(2-oxo-2,3-dihidrobenzo[d]oxazol-6-ilszulfonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

4-(trifluormetóxi)benzil-2-(4,5,6,7-tetrahidro-1H-[1,2,3]triazolo[4,5-c]piridin-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

2-fluor-4-(trifluormetóxi)benzil-2-(4,5,6,7-tetrahidro-1H-[1,2,3]triazolo[4,5-c]piridin-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

[4-(trifluormetóxi)fenil]metil-2-((1H-triazol-4-ilmetil)karbamoil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

[2-fluor-4-(trifluormetóxi)fenil]metil-2-((1H-triazol-4-ilmetil)karbamoil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

(-)-2-fluor-4-(trifluormetóxi)benzil-2-(4,5,6,7-tetrahidro-1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

(+)-2-fluor-4-(trifluormetóxi)benzil-2-(4,5,6,7-tetrahidro-1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

[2-fluor-4-(trifluormetil)fenil]metil-2-[4,5,6,7-tetrahidro-1H-benzotriazol-5-karbonil]-2,7-diazaspiro[3.5]nonán-7-karboxilát (A enantiomer);

[2-fluor-4-(trifluormetil)fenil]metil-2-[4,5,6,7-tetrahidro-1H-benzotriazol-5-karbonil]-2,7-diazaspiro[3.5]nonán-7-karboxilát (B enantiomer);

és gyógyászatilag elfogadható sóik.

9. Az 1-8. igénypontok bármelyike szerinti vegyület, amelyet a következők közül választunk:

3,5-diklórbenzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

3-klór-5-(metilszulfonil)benzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

3-klór-5-(metilszulfonil)benzil-2-(2-oxo-2,3-dihidrobenzo[d]oxazol-6-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

3,5-diklórbenzil-2-(2-oxo-2,3-dihidrobenzo[d]oxazol-6-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

(E)-1-(2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-il)-3-(3,5-diklórfenil)prop-2-én-1-on;

3-(metilszulfonil)-5-(trifluormetil)benzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

[2-metil-4-(trifluormetoxi)fenil]metil-2-(4,5,6,7-tetrahidro-1H-benzotriazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

(+)-2-fluor-4-(trifluormetoxi)benzil-2-(4,5,6,7-tetrahidro-1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

és gyógyászatilag elfogadható sóik.

10. Az 1-6. és 8. igénypontok bármelyike szerinti vegyület, amelyet a következők közül választunk:

3,5-diklórbenzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

3-klór-5-(metilszulfonil)benzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

3-klór-5-(metilszulfonil)benzil-2-(2-oxo-2,3-dihidrobenzo[d]oxazol-6-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

3,5-diklórbenzil-2-(2-oxo-2,3-dihidrobenzo[d]oxazol-6-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

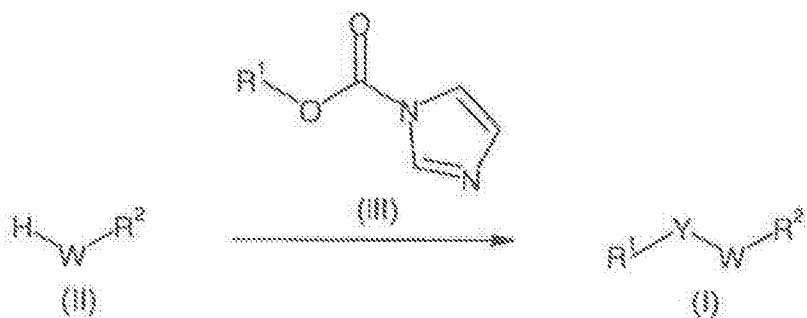
(E)-1-(2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-il)-3-(3,5-diklórfenil)prop-2-én-1-on;

3-(metilszulfonil)-5-(trifluormetil)benzil-2-(1H-benzo[d][1,2,3]triazol-5-karbonil)-2,7-diazaspiro[3.5]nonán-7-karboxilát;

és gyógyászatilag elfogadható sók.

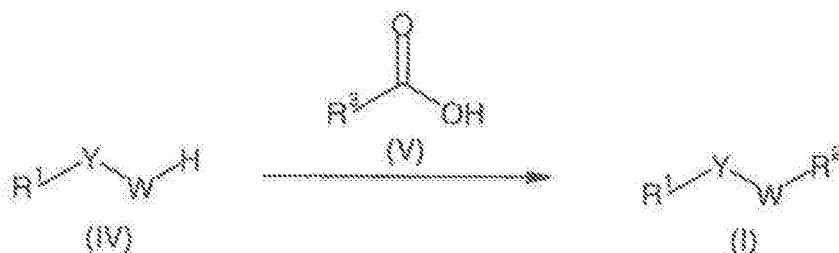
11. Eljárás az 1-10. igénypontok bármelyike szerinti vegyület előállítására, amely során

a) (II) képletű vegyületet reagáltatunk (III) képletű vegyület jelenlétében



; vagy

b) (IV) képletű vegyületet reagáltatunk (V) képletű vegyület jelenlétében



ahol az a) lépésben R^1 , R^2 és W jelentése az 1. igénypontban meghatározott, Y jelentése $-\text{C}(\text{O})-$ csoport, és ahol a b) lépésben R^1 és Y jelentése az igénypontban meghatározott, W jelentése A, B, C, D, E, F, G, H, I, J, K, L, M, N, P vagy Q csoport, és R^2 jelentése $-\text{C}(\text{O})-\text{R}^3$ csoport.

12. Az 1-10. igénypontok bármelyike szerinti vegyület terápiásan hatásos anyagként való alkalmazásra.

13. Gyógyszerkészítmény, amely tartalmaz 1-10. igénypontok bármelyike szerinti vegyületet és terápiásan közömbös hordozóanyagot.


14. Az 1-10. igénypontok bármelyike szerinti vegyület vese-állapotok, májállapotok, gyulladásos állapotok, idegrendszer állapotai, fibrózisos betegségek és akut vagy

krónikus szervtranszplantátum-kiütődés kezelésében vagy megelőzésében való alkalmazásra.

15. Az 1-10. igénypontok bármelyike szerinti vegyület, amikor a 11. igénypont szerinti eljárással van előállítva.

165/1713

Meghatalmazott:


Dr. Miskolczi Mária
Orvos
1111 Budapest, Egy László u. 40.
Tel. 218-4182 Fax 218-6526