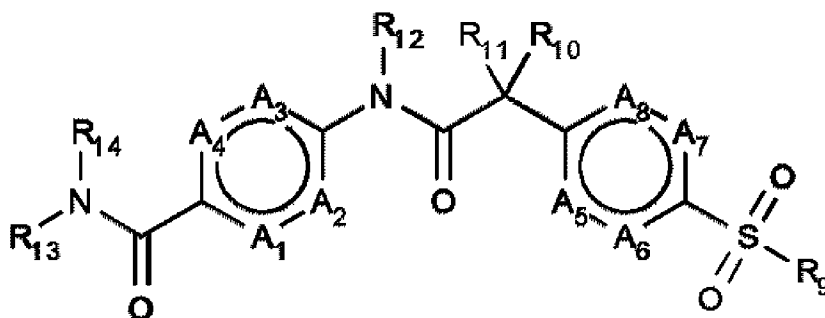




(86) Date de dépôt PCT/PCT Filing Date: 2016/06/03
(87) Date publication PCT/PCT Publication Date: 2016/12/08
(45) Date de délivrance/Issue Date: 2023/08/08
(85) Entrée phase nationale/National Entry: 2017/12/01
(86) N° demande PCT/PCT Application No.: EP 2016/062696
(87) N° publication PCT/PCT Publication No.: 2016/193459
(30) Priorité/Priority: 2015/06/05 (EP15170763.5)

(51) Cl.Int./Int.Cl. *C07D 213/75* (2006.01),
A61K 31/10 (2006.01), *A61P 29/00* (2006.01),
A61P 37/00 (2006.01), *C07C 317/32* (2006.01),
C07D 207/325 (2006.01), *C07D 211/16* (2006.01),
C07D 215/08 (2006.01), *C07D 231/40* (2006.01),
C07D 261/08 (2006.01), *C07D 261/14* (2006.01),
C07D 277/46 (2006.01), *C07D 285/135* (2006.01),
C07D 307/52 (2006.01)
(72) Inventeurs/Inventors:
CALS, JOSEPH MARIA GERARDUS BARBARA, NL;
DE KIMPE, VERA, NL;
NABUURS, SANDER BERNARDUS, NL
(73) Propriétaires/Owners:

(54) Titre : MODULATEURS DE ROR GAMMA (ROR γ)
(54) Title: ROR GAMMA (ROR γ) MODULATORS



(Formula I)

(57) Abrégé/Abstract:

The present invention relates to compounds according to Formula I: or a pharmaceutically acceptable salt thereof. The compounds can be used as inhibitors of ROR γ and are useful for the treatment of ROR γ mediated diseases such as autoimmune and inflammatory diseases.

(73) **Propriétaires(suite)/Owners(continued):** LEAD PHARMA HOLDING B.V., NL; SANOFI, FR

(74) **Agent:** BERESKIN & PARR LLP/S.E.N.C.R.L.,S.R.L.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property
Organization
International Bureau



(10) International Publication Number
WO 2016/193459 A1

(43) International Publication Date
8 December 2016 (08.12.2016)

(51) International Patent Classification:

C07D 213/75 (2006.01) *C07D 277/46* (2006.01)
C07D 215/08 (2006.01) *C07D 285/135* (2006.01)
C07D 231/40 (2006.01) *C07D 211/16* (2006.01)
C07C 317/32 (2006.01) *C07D 307/52* (2006.01)
C07D 261/08 (2006.01) *A61K 31/10* (2006.01)
C07D 261/14 (2006.01) *A61P 37/00* (2006.01)
C07D 207/325 (2006.01) *A61P 29/00* (2006.01)

(21) International Application Number:

PCT/EP2016/062696

(22) International Filing Date:

3 June 2016 (03.06.2016)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data:

15170763.5 5 June 2015 (05.06.2015) EP

(71) Applicants: LEAD PHARMA CEL MODELS IP B.V.

[NL/NL]; Molenweg 79, 5349 AC Oss (NL). SANOFI
[FR/FR]; 54 Rue La Boetie, 75008 Paris (FR).

(72) Inventors: CALS, Joseph Maria Gerardus Barbara; c/o

Lead Pharma, Molenweg 79, 5349 AC Oss (NL). DE
KIMPE, Vera; c/o Lead Pharma, Molenweg 79, 5349 AC
Oss (NL). NABUURS, Sander Bernardus; c/o Lead
Pharma, Molenweg 79, 5349 AC Oss (NL).

(74) Agents: DE VRIES & METMAN et al.; Overschiestraat

180, 1062 XK Amsterdam (NL).

(81) Designated States (unless otherwise indicated, for every

kind of national protection available): AE, AG, AL, AM,
AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY,
BZ, CA, CH, CL, CN, CO, CR, CU, CZ, DE, DK, DM,
DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT,
HN, HR, HU, ID, IL, IN, IR, IS, JP, KE, KG, KN, KP, KR,
KZ, LA, LC, LK, LR, LS, LU, LY, MA, MD, ME, MG,
MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM,
PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC,
SD, SE, SG, SK, SL, SM, ST, SV, SY, TH, TJ, TM, TN,
TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every

kind of regional protection available): ARIPO (BW, GH,
GM, KE, LR, LS, MW, MZ, NA, RW, SD, SL, ST, SZ,
TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, RU,
TJ, TM), European (AL, AT, BE, BG, CH, CY, CZ, DE,
DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU,
LV, MC, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK,
SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,
GW, KM, ML, MR, NE, SN, TD, TG).

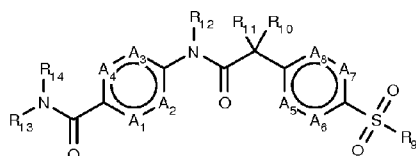
Declarations under Rule 4.17:

— of inventorship (Rule 4.17(iv))

Published:

— with international search report (Art. 21(3))

(54) Title: ROR GAMMA (RORY) MODULATORS



(I)

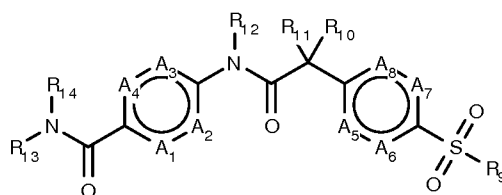
(57) **Abstract:** The present invention relates to compounds according to Formula I: or a pharmaceutically acceptable salt thereof. The compounds can be used as inhibitors of RORY and are useful for the treatment of RORY mediated diseases such as autoimmune and inflammatory diseases.

ROR gamma (ROR γ) modulators.

The retinoic-acid-receptor-related orphan receptor γ t (ROR γ t) acts as a master regulator of the development of T_H17 cells, but also as a critical component in non-T_H17 IL-17 producing cells, such as for example $\gamma\delta$ T-cells. The ROR gene family is part of the nuclear hormone receptor superfamily, and consists of three members (ROR α , ROR β , and ROR γ). Each gene is expressed in different isoforms, differing foremost in their *N*-terminal sequence. Two isoforms of ROR γ have been identified: ROR γ 1 and ROR γ 2 (also known as ROR γ t). The term ROR γ is used here to describe both ROR γ 1 and/or ROR γ 2.

The present invention relates to novel ROR γ modulator compounds containing a 4-[2-(4-sulfonylphenyl)acetamido]benzamide scaffold, to pharmaceutical compositions comprising the same and to the use of said compounds for the treatment of ROR γ -mediated diseases or conditions, in particular autoimmune diseases and inflammatory diseases.

The present invention relates to compounds according to Formula I



(Formula I)

or a pharmaceutically acceptable salt thereof wherein:

- A₁-A₈ are N or CR₁-CR₈, respectively, with the proviso that no more than two of the four positions A in A₁-A₄ can be simultaneously N and that no more than two of the four positions A in A₅-A₈ can be simultaneously N;
- R₁-R₈ are independently H, halogen, amino, C(1-3)alkoxy, (di)C(1-3)alkylamino or C(1-6)alkyl;
- R₉ is C(1-6)alkyl;
- R₁₀ and R₁₁ are independently H, F, methyl, ethyl, hydroxy or methoxy or R₁₀ and R₁₁ together is carbonyl, all alkyl groups, if present, optionally being substituted with one or more F;
- R₁₂ is H or C(1-6)alkyl;
- R₁₃ is C(3-6)cycloalkyl, C(3-6)cycloalkylC(1-3)alkyl, C(2-5)heterocycloalkyl, C(2-5)heterocycloalkylC(1-3)alkyl, C(6-10)aryl, C(6-10)arylC(1-3)alkyl, C(1-9)heteroaryl or C(1-9)heteroarylC(1-3)alkyl, all groups optionally substituted with one or more

halogen, amino, hydroxy, cyano, C(1-3)alkoxy, C(1-3)alkoxycarbonyl, (di)C(1-3)alkylamino or C(1-3)alkyl;

- R₁₄ is H, C(1-6)alkyl, C(2-6)alkenyl, C(3-6)cycloalkyl, C(3-6)cycloalkylC(1-3)alkyl, C(2-5)heterocycloalkyl, C(2-5)heterocycloalkylC(1-3)alkyl, C(6-10)aryl, C(6-10)arylC(1-3)alkyl, C(1-9)heteroaryl or C(1-9)heteroarylC(1-3)alkyl, all groups optionally substituted with one or more halogen, amino, hydroxy, cyano, C(1-3)alkoxy, C(1-3)alkoxycarbonyl, (di)C(1-3)alkylamino or C(1-3)alkyl;
- or R₁₃ and R₁₄ are fused and form a ring having 5 to 7 atoms by joining R₁₃ being C(1-6)alkyl or C(2-6)alkenyl with an independent substituent within the definition of R₁₄, all groups optionally substituted with one or more halogen, amino, hydroxy, cyano, C(1-3)alkoxy, C(1-3)alkoxycarbonyl, (di)C(1-3)alkylamino or C(1-3)alkyl.

The term C(1-6)alkyl as used herein means a branched or unbranched alkyl group having 1-6 carbon atoms, for example methyl, ethyl, propyl, isopropyl, butyl, tert-butyl, n-pentyl and n-hexyl. All carbon atoms may optionally be substituted with one or more halogen.

The term C(1-3)alkyl as used herein means an alkyl group having 1-3 carbon atoms, i.e. methyl, ethyl, propyl or isopropyl. All carbon atoms may optionally be substituted with one or more halogen.

The term C(2-6)alkenyl as used herein means a branched or unbranched alkenyl group having 2-6 carbon atoms, for example 4-hexenyl, but-2-enyl, 1-methylenepropyl, 2-propenyl (allyl) and ethenyl (vinyl). All carbon atoms may optionally be substituted with one or more halogen.

The term C(6-10)aryl as used herein means an aromatic hydrocarbon group having 6-10 carbon atoms, for example phenyl or naphthyl. All carbon atoms may optionally be substituted with one or more halogen.

The term C(6-10)arylC(1-3)alkyl as used herein means an C(6-10)aryl group attached to a C(1-3)alkyl group, both with the same meaning as previously defined.

The term C(6)aryl as used herein means an aromatic hydrocarbon group having 6 carbon atoms, i.e. phenyl. All carbon atoms may optionally be substituted with one or more halogen.

The term C(6)arylC(1-3)alkyl as used herein means an C(6)aryl group attached to a C(1-3)alkyl group, both with the same meaning as previously defined.

The term heteroatom as used herein refers to a nitrogen, sulfur or oxygen atom.

The term amino as used herein refers to an NH₂ group.

The term C(1-9)heteroaryl as used herein means an aromatic group having 1-9 carbon atoms and 1-4 heteroatoms, which may be attached via a nitrogen atom if feasible, or a carbon atom.

Examples include imidazolyl, thiadiazolyl, pyridinyl, pyrimidinyl, furyl, pyrazolyl, isoxazolyl, tetrazolyl, oxazol, thiazol and quinolyl. All carbon atoms may optionally be substituted with one or more halogen or methyl.

The term C(1-9)heteroarylC(1-3)alkyl as used herein means an C(1-9)heteroaryl group attached to a C(1-3)alkyl group, both with the same meaning as previously defined.

The term C(1-5)heteroaryl as used herein means an aromatic group having 1-5 carbon atoms and 1-4 heteroatoms, which may be attached via a nitrogen atom if feasible, or a carbon atom. Examples include imidazolyl, thiadiazolyl, pyridinyl, pyrimidinyl, furyl, pyrazolyl, isoxazolyl, and tetrazolyl. All carbon atoms may optionally be substituted with one or more halogen or methyl.

The term C(1-5)heteroarylC(1-3)alkyl as used herein means an C(1-5)heteroaryl group attached to a C(1-3)alkyl group, both with the same meaning as previously defined.

The term C(3-6)cycloalkyl as used herein means a saturated cyclic hydrocarbon having 3-6 carbon atoms, i.e. cyclopropyl, cyclobutyl, cyclopentyl or cyclohexyl. All carbon atoms may optionally be substituted with one or more halogen or methyl.

The term C(3-6)cycloalkylC(1-3)alkyl as used herein means an C(3-6)cycloalkyl group attached to an C(1-3)alkyl group, both with the same meaning as previously defined. An example is cyclopropylmethyl.

The term C(2-5)heterocycloalkyl as used herein means a saturated cyclic hydrocarbon having 2-5 carbon atoms and 1-3 heteroatoms, which may be attached via a nitrogen atom if feasible, or a carbon atom. Examples include piperazinyl, pyrazolidyl, piperidinyl, morpholinyl, oxolanyl and pyrrolidinyl. All carbon atoms may optionally be substituted with one or more halogen or methyl.

The term C(4)heterocycloalkyl as used herein means a saturated cyclic hydrocarbon having 4 carbon atoms and 1-3 heteroatoms, which may be attached via a nitrogen atom if feasible, or a carbon atom. Examples include piperazinyl, oxolanyl and pyrrolidinyl. All carbon atoms may optionally be substituted with one or more halogen or methyl.

The term C(2-5)heterocycloalkylC(1-3)alkyl as used herein means an C(2-5)heterocycloalkyl group attached to an C(1-3)alkyl group, both with the same meaning as previously defined.

The term C(4)heterocycloalkylC(1-3)alkyl as used herein means an C(4)heterocycloalkyl group attached to a C(1-3)alkyl group, both with the same meaning as previously defined.

The term (di)C(1-3)alkylamino as used herein means an amino group, which is monosubstituted or disubstituted with a C(1-3)alkyl group, the latter having the same meaning as previously defined.

The term C(1-3)alkoxy means an alkoxy group having 1-3 carbon atoms, the alkyl moiety being branched or unbranched. All carbon atoms are optionally substituted with one or more F.

The term C(1-3)alkoxycarbonyl means a carbonyl group substituted with a C(1-3)alkoxy, the latter having the same meaning as previously defined.

- 5 The term halogen as used herein means Cl or F.

In the above definitions with multifunctional groups, the attachment point is at the last group.

When, in the definition of a substituent, is indicated that "all of the alkyl groups" of said substituent are optionally substituted, this also includes the alkyl moiety of an alkoxy group.

- 10 The term "substituted" means that one or more hydrogens on the designated atom/atoms is/are replaced with a selection from the indicated group, provided that the designated atom's normal valency under the existing circumstances is not exceeded, and that the substitution results in a stable compound. Combinations of substituents and/or variables are permissible only if such combinations result in stable compounds. "Stable compound" or "stable structure" is defined as a compound or structure that is sufficiently robust to survive isolation to a useful
15 degree of purity from a reaction mixture, and formulation into an efficacious therapeutic agent.

The term "optionally substituted" means optional substitution with the specified groups, radicals or moieties.

- 20 The term pharmaceutically acceptable salt represents those salts which are, within the scope of medical judgment, suitable for use in contact for the tissues of humans and lower animals without undue toxicity, irritation, allergic response and the like, and are commensurate with a reasonable benefit/risk ratio. Pharmaceutically acceptable salts are well known in the art. They may be obtained during the final isolation and purification of the compounds of the invention, or separately by reacting the free base function with a suitable mineral acid such as hydrochloric acid, phosphoric acid, or sulfuric acid, or with an organic acid such as for example
25 ascorbic acid, citric acid, tartaric acid, lactic acid, maleic acid, malonic acid, fumaric acid, glycolic acid, succinic acid, propionic acid, acetic acid, methanesulfonic acid, and the like. The acid function can be reacted with an organic or a mineral base, like sodium hydroxide, potassium hydroxide or lithium hydroxide.

In one embodiment the invention relates to a compound according to Formula I wherein:

- 30 - A₁-A₄ are respectively CR₁-CR₄;
- or A₁ and A₄ are respectively CR₁ and CR₄ and A₂ or A₃ is N, the remaining position A being CR₂ or CR₃;
- A₅-A₈ are respectively CR₅-CR₈;
- or A₅ and A₈ are respectively CR₁ and CR₄ and A₆ or A₇ is N, the remaining position A
35 being CR₆ or CR₇;

- R₁-R₄ are independently H, halogen or C(1-6)alkyl;
- R₅-R₈ are independently H;
- R₉ is C(1-3)alkyl;
- R₁₀ and R₁₁ are independently H;
- 5 - R₁₂ is H;
- R₁₃ is C(3-6)cycloalkyl, C(3-6)cycloalkylC(1-3)alkyl, C(2-5)heterocycloalkylC(1-3)alkyl, C(6-10)aryl, C(6-10)arylC(1-3)alkyl, C(1-9)heteroaryl or C(1-9)heteroarylC(1-3)alkyl, all groups optionally substituted with one or more C(1-3)alkyl;
- R₁₄ is C(1-6)alkyl, C(2-6)alkenyl, C(3-6)cycloalkyl, C(2-5)heterocycloalkyl, C(6-10)aryl, or C(6-10)arylC(1-3)alkyl, all groups optionally substituted with one or more halogen, hydroxy or C(1-3)alkyl;
- 10 - or R₁₃ and R₁₄ are fused and form a ring having 5 to 7 atoms by joining R₁₃ being C(1-6)alkyl or C(2-6)alkenyl with an independent substituent within the definition of R₁₄ being C(6-10)aryl or C(6-10)arylC(1-3)alkyl.

15 In another embodiment the invention relates to a compound according to Formula I wherein:

- A₁-A₄ are respectively CR₁-CR₄;
- or A₁ and A₄ are respectively CR₁ and CR₄ and A₂ or A₃ is N, the remaining position A being CR₂ or CR₃;
- A₅-A₈ are respectively CR₅-CR₈;
- 20 - or A₅ and A₈ are respectively CR₁ and CR₄ and A₆ or A₇ is N, the remaining position A being CR₆ or CR₇; R₁-R₄ are independently H, Cl, F or methyl;
- R₅-R₈ are independently H;
- R₉ is ethyl;
- R₁₀ and R₁₁ are independently H;
- 25 - R₁₂ is H;
- R₁₃ is cyclobutyl, cyclopropylmethyl, oxolanylpropanyl, phenyl, benzyl, oxazolyl, pyrazolyl, thiadiazolyl, thiazolyl, pyridinyl, oxazolylmethyl or furanylmethyl, all groups optionally substituted with one or more methyl;
- R₁₄ is methyl, ethyl, tertbutyl, hydroxypropyl, propyl, cyclopropyl, cyclobutyl, oxolanyl, phenyl or benzyl, all groups optionally substituted with one or more F, or methyl;
- 30 - or R₁₃ and R₁₄ are fused and form a 1,2,3,4-tetrahydroquinoline, phenylpyrrolidine or phenylpiperidine.

In one embodiment the invention relates to a compound according to Formula I wherein:

- A₁-A₄ are respectively CR₁-CR₄;
- 35 - A₅ and A₈ are respectively CR₅ and CR₈;
- A₆ or A₇ is N, the remaining position A being CR₆ or CR₇;

- R₁-R₄ are independently H or halogen;
- R₅-R₈ are independently H;
- R₉ is C(1-3)alkyl;
- R₁₀ and R₁₁ are independently H;
- 5 - R₁₂ is H;
- R₁₃ is C(6-10)aryl;
- and R₁₄ is C(1-6)alkyl.

In another embodiment the invention relates to a compound according to Formula I wherein:

- A₁-A₄ are respectively CR₁-CR₄;
- 10 - A₅ and A₈ are respectively CR₅ and CR₈;
- A₆ or A₇ is N, the remaining position A being CR₆ or CR₇;
- R₁-R₄ are independently H, Cl or F;
- R₅-R₈ are independently H;
- R₉ is ethyl;
- 15 - R₁₀ and R₁₁ are independently H;
- R₁₂ is H;
- R₁₃ is phenyl;
- and R₁₄ is ethyl or tertbutyl.

In one embodiment the invention relates to a compound according to Formula I wherein all
20 positions A in A₁-A₄ are CR₁-CR₄.

In another embodiment the invention relates to a compound according to Formula I wherein all positions A in A₅-A₈ are CR₅-CR₈.

In another embodiment the invention relates to a compound according to Formula I wherein all of the positions A in A₁-A₈ are carbon.

25 In another embodiment the invention relates to a compound according to Formula I wherein one of the positions A in A₁-A₈ is N, the remaining positions A being carbon. In another embodiment the invention relates to a compound according to Formula I wherein either position A₁ or A₂ is N and the remaining positions A in A₁-A₈ are CR₁-CR₈.

In another embodiment the invention relates to a compound according to Formula I wherein
30 either position A₆ or A₇ is N and the remaining positions A in A₁-A₈ are CR₁-CR₈. In another embodiment the invention relates to a compound according to Formula I wherein R₁-R₈ are independently H, halogen, methoxy or methyl.

In yet another embodiment the invention relates to a compound according to Formula I wherein R₁-R₈ are independently H, halogen or methyl.

In another embodiment the invention relates to a compound according to Formula I wherein all positions R in R₁-R₄ are H.

In another embodiment the invention relates to a compound according to Formula I wherein all positions R in R₁-R₄ are halogen or methyl.

- 5 In yet another embodiment the invention relates to a compound according to Formula I wherein R₈ is methyl and all positions R in R₅-R₇ are H.

In another embodiment the invention relates to a compound according to Formula I wherein all positions R in R₅-R₈ are H.

- 10 In again another embodiment the invention relates to a compound according to Formula I wherein all positions R in R₁-R₈ are H.

In one embodiment the invention also relates to a compound according to Formula I wherein R₉ is C(1-3)alkyl.

In another embodiment the invention also relates to a compound according to Formula I wherein R₉ is ethyl.

- 15 In one embodiment the invention relates to a compound according to Formula I wherein R₁₀ and R₁₁ are independently H, methyl or hydroxyl.

In another embodiment the invention relates to a compound according to Formula I wherein R₁₀ and R₁₁ are both H.

- 20 The invention also relates to a compound according to Formula I wherein R₁₂ is H or C(1-3)alkyl.

In another embodiment the invention relates to a compound according to Formula I wherein R₁₂ is H.

- 25 In one embodiment the invention relates to a compound according to Formula I wherein R₁₃ is C(3-6)cycloalkyl, C(3)cycloalkylC(1-3)alkyl, C(2-5)heterocycloalkyl, C(4)heterocycloalkylC(1-3)alkyl, C(6)aryl, C(6)arylC(1-3)alkyl, C(1-5)heteroaryl or C(1-5)heteroarylC(1-3)alkyl, all groups optionally substituted with one or more halogen, amino, hydroxy, cyano, C(1-3)alkoxy, C(1-3)alkoxycarbonyl, (di)C(1-3)alkylamino or C(1-3)alkyl.

- 30 In another embodiment the invention relates to a compound according to Formula I wherein R₁₃ is C(3-6)cycloalkyl, C(3)cycloalkylC(1-3)alkyl, C(4)heterocycloalkylC(1-3)alkyl, C(6)aryl, C(6)arylC(1-3)alkyl, C(1-5)heteroaryl, or C(1-5)heteroarylC(1-3)alkyl, all groups optionally substituted with one or more C(1-3)alkyl.

In yet another embodiment the invention relates to a compound according to Formula I wherein R₁₄ is H, C(1-6)alkyl, C(2-6)alkenyl, C(3-6)cycloalkyl, C(3-6)cycloalkylC(1-3)alkyl,

C(4)heterocycloalkyl, C(2-5)heterocycloalkylC(1-3)alkyl, C(6)aryl, C(6)arylC(1-3)alkyl, C(1-5)heteroaryl or C(1-5)heteroarylC(1-3)alkyl, all groups optionally substituted with one or more halogen, amino, hydroxy, cyano, C(1-3)alkoxy, C(1-3)alkoxycarbonyl, (di)C(1-3)alkylamino or C(1-3)alkyl.

- 5 In yet another embodiment the invention relates to a compound according to Formula I wherein R_{14} is C(1-6)alkyl, C(3-6)cycloalkyl, C(4)heterocycloalkyl, C(6)aryl or C(6)arylC(1-3)alkyl, all groups optionally substituted with one or more halogen, hydroxy or C(1-3)alkyl.

In another embodiment the invention relates to a compound according to Formula I wherein R_{14} is H or C(1-6)alkyl, all alkyl chains optionally substituted with one or more halogen.

- 10 In yet another embodiment the invention relates to a compound according to Formula I wherein R_{13} and R_{14} are fused and form a ring having 5 to 7 atoms by joining R_{13} being C(1-6)alkyl or C(2-6)alkenyl with an independent R_{14} substituent selected from C(3-6)cycloalkyl, C(3-6)cycloalkylC(1-3)alkyl, C(2-5)heterocycloalkyl, C(2-5)heterocycloalkyl-C(1-3)alkyl, C(6)aryl, C(6)arylC(1-3)alkyl, C(1-5)heteroaryl or C(1-5)heteroaryl-C(1-3)alkyl, all groups
15 optionally substituted with one or more halogen, amino, hydroxy, cyano, C(1-3)alkoxy, C(1-3)alkoxycarbonyl, (di)C(1-3)alkylamino or C(1-3)alkyl.

- In again another embodiment the invention relates to a compound according to Formula I wherein R_{13} and R_{14} are fused and form a ring having 5 to 7 atoms by joining R_{13} being propyl with R_{14} selected from C(1-6)alkyl, C(2-6)alkenyl, C(2-5)heterocycloalkyl,
20 C(2-5)heterocycloalkylC(1-3)alkyl, C(6)aryl, C(6)arylC(1-3)alkyl, C(1-5)heteroaryl or C(1-5)heteroarylC(1-3)alkyl, with all groups optionally substituted with one or more halogen, amino, hydroxy, cyano, C(1-3)alkoxy, C(1-3)alkoxycarbonyl, (di)C(1-3)alkylamino or C(1-3)alkyl.

- In again another embodiment the invention relates to a compound according to Formula I wherein R_{13} and R_{14} are fused and form a ring having 5 to 7 atoms by joining R_{13} being propyl
25 with R_{14} selected from C(6)aryl or C(6)arylC(1-3)alkyl. The invention also relates to those compounds wherein all specific definitions for A_1 through A_8 , R_1 through R_{14} , and all substituent groups in the various aspects of the inventions defined here above occur in any combination within the definition of the compound of Formula I.

- In another aspect the invention relates to compounds of Formula I, which have a pIC₅₀ of 5
30 or higher. In yet another aspect the invention relates to compounds according to Formula I with a pIC₅₀ of more than 6. In yet another aspect the invention relates to compounds according to Formula I with a pIC₅₀ of more than 7. In yet another aspect the invention relates to compounds according to Formula I with a pIC₅₀ of more than 8.

- In yet another aspect the invention resides in the compounds according to Formula I selected
35 as described in examples 1 - 45.

The compounds of Formula I may form salts, which are also within the scope of this invention. Reference to a compound of Formula I herein is understood to include reference to salts thereof, unless otherwise indicated.

The compounds of Formula I may contain asymmetric or chiral centers and, therefore, exist in different stereoisomeric forms. It is intended that all stereoisomeric forms of the compounds of Formula I as well as mixtures thereof, including racemic mixtures, form part of the present invention.

Diastereomeric mixtures can be separated into their individual diastereomers on the basis of their physical chemical differences by methods well known to those skilled in the art, such as, for example, chromatography and/or fractional crystallization. Enantiomers can be separated by converting the enantiomeric mixture into a diastereomeric mixture by reaction with an appropriate optically active compound (e.g. chiral auxiliary such as a chiral alcohol or Mosher's acid chloride), separating the diastereomers and converting (e.g. hydrolyzing) the individual diastereomers to the corresponding pure enantiomers. Enantiomers can also be separated by use of chiral HPLC column.

The skilled artisan will recognize that desirable IC₅₀ values are dependent on the compound tested. For example, a compound with an IC₅₀ value less than 10⁻⁵ M is generally considered as a candidate for drug selection. Preferably, this value is lower than 10⁻⁶ M. However, a compound which has a higher IC₅₀ value, but is selective for the particular receptor, may be even a better candidate.

The compounds of the invention inhibit ROR γ activity. Modulation of ROR γ activity can be measured using for example biophysical (natural) ligand displacement studies, biochemical AlphaScreen or FRET assays, cellular GAL4 reporter gene assays, cellular IL-17 promotor reporter assay or functional IL-17 ELISA assays using for example mouse splenocytes or human peripheral blood mononuclear cells (PBMCs) cultured under T_H17 polarizing conditions.

In such assays, the interaction of a ligand with ROR γ can be determined by measuring, for example, the ligand modulated interaction of cofactor-derived peptides with the ROR γ ligand binding domain, or measuring the gene products of ligand modulated ROR γ mediated transcription using, for example, luciferase reporter assays or IL-17 ELISA assays.

The present invention also relates to a pharmaceutical composition comprising compounds or pharmaceutically acceptable salts thereof having the general Formula I in admixture with pharmaceutically acceptable excipients and optionally other therapeutically active agents.

The present invention also relates to a pharmaceutical composition comprising compounds or pharmaceutically acceptable salts thereof having the general Formula I in admixture with

pharmaceutically acceptable excipients and one or more pharmaceutically acceptable excipients.

The excipients must be "acceptable" in the sense of being compatible with the other ingredients of the composition and not deleterious to the recipients thereof.

- 5 The present invention also relates to a pharmaceutical composition comprising at least one additional therapeutically active agent.

The invention further includes a compound of Formula I in combination with one or more other drug(s).

- 10 Compositions include e.g. those suitable for oral, sublingual, subcutaneous, intravenous, intramuscular, nasal, local, or rectal administration, and the like, all in unit dosage forms for administration.

For oral administration, the active ingredient may be presented as discrete units, such as tablets, capsules, powders, granulates, solutions, suspensions, and the like.

- 15 For parenteral administration, the pharmaceutical composition of the invention may be presented in unit-dose or multi-dose containers, e.g. injection liquids in predetermined amounts, for example in sealed vials and ampoules, and may also be stored in a freeze dried (lyophilized) condition requiring only the addition of sterile liquid carrier, e.g. water, prior to use.

- 20 Mixed with such pharmaceutically acceptable excipients, the active agent may be compressed into solid dosage units, such as pills, tablets, or be processed into capsules or suppositories. By means of pharmaceutically acceptable liquids the active agent can be applied as a fluid composition, e.g. as an injection preparation, in the form of a solution, suspension, emulsion, or as a spray, e.g. a nasal spray.

- 25 For making solid dosage units, the use of conventional additives such as fillers, colorants, polymeric binders and the like is contemplated. In general any pharmaceutically acceptable additive, which does not interfere with the function of the active compounds, can be used. Suitable carriers with which the active agent of the invention can be administered as solid compositions include lactose, starch, cellulose derivatives and the like, or mixtures thereof, used in suitable amounts. For parenteral administration, aqueous suspensions, isotonic saline
30 solutions and sterile injectable solutions may be used, containing pharmaceutically acceptable dispersing agents and/or wetting agents, such as propylene glycol or butylene glycol.

The invention further includes a pharmaceutical composition, as hereinbefore described, in combination with packaging material suitable for said composition, said packaging material including instructions for the use of the composition for the use as hereinbefore described.

The exact dose and regimen of administration of the active ingredient, or a pharmaceutical composition thereof, may vary with the particular compound, the route of administration, and the age and condition of the individual subject to whom the medicament is to be administered.

In general parenteral administration requires lower dosages than other methods of administration, which are more dependent upon absorption. However, a dosage for humans preferably contains 0.0001-100 mg per kg body weight. The desired dose may be presented as one dose or as multiple sub-doses administered at appropriate intervals throughout the day.

10 The compounds according to the invention can be used in therapy.

A further aspect of the invention resides in the use of compounds according to the invention or a pharmaceutically acceptable salt thereof for the treatment of ROR γ -mediated diseases or ROR γ mediated conditions.

Another aspect of the invention resides in the use of compounds having the general Formula I or a pharmaceutically acceptable salt thereof for the treatment of autoimmune diseases, in particular those diseases in which T_H17 cells and non-T_H17 cells, which express T_H17 hallmark cytokines play a prominent role. These include, but are not limited to, the treatment of rheumatoid arthritis, psoriasis, inflammatory bowel disease, Crohn's disease and multiple sclerosis.

20 In another aspect, compounds having the general Formula I or a pharmaceutically acceptable salt thereof can be used for treatment of inflammatory diseases in which T_H17 cells and/or non-T_H17 cells, which express T_H17 hallmark cytokines play a prominent role such as, but not limited to respiratory diseases, osteoarthritis and asthma. Also, compounds or a pharmaceutically acceptable salt thereof having the general Formula I can be used for
25 treatment of infectious diseases in which T_H17 cells and/or non-T_H17 cells, which express T_H17 hallmark cytokines play a prominent role such as, but not limited to mucosal leishmaniasis.

Compounds having the general Formula I or a pharmaceutically acceptable salt thereof can also be used for treatment of other diseases in which T_H17 cells and/or non-T_H17 cells, which express T_H17 hallmark cytokines play a prominent role such as, but not limited to Kawasaki
30 disease and Hashimoto's thyroiditis.

In yet another aspect the invention resides in the use of compounds having the general Formula I for the treatment of multiple sclerosis, inflammatory bowel disease, Crohn's disease, psoriasis, rheumatoid arthritis, asthma, osteoarthritis, Kawasaki disease, Hashimoto's thyroiditis, cancer and mucosal leishmaniasis.

In another aspect, the compounds according to the invention can be used in therapies to treat or prevent multiple sclerosis, inflammatory bowel disease, Crohn's disease, psoriasis and rheumatoid arthritis, asthma, osteoarthritis, Kawasaki disease, Hashimoto's thyroiditis, cancer and mucosal leishmaniasis.

- 5 In another aspect the compounds according to the invention can be used to treat or prevent psoriasis.

In yet another aspect the compounds according to the invention can be used to treat inflammatory bowel disease.

- 10 The invention is illustrated by the following examples.

EXEMPLIFICATION

- As depicted in the Examples below, in certain exemplary embodiments, compounds are prepared according to the following general procedures. It will be appreciated that, although
15 the general methods depict the synthesis of certain compounds of the invention, the following general methods, and other methods known to one skilled in the art, can be applied to all compounds and subclasses and species of each of these compounds, as described herein.

GENERAL METHODS OF PREPARATION.

- 20 The compounds described herein, including compounds of general Formula I can be readily prepared according to the following reaction schemes and examples, or modifications thereof, using readily available starting materials, reagents and conventional synthesis procedures. Many of the reactions can also be carried out under microwave conditions or using conventional heating or utilizing other technologies such as solid phase reagents/scavengers
25 or flow chemistry. In these reactions, it is also possible to make use of variants which are themselves known to those skilled in the art, but are not mentioned in greater detail. For example, where specific acids, bases, reagents, coupling agents, solvents, etc. are mentioned, it is understood that other suitable acids, bases, reagents, coupling agents, solvents etc. may be used and are included within the scope of the present invention. Furthermore, other
30 methods for preparing compounds of the invention will be readily apparent to a person of ordinary skill in the art in light of the following reaction schemes and examples. In cases where synthetic intermediates and final products contain potentially reactive functional groups, for example amino, hydroxyl, thiol and carboxylic acid groups that may interfere with the desired reaction, it may be advantageous to employ protected forms of the intermediate. Methods for

the selection, introduction and subsequent removal of protecting groups are well known to those skilled in the art. The compounds obtained by using the general reaction sequences may be of insufficient purity. The compounds can be purified by using any of the methods for purification of organic compounds, for example, crystallization or silica gel or alumina column chromatography, using different solvents in suitable ratios. All possible stereoisomers are envisioned within the scope of the invention. In the discussion below variables have the meaning indicated above unless otherwise indicated.

The abbreviations used in these experimental details are listed below and additional ones should be considered known to a person skilled in the art of synthetic chemistry.

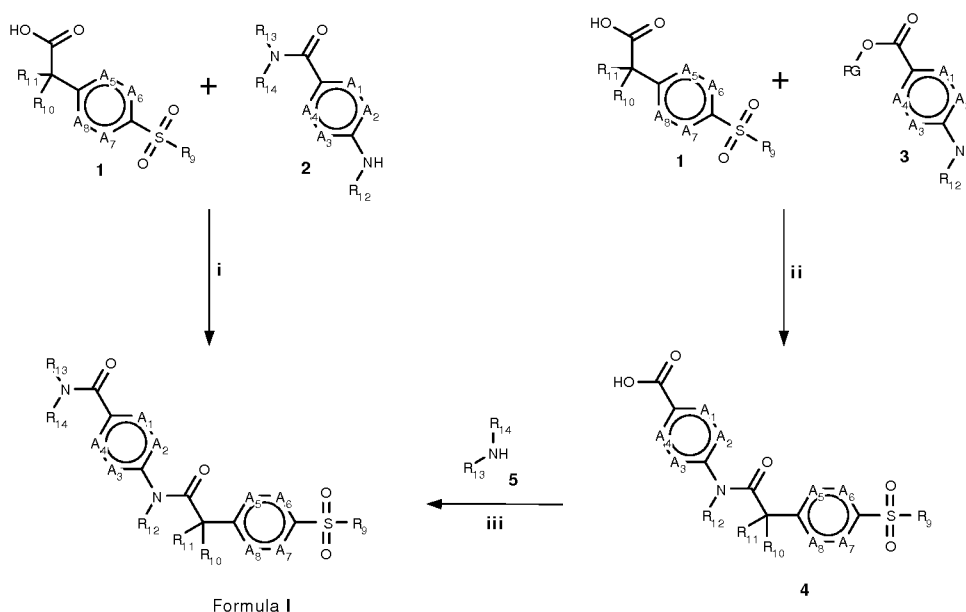
Abbreviations used herein are as follow: **r.t.**: room temperature; **HATU**: 2-(7-Aza-1*H*-benzotriazole-1-yl)-1,1,3,3-tetramethyluronium hexafluorophosphate; **DMF**: Dimethyl formamide; **DiPEA**: Diisopropylethylamine; **DMAP**: 4-(dimethylamino)pyridine; **DCC**: *N,N*-Dicyclohexylcarbodiimide; **mCPBA**: 3-chloroperoxybenzoic acid; **TFA**: Trifluoroacetic acid; **THF**: Tetrahydrofuran; **DMSO**: Dimethylsulfoxide; **PyBOP**: (Benzotriazol-1-yloxy)tripyrrolidinophosphonium hexafluorophosphate; **EtOH**: Ethanol; **EDCI**: 1-Ethyl-3-(3-dimethylaminopropyl)carbodiimide; **AIBN**: Azobisisobutyronitrile; **NBS**: *N*-bromosuccinimide; **TBAF**: tetra-*n*-butylammonium fluoride; **TMSCN**: trimethylsilyl cyanide.

Chemical names are preferred IUPAC names, generated using MarvinSketch version 6.3.0.

If a chemical compound is referred to using both a chemical structure and a chemical name, and an ambiguity exists between the structure and the name, the structure predominates.

GENERAL PROCEDURES

Scheme 1:



- 5 As depicted in scheme 1, the derivatives of the invention having Formula I can be prepared by methods known in the art of organic chemistry. Compounds of the invention can for example be obtained by an amide coupling reaction between a (hetero)aryl acetic acid derivative **1**, wherein A₅, A₆, A₇, A₈, R₉, R₁₀ and R₁₁ have the meaning as previously described, and a (hetero)aryl amino derivative **2**, wherein A₁, A₂, A₃, A₄, R₁₂, R₁₃ and R₁₄ have the meaning as
- 10 previously described, which can easily be prepared by someone skilled in the art of organic chemistry, using a coupling reagent such as EDCI, HATU, DCC, or PyBOP or the like, in the presence of a suitable base such as DiPEA or catalyst such as DMAP.

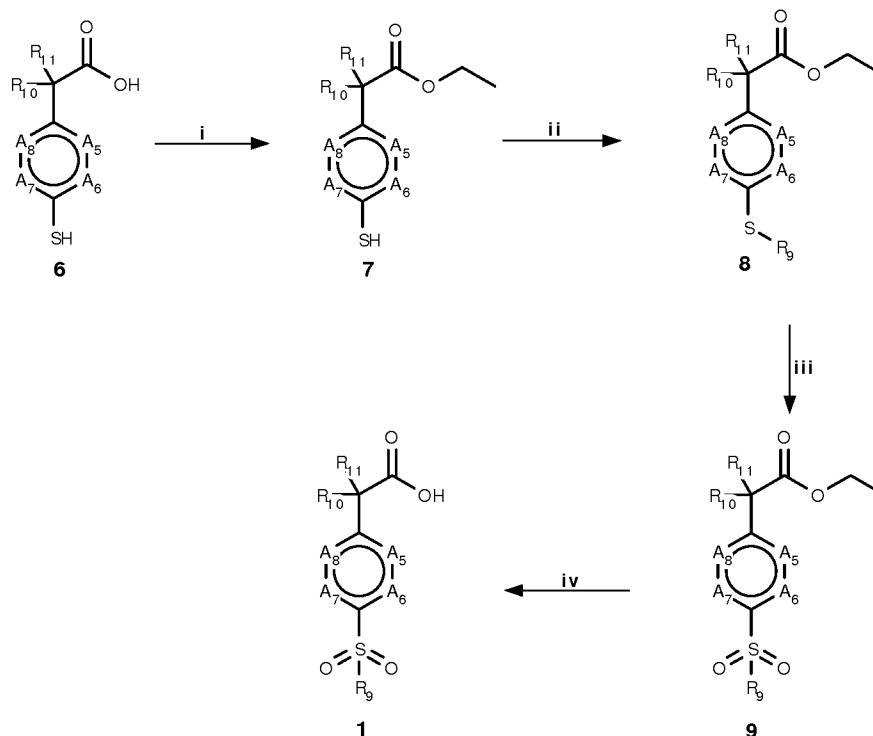
In an alternative way, a (hetero)aryl acetic acid derivative **1** can be converted into an acid chloride, using for example SOCl₂ or oxalyl chloride, which then can be coupled, in the

15 presence of a suitable base such as Et₃N or the like, with (hetero)aryl amino derivative **2**, obtaining derivatives of Formula I.

Alternatively, a (hetero)aryl acetic acid derivative **1** can be condensed with a suitable acid protected (hetero)aryl amino derivative **3**, wherein A₁, A₂, A₃, A₄, and R₁₂ have the meaning as previously described, using methods as described above. After removal of the protecting

20 group, the obtained carboxylic acid derivative **4** can be condensed with a suitable amine **5**, wherein R₁₃ and R₁₄ have the meaning as previously described, using methods as described before, giving derivatives of Formula I.

Scheme 2:

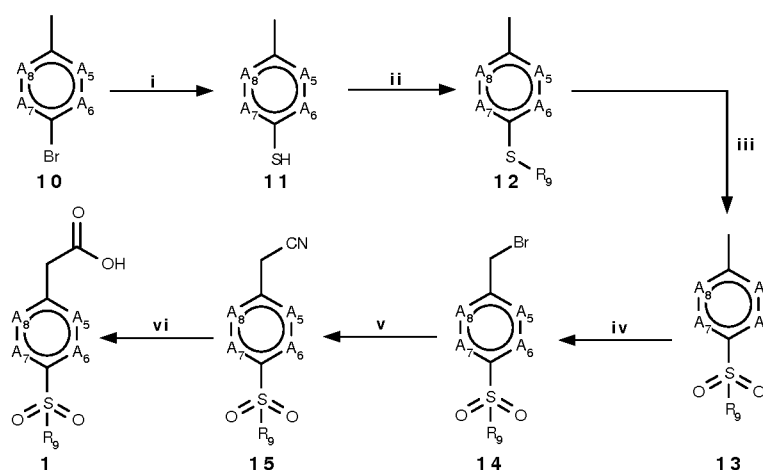


Conditions: i) H_2SO_4 , EtOH, 60 °C; ii) Alkylhalide, K_2CO_3 , CH_3CN , r.t.; iii) mCPBA, CH_2Cl_2 ,
 5 r.t.; iv) 2N NaOH, EtOH, r.t..

Scheme 2 illustrates a general method for preparing 2-[4-(alkylsulfonyl)phenyl]acetic acid derivatives of building block **1** wherein R_9 , R_{10} , R_{11} , A_5 , A_6 , A_7 and A_8 have the meaning as previously described.

- 10 Esterification of 4-mercaptophenylacetic acid derivatives **6** under acidic conditions, using for example H_2SO_4 in ethanol, provides ethyl 2-(4-mercaptophenyl)acetate derivatives **7**. Alkylation of the sulfur group using an alkylhalide in the presence of a base, such as K_2CO_3 , gives the corresponding ethyl 2-[4-(alkylsulfanyl)phenyl]acetate derivatives **8**. Oxidation, using e.g. mCPBA, gives ethyl 2-[4-(alkylsulfonyl)phenyl]acetate derivatives **9** which after
 15 saponification of the ester moiety under basic conditions, e.g. NaOH in ethanol, gives the corresponding 2-[4-(alkylsulfonyl)phenyl]acetic acid derivatives **1**.

Scheme 3:



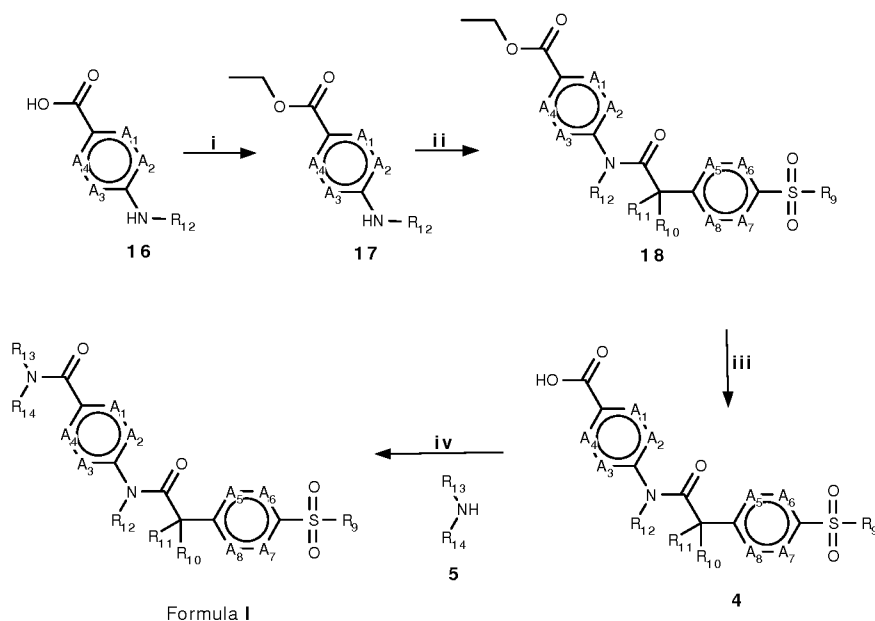
Conditions ($A_6 = N$): i) Thiourea, HCl (aq), reflux; ii) alkyl halide, K_2CO_3 , CH_3CN , r.t.; iii) mCPBA, CH_2Cl_2 , $0^\circ C \rightarrow RT$; iv) NBS, AIBN, CH_3CN , $60^\circ C$; v) TMSCN, TBAF, CH_3CN , reflux;
 5 vi) NaOH, EtOH, reflux.

Scheme 3 shows a general method for the preparation of 2-(6-alkylsulfonylpyridin-3-yl)acetic acid derivatives of building block **1** wherein A_6 is N and R_9 , R_{10} , R_{11} , A_5 , A_7 and A_8 have the meaning as previously described.

- 10 Reaction of 2-bromo-5-methylpyridine derivatives **10** with thiourea under acidic conditions gives 5-methylpyridine-2-thiol derivatives **11** which can be alkylated in the presence of a suitable base such as potassium carbonate to give the corresponding 2-(alkylsulfanyl)-5-methylpyridine derivatives **12**. Oxidation using mCPBA for example to the corresponding sulfone derivatives **13**, which upon radical bromination with NBS in presence of a radical
 15 initiator such as AIBN provides 5-(bromomethyl)-2-(alkylsulfanyl)pyridine derivatives **14**. These bromide derivatives can be converted to the corresponding nitrile derivatives **15** by treating them with a cyanide source such as TMSCN or potassium cyanide or the like. If TMSCN is used, it is required to add a fluoride source such as TBAF or the like to generate the cyanide nucleophile in situ. Hydrolysis of the nitrile derivatives **15** can provide the
 20 corresponding carboxylic acid derivatives of building block **1** wherein A_6 is N.

Some of the building blocks **1** are commercially available, known or prepared according to methods known to those skilled in the art.

Scheme 4:



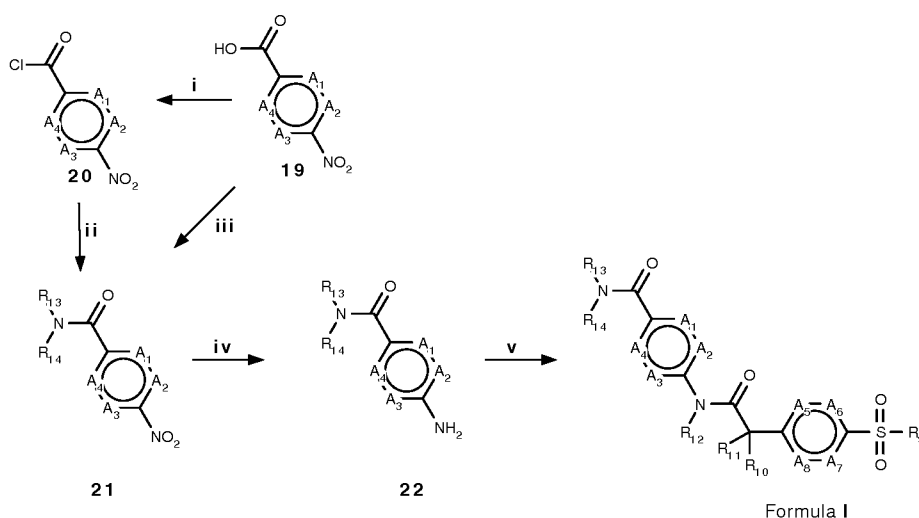
Conditions: i) Ethanol, HCl (conc.), r.t.; ii) a suitable derivative **1**, EDCI, DMAP, CH_2Cl_2 , 60 °C;

5 iii) 2N NaOH, EtOH, reflux; iv) A suitable amine **5**, EDCI, DMAP, CH_2Cl_2 , 60 °C.

Scheme 4 demonstrates a general method for the preparation of Formula I amide derivatives wherein R_9 , R_{10} , R_{11} , R_{12} , R_{13} , R_{14} , A_1 , A_2 , A_3 , A_4 , A_5 , A_6 , A_7 and A_8 have the meaning as previously described.

- 10 Reaction of carboxylic acid derivatives **16** with ethanol, under acidic conditions, give the corresponding ethyl ester derivatives **17**, which can be condensed with 2-[4-(alkylsulfonyl)phenyl]acetic acid derivatives **1**, in the presence of for example EDCI and DMAP, gives derivatives **18**. After saponification of the ester moiety under basic conditions, by using for example NaOH in ethanol, the obtained derivatives **4** can be condensed with amine
- 15 derivatives **5**, in the presence of for example EDCI and DMAP, giving derivatives of Formula I.

Scheme 5:



Conditions: i) SOCl_2 , CH_2Cl_2 , r.t.; ii) A suitable amine 5, triethyl amine, CH_2Cl_2 , r.t.; iii) A suitable amine 5, EDCI, DMAP, CH_2Cl_2 , 60 °C; iv) Zinc powder, NH_4Cl , THF, water 65 °C; v) a suitable derivative 1, EDCI, DMAP, CH_2Cl_2 , 60 °C.

Scheme 5 demonstrates an alternative route for the preparation of Formula I amide derivatives wherein R_9 , R_{10} , R_{11} , R_{12} , R_{13} , R_{14} , A_1 , A_2 , A_3 , A_4 , A_5 , A_6 , A_7 and A_8 have the meaning as previously described.

4-Nitrobenzoic acid derivatives 19 can be condensed with suitable amines, in the presence of for example EDCI and DMAP, giving 4-nitrobenzamide derivatives 21. Alternatively, 4-nitrobenzoic acid derivatives can easily be converted into the corresponding 4-nitrobenzoyl chloride derivatives 20 by using for example SOCl_2 or oxalyl chloride, which then can be coupled with suitable amines in the presence of a base such as Et_3N or the like.

The nitro group of derivatives 21 can be reduced, by using for example NH_4Cl in the presence of zinc or iron, giving the 4-aminobenzamide derivatives 22, which can be condensed with derivatives 1, in the presence of for example EDCI and DMAP, giving derivatives of Formula I wherein R_{12} is hydrogen.

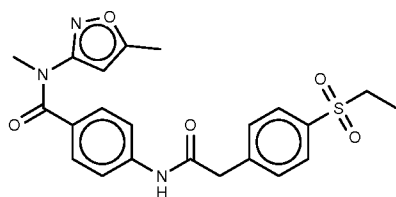
Examples

All building blocks used are commercially available, known or prepared according to methods known to those skilled in the art.

5

Examples 1 - 45

1: 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-methyl-*N*-(5-methyl-1,2-oxazol-3-yl)benzamide.



10

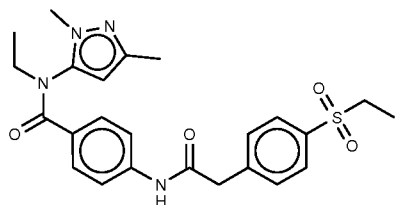
- i) To a solution of *N*,5-dimethyl-1,2-oxazol-3-amine (0.5 g) and triethyl amine (1.9 mL) in CH₂Cl₂ (5 mL) was added 4-nitrobenzoyl chloride (0.91 g) in CH₂Cl₂ (5 mL). The reaction mixture was stirred overnight at room temperature under a nitrogen atmosphere. The reaction mixture was washed with water, an aqueous 1M HCl solution, water, a saturated aqueous NaHCO₃ solution, water, brine and dried over MgSO₄. The combined organic layers were concentrated under reduced pressure and the residue was purified on SiO₂, using 0% to 6% CH₃OH/ethyl acetate (1:1) in CH₂Cl₂ as the eluent, giving *N*-methyl-*N*-(5-methyl-1,2-oxazol-3-yl)-4-nitrobenzamide (824 mg).
- ii) To a solution of the product obtained in the previous step (0.82 g) in ethanol (20 mL) was added SnCl₂ (2.99 g). The reaction mixture was stirred for 1 hour at 70 °C. After cooling to room temperature, the reaction mixture was quenched by pouring it onto ice and the pH was set to 14 by addition of an aqueous 2M NaOH solution. The aqueous layer was washed with ethyl acetate and the combined organic layers were washed with brine and dried over MgSO₄. The solvent was removed under reduced pressure giving 4-amino-*N*-methyl-*N*-(5-methyl-1,2-oxazol-3-yl)benzamide (687 mg). The product was used in the next step without further purification.
- iii) To a solution of the product obtained in the previous step (45 mg), 2-[4-(ethanesulfonyl)phenyl]acetic acid (54 mg) and DMAP (5 mg) in CH₂Cl₂ (2 mL) was added dropwise at 0 °C a solution of EDCI (45 mg) in CH₂Cl₂. The reaction mixture was stirred at room temperature overnight. The organic layer was washed with a saturated aqueous NaHCO₃ solution, water then brine, dried over MgSO₄ and concentrated under reduced

30

pressure. The residue was purified on SiO₂, using 1% to 10% methanol in CH₂Cl₂ as the eluent, giving the title compound 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-N-methyl-N-(5-methyl-1,2-oxazol-3-yl)benzamide (42 mg) as a white solid. MS(ES⁺) *m/z* 442.1 (M+H)⁺.

- 5 Following a procedure analogous to that described for **example 1**, the following compounds have been prepared.

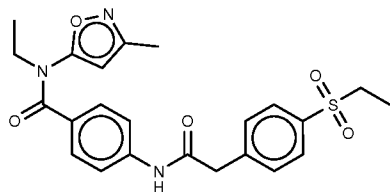
2: *N*-(1,3-dimethyl-1*H*-pyrazol-5-yl)-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethylbenzamide.



10

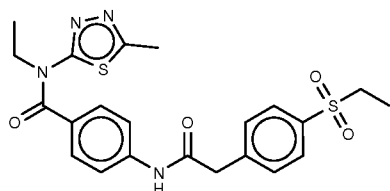
MS(ES⁺) *m/z* 469.2 [M+H]⁺.

3: 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-*N*-(3-methyl-1,2-oxazol-5-yl)benzamide.



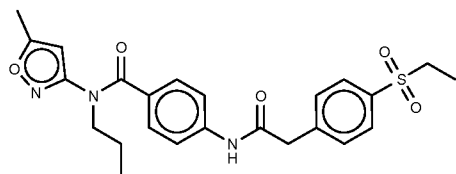
MS(ES⁺) *m/z* 456.2 [M+H]⁺.

- 15 **4:** 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-*N*-(5-methyl-1,3,4-thiadiazol-2-yl)benzamide.



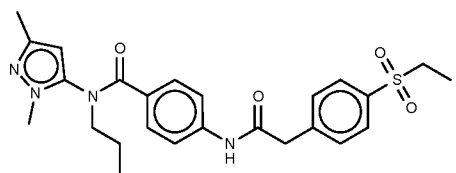
MS(ES⁺) *m/z* 473.1 [M+H]⁺.

5: 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-(5-methyl-1,2-oxazol-3-yl)-*N*-propylbenzamide.



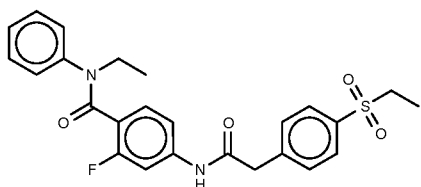
MS(ES⁺) *m/z* 470.2 [M+H]⁺.

6: *N*-(1,3-dimethyl-1*H*-pyrazol-5-yl)-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-propylbenzamide.



MS(ES⁺) *m/z* 483.2 [M+H]⁺.

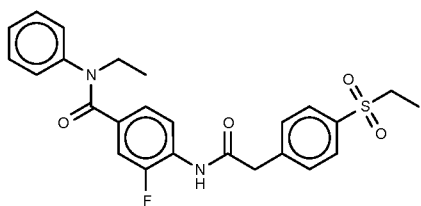
7: 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-2-fluoro-*N*-phenylbenzamide.



10

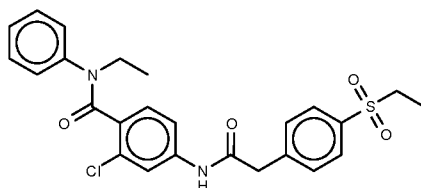
MS(ES⁺) *m/z* 469.2 [M+H]⁺.

8: 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-3-fluoro-*N*-phenylbenzamide.



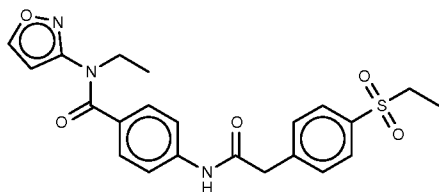
MS(ES⁺) *m/z* 469.2 [M+H]⁺.

9: 2-chloro-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-*N*-phenylbenzamide.



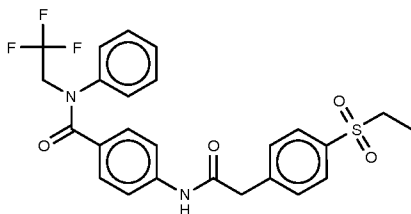
MS(ES⁺) *m/z* 486.2 [M+H]⁺.

10: 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-*N*-(1,2-oxazol-3-yl)benzamide.



MS(ES⁺) *m/z* 442.2 [M+H]⁺.

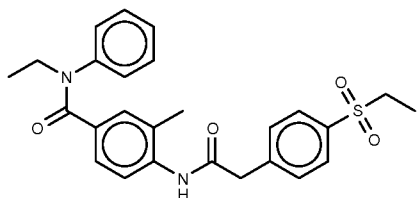
11: 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-phenyl-*N*-(2,2,2-trifluoroethyl)benzamide.



5

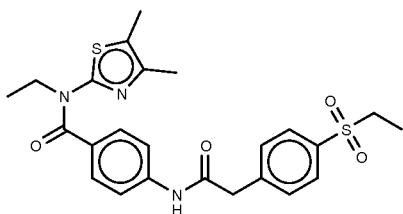
MS(ES⁺) *m/z* 505.2 [M+H]⁺.

12: 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-3-methyl-*N*-phenylbenzamide.



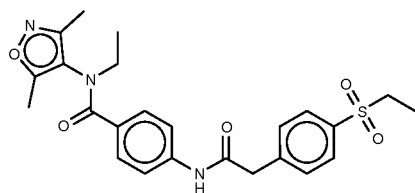
MS(ES⁺) *m/z* 465.2 [M+H]⁺.

10 **13:** *N*-(4-methyl-5-methyl-1,3-thiazol-2-yl)-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethylbenzamide.



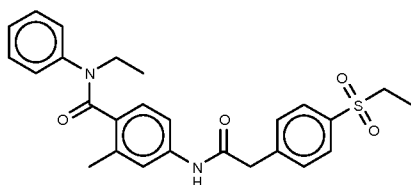
MS(ES⁺) *m/z* 486.2 [M+H]⁺.

14: *N*-(dimethyl-1,2-oxazol-4-yl)-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethylbenzamide.



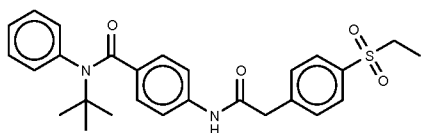
MS(ES⁺) *m/z* 470.2 [M+H]⁺.

5 **15:** 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-2-methyl-*N*-phenylbenzamide.



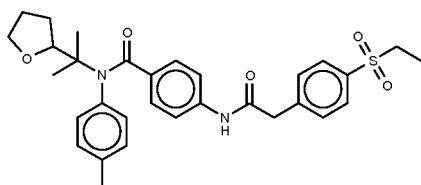
MS(ES⁺) *m/z* 465.2 [M+H]⁺.

16: *N*-tert-butyl-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-phenylbenzamide.



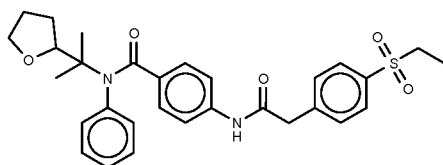
MS(ES⁺) *m/z* 479.2 [M+H]⁺.

10 **17:** 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-(4-methylphenyl)-*N*-[2-(oxolan-2-yl)propan-2-yl]benzamide.



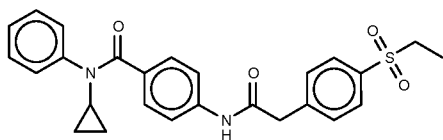
MS(ES⁺) *m/z* 549.2 [M+H]⁺.

15 **18:** 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-[2-(oxolan-2-yl)propan-2-yl]-*N*-phenylbenzamide.



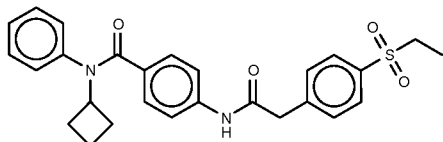
MS(ES⁺) *m/z* 536.2 [M+H]⁺.

19: *N*-cyclopropyl-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-phenylbenzamide.



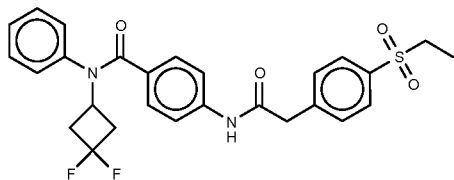
MS(ES⁺) *m/z* 463.1 [M+H]⁺.

20: *N*-cyclobutyl-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-phenylbenzamide.



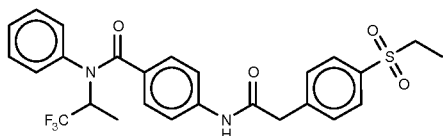
MS(ES⁺) *m/z* 477.2 [M+H]⁺.

21: *N*-(3,3-difluorocyclobutyl)-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-phenylbenzamide.



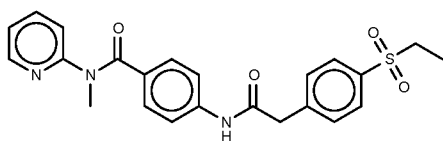
MS(ES⁺) *m/z* 513.1 [M+H]⁺.

22: 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-phenyl-*N*-(1,1,1-trifluoropropan-2-yl)benzamide.



MS(ES⁺) *m/z* 519.2 [M+H]⁺.

23: 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-methyl-*N*-(pyridin-2-yl)benzamide.



i) To a suspension of 4-aminobenzoic acid (20 g) in methanol (150 mL) was added concentrated HCl (25 mL) and the resulting mixture was stirred overnight at room temperature. The reaction mixture was quenched by the addition of a saturated aqueous NaHCO₃ solution.

The organic solvent was removed under reduced pressure and the aqueous layer was extracted with ethyl acetate. The combined organic phases were washed water, brine, dried over MgSO_4 and concentrated under reduced pressure giving methyl 4-aminobenzoate as an off white solid (20 g). The product was used in the next step without further purification.

5 ii) Following a procedure analogous to that described in **example 1, step iii**, using the product obtained in the previous step (390 mg) and 2-[4-(ethanesulfonyl)phenyl]acetic acid (500 mg) as the starting materials, methyl 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}benzoate (560 mg) has been synthesized.

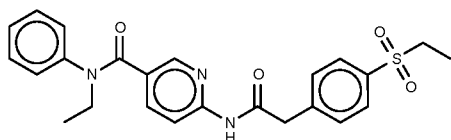
10 iii) To a solution of the product obtained in the previous step (560 mg) in ethanol was added a aqueous 2N NaOH solution (5 mL) and the resulting mixture was stirred overnight at room temperature. After adding water (100 mL) the mixture was washed with CH_2Cl_2 and acidified to pH = 6 by addition of an aqueous 6M HCl solution. The precipitate was filtered off, washed with water and dried at 40 °C under reduced pressure. The obtained 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}benzoic acid (390 mg) was used in the next step without
15 further purification.

iv) Following a procedure analogous to that described in **example 1, step iii**, using the product obtained in the previous step (40 mg) and 2-(methylamino)pyridine (15 mg) as the starting materials, methyl 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}benzoate (19 mg) was synthesized. MS(ES^+) m/z 438.2 $[\text{M}+\text{H}]^+$.

20

Following a procedure analogous to that described for **example 23**, the following compounds have been prepared.

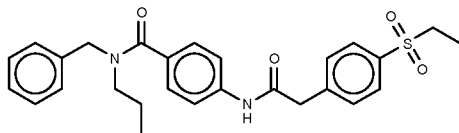
24: 6-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-*N*-phenylpyridine-3-carboxamide.



25

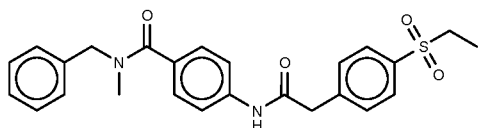
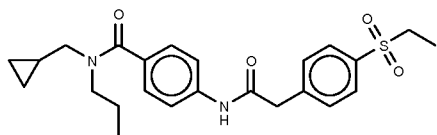
MS(ES^+) m/z 452.2 $[\text{M}+\text{H}]^+$.

25: *N*-benzyl-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-propylbenzamide.

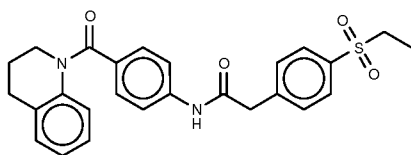
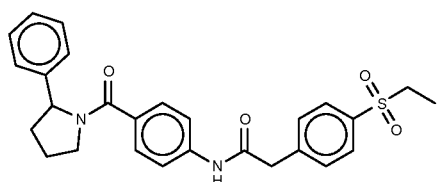
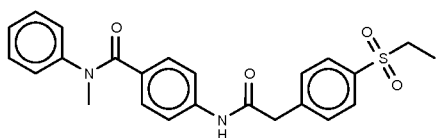


MS(ES^+) m/z 479.3 $[\text{M}+\text{H}]^+$.

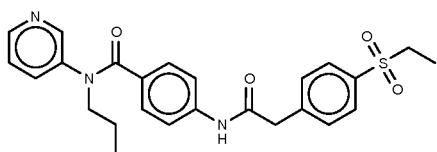
30 **26:** *N*-benzyl-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-methylbenzamide.

MS(ES⁺) m/z 451.2 [M+H]⁺.**27:** *N*-(cyclopropylmethyl)-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-propylbenzamide.MS(ES⁺) m/z 443.2 [M+H]⁺.

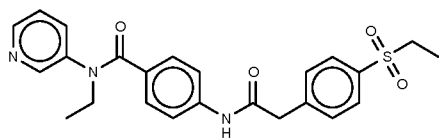
5

28: 2-[4-(ethanesulfonyl)phenyl]-*N*-[4-(1,2,3,4-tetrahydroquinoline-1-carbonyl)phenyl]acetamide.MS(ES⁺) m/z 463.2 [M+H]⁺.10 **29:** 2-[4-(ethanesulfonyl)phenyl]-*N*-[4-(2-phenylpyrrolidine-1-carbonyl)phenyl]acetamide.MS(ES⁺) m/z 477.2 [M+H]⁺.**30:** 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-methyl-*N*-phenylbenzamide.MS(ES⁺) m/z 437.2 [M+H]⁺.

15

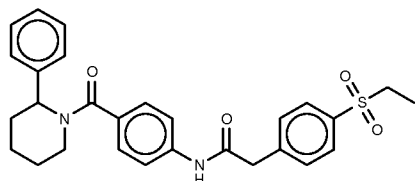
31: 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-propyl-*N*-(pyridin-3-yl)benzamide.MS(ES⁺) m/z 466.2 [M+H]⁺.

32: 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-*N*-(pyridin-3-yl)benzamide.



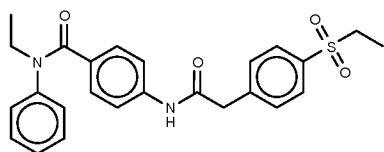
MS(ES⁺) *m/z* 452.2 [M+H]⁺.

5 **33:** 2-[4-(ethanesulfonyl)phenyl]-*N*-[4-(2-phenylpiperidine-1-carbonyl)phenyl]acetamide.



MS(ES⁺) *m/z* 491.2 [M+H]⁺.

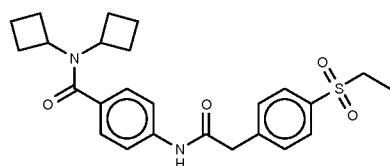
34: 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-*N*-phenylbenzamide.



MS(ES⁺) *m/z* 451.2 [M+H]⁺.

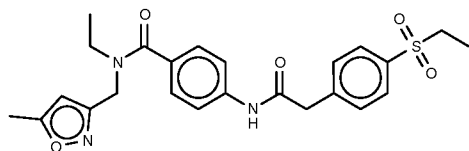
10

35: *N,N*-dicyclobutyl-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}benzamide.



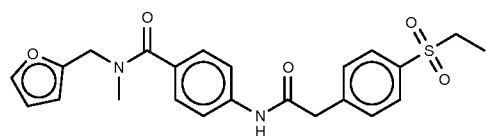
MS(ES⁺) *m/z* 455.2 [M+H]⁺.

15 **36:** 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-*N*-[(5-methyl-1,2-oxazol-3-yl)methyl]benzamide.



MS(ES⁺) *m/z* 470.2 [M+H]⁺.

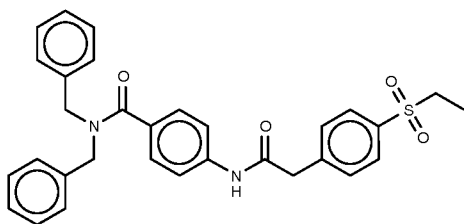
37: 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-(furan-2-ylmethyl)-*N*-methylbenzamide.



MS(ES⁺) *m/z* 441.2 [M+H]⁺.

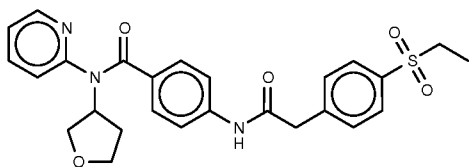
20

38: *N,N*-dibenzyl-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}benzamide.



MS(ES⁺) *m/z* 527.2 [M+H]⁺.

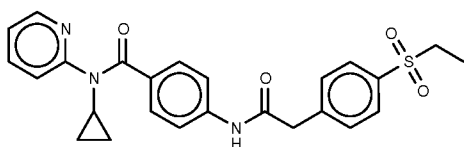
39: 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-(oxolan-3-yl)-*N*-(pyridin-2-yl)benzamide.



5

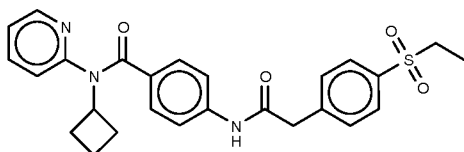
MS(ES⁺) *m/z* 494.1 [M+H]⁺.

40: *N*-cyclopropyl-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-(pyridin-2-yl)benzamide.



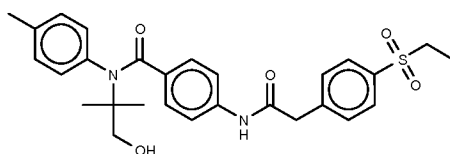
MS(ES⁺) *m/z* 494.1 [M+H]⁺.

10 **41:** *N*-cyclobutyl-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-(pyridin-2-yl)benzamide.



MS(ES⁺) *m/z* 478.2 [M+H]⁺.

42: 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-(1-hydroxy-2-methylpropan-2-yl)-*N*-(4-methylphenyl)benzamide.

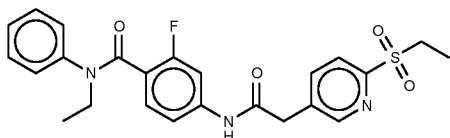


15

i) Following a procedure analogous to that described for **example 1**, using appropriate starting materials, *N*-{1-[(*tert*-butyldiphenylsilyl)oxy]-2-methylpropan-2-yl}-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-(4-methylphenyl)benzamide has been prepared.

ii) A suspension of the product obtained in the previous step (82 mg) and NH_4F (41 mg) in methanol (20 mL) was stirred overnight at 60 °C. The reaction mixture was concentrated under vacuo and the residue was dissolved in ethyl acetate. This solution was washed with water, brine, dried over magnesium sulfate and concentrated under reduced vacuo. The residue was purified on reverse phase HPLC, giving the title compound 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-N-(1-hydroxy-2-methylpropan-2-yl)-N-(4-methylphenyl)benzamide (10 mg). MS(ES^+) m/z 509.2 ($\text{M}+\text{H}$) $^+$.

43: 4-{2-[6-(ethanesulfonyl)pyridin-3-yl]acetamido}-N-ethyl-2-fluoro-N-phenylbenzamide.



i) To a suspension of 2-bromo-5-methylpyridine (10 g) in water (70 ml) was added at room temperature an aqueous 25% HCl solution, after which thiourea (9.6) was added until the reaction mixture became a clear solution. The reaction mixture was stirred at reflux temperature for 48 hours during which more thiourea (7.3 g) was added portion wise, until complete conversion. The reaction mixture was cooled to 0 °C and quenched by the addition of an aqueous 4N NaOH solution (51 ml). The formed precipitate was dissolved in CH_2Cl_2 (200 mL) and the organic layer was washed with water. The aqueous layer was acidified to pH = 3 and extracted with CH_2Cl_2 3 times. The combined organic layers were dried over MgSO_4 and concentrated under vacuo. The residue was recrystallized from ethanol to give 5-methylpyridine-2-thiol (4.5 g) as a white solid.

ii) To a suspension of the product obtained in the previous step (2.3 g) and K_2CO_3 (600 mg) in acetonitrile (45 mL) was added at room temperature bromoethane (1.7 mL). After stirring for 17 hours, the reaction mixture was filtered and the filtrate was concentrated under reduced pressure. The crude product (2.8 g) was purified via an acid-base extraction. The organic layer was dried on MgSO_4 and concentrated under reduced pressure to give 2-(ethylsulfany)-5-methylpyridine (2.6 g)

iii) *m*-CPBA (8.9 g) was added to an ice cold solution of the product obtained in the previous step (2.6 g) in CH_2Cl_2 (75 mL). After stirring the reaction mixture over the weekend at room temperature, the reaction mixture was filtered and the filtrate was washed with a saturated aqueous NaHCO_3 solution, water and brine. The organic layer was dried on MgSO_4 and concentrated under reduced pressure. The crude product was purified on SiO_2 , using 0% to 50% ethyl acetate in heptane as the eluent to give 2-(ethanesulfonyl)-5-methylpyridine (2.0 g) as a white solid.

iv) To a solution of the product obtained in the previous step (990 mg) in acetonitrile (25 mL) were added NBS (950 mg) and AIBN (44 mg). The reaction mixture was stirred for 17 hours at reflux temperature under a nitrogen atmosphere. After cooling, the reaction mixture was filtered and the filtrate was concentrated under reduced pressure. The crude product was purified on SiO₂, using 0% to 50% ethyl acetate in heptane as the eluent, to give 5-(bromomethyl)-2-(ethanesulfonyl)pyridine (817 mg).

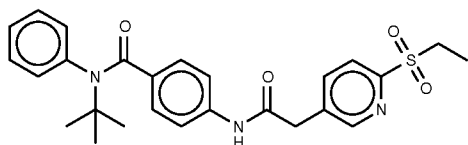
v) The product obtained in the previous step (684 mg) was added to a nitrogen purged solution of trimethylsilyl cyanide (486 μ L) and TBAF (3375 μ L) in acetonitrile (25 mL). The reaction mixture was stirred at 85 °C in a microwave reactor for 4 hours. After cooling to room temperature the reaction mixture was diluted with a 3 to 1 mixture of CH₂Cl₂ and 2-propanol. The resulting mixture was washed with water, brine, dried on MgSO₄, filtered and the filtrate was concentrated under reduced pressure. The crude product was purified on SiO₂, using 0% to 70% ethyl acetate in heptane as the eluent to give 2-[6-(ethanesulfonyl)pyridin-3-yl]acetonitrile (315 mg) as a white solid.

vi) To a solution of the product obtained in the previous step (315 mg) in ethanol (3 mL) was added a 2N aqueous NaOH solution. The reaction mixture was stirred for 2 hours in a microwave reactor at 100 °C. After cooling to room temperature, the reaction mixture was washed with CH₂Cl₂. The aqueous layer was acidified to pH = 3 and extracted with ethyl acetate. The combined organic layers were washed with water, brine, dried on MgSO₄, filtered and concentrated under reduced pressure to give 2-[6-(ethanesulfonyl)pyridin-3-yl]acetic acid as the crude product. The product was used in the next step without further purification.

vii) Following a procedure analogous to that described for **example 1**, using the product obtained in the previous step and appropriate starting materials, the title compound 4-{2-[6-(ethanesulfonyl)pyridin-3-yl]acetamido}-N-ethyl-2-fluoro-N-phenylbenzamide (61 mg) has been prepared. MS(ES⁺) m/z 470.2 (M+H)⁺.

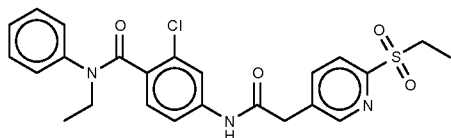
Following a procedure analogous to that described for **example 43**, the following compounds have been prepared.

44: *N*-tert-butyl-4-{2-[6-(ethanesulfonyl)pyridin-3-yl]acetamido}-*N*-phenylbenzamide.



MS(ES⁺) m/z 480.2 [M+H]⁺.

45: 2-chloro-4-{2-[6-(ethanesulfonyl)pyridin-3-yl]acetamido}-N-ethyl-N-phenylbenzamide.



MS(ES⁺) m/z 486.2 [M+H]⁺.

5 **Example 46**

RORy GAL4 reporter gene assay

Example inhibitors **1-45** were tested for their ability to inhibit RORy activity in a RORy GAL4 reporter gene assay. The assay procedure and results are described below.

RORy GAL4 reporter gene assay description

- 10 A GAL4 one-hybrid reporter system employing luciferase readout was established to determine inhibition of RORy in 293FT cells. The RORy ligand-binding domain (LBD) was fused to the yeast GAL4 DNA binding domain (DBD) and placed under the control of the human cytomegalovirus (CMV) immediate early promoter, using expression vector pFN26A (Promega) and standard recombinant DNA cloning methods. To serve as a control in the
- 15 assay, a similar vector was generated in which the GAL4-DBD was fused to Herpes simplex virus protein 16 (VP16), a constitutive transcriptional activator.

- To monitor the inhibitory effect of compounds on RORy, a transcriptional reporter construct was used. The pGL4.35 vector (Promega) contains nine copies of the GAL4 Upstream Activator Sequence (UAS). This sequence drives the transcription of the luciferase reporter
- 20 gene *luc2P* in response to binding of a fusion protein containing the GAL4 DNA binding domain, as for example expressed by the GAL4-RORy-LBD and GAL4-VP16 expression vectors described above. To allow a GAL4 fusion protein to drive the expression of the luciferase reporter, the pGL4.35 expression vector and the appropriate GAL4 fusion protein expression vector were bulk transfected in the 293FT cells using standard transfection
- 25 techniques.

The day after transfection, cells were plated into 96 well plates, test compound was added and the plates were incubated overnight. Subsequently, the firefly luciferase activity was quantified using luciferase detection reagent and luminescence readout.

- 30 *Detailed assay description*

293FT cells (Invitrogen) were transfected with a GAL4 fusion protein expression vector (as described above) and the transcriptional reporter construct (pGL4.35, Promega). 60 μ L of *TransIT*-293 transfection reagent (Mirus Bio) was added drop wise to 1500 μ L Opti-MEM I Reduced Serum Medium (Invitrogen) and incubated at room temperature (RT) for 5 to 20 minutes. 1500 μ L of this reagent mixture was added to 5 μ g of GAL4 fusion protein expression vector and 5 μ g of the transcriptional reporter construct, and incubated at RT for 20 minutes.

To harvest 293FT cells from a T75 flask, first the culture medium was taken off the cells. Subsequently, the cells were washed with Phosphate Buffered Saline (PBS) (Lonza), after which the PBS was removed. To dissociate the cells, 1 ml of TrypLE Express (Invitrogen) was added to the flask, followed by incubation at RT until the cells visually started to detach. Cells were collected in 5 mL of assay medium (DMEM culture medium (Lonza), 10% dialyzed FBS (Invitrogen) and Pen/Strep (Lonza)) to achieve a single cell suspension. 10×10^6 cells were spun down and re-suspended in 10 mL of assay medium. Subsequently, the cell suspension was added to the transfection mix tube, and then transferred as a whole to a T75 flask (Greiner), followed by overnight (16-24 hours) incubation at 37 °C and 5% CO₂.

For compound screening, the cells were harvested (as described above) and counted. 13×10^6 cells were spun down, the supernatant was aspirated and the cells were re-suspended in 17.3 mL of assay medium obtaining a cell suspension of 0.75×10^6 cells/mL. 80 μ L of cell suspension (60,000 cells) was plated per well into a white, flat bottom, tissue culture treated, 96 well screening plates (Greiner).

Test compounds were diluted, starting from a 10 mM DMSO stock solution, to serial dilutions in DMSO at 500x the final test concentration. Subsequently, these solutions were diluted to 5x the final test concentration in two 10-fold-dilution steps in assay medium. The final DMSO concentration of the 5x test compound solution was 1%. 20 μ L of the 5x test compound solution was added to each test well of the 96 well plate previously plated with 80 μ L cell suspension, resulting in the final test concentration with 0.2% DMSO.

The plates were incubated overnight (16-24 hours) at 37 °C and 5% CO₂.

For the luciferase readout, the luciferase reagent (Britelite Plus, Perkin Elmer) was brought to RT. To each test well of the screening plates, 100 μ L of 2.5-fold diluted Britelite Plus reagent was added, followed by incubation at RT for 10 minutes. The luciferase luminescence signal was measured using a Wallac Victor Microplate Reader (Perkin Elmer).

The half maximum inhibitory concentration (IC₅₀) values for the test compounds were calculated from the luciferase signal using GraphPad Prism software (GraphPad Software).

All exemplified compounds of Formula I (Examples 1 - 45) were found to have mean pIC₅₀ values above 5.

Examples 1 - 22, 23 - 35, 37, 38 and examples 40 - 44 were found to have mean pIC_{50} values above or equal to 6.

Examples 2, 3, 5, 6, 7 - 9, 11, 13, 16 - 22, 25, 28, 30, 31, 33, 34, 38, 42 and 44 were found to have mean pIC_{50} values above or equal to 7.

- 5 Examples 11, 13, 16, 18 and 34 were found to have mean pIC_{50} values above or equal to 8.

Example 47

Peripheral blood mononuclear cell (PBMC) IL-17 assay

- 10 Example inhibitors 2, 5, 6, 11, 13, 16, 17, 18, 21 and 44 were tested for their ability to inhibit the IL-17A production in anti-CD3/anti-CD28 stimulated peripheral blood mononuclear cells (PBMCs) isolated from human blood. The assay procedure and results are described below.

PBMC IL-17 assay description

- 15 This assay is designed to measure the levels of IL-17A secreted from anti-CD3/anti-CD28 stimulated PBMCs with the aim of measuring ROR γ mediated inhibition of IL-17A production.

The assay medium consists of 90% RPMI 1640 (Lonza), 10% heat inactivated fetal bovin serum (FBS, Lonza) and 100 U/mL penicillin/streptomycin solution.

Assay description

- 20 Anti-CD3 antibody (BD Pharmingen) was diluted to 10 $\mu\text{g}/\text{ml}$ in PBS (Lonza). 30 μL of 10 $\mu\text{g}/\text{ml}$ anti-CD3 solution was added to the inner 60 wells, excluding any negative control wells, of a 96-well cell culture treated U-bottom plate (Greiner). Plates were incubated overnight (16-24 hours) at 37 °C and 5% CO_2 .

- 25 Peripheral blood mononuclear cells were separated from buffy coats (Sanquin) using Ficoll-Paque PREMIUM separation medium (GE Healthcare Life Sciences) according to manufacturer's protocol and re-suspended in assay medium at 37 °C.

- Test compounds were diluted, starting from a 10 mM dimethylsulfoxide (DMSO) stock solution, to serial dilutions in DMSO at 200x the final test concentration. Subsequently, these solutions were diluted in two dilution steps in assay medium to 10x the final test concentration. The
30 DMSO concentration of the 10x test compound solution was 5%.

Anti-CD28 antibody (BD Pharmingen) was diluted to 20 $\mu\text{g}/\text{mL}$ in PBS. The PBMCs were diluted to a concentration of 2.5×10^6 cells/mL in assay medium at 37 °C.

For compound screening, the anti-CD3 coated plates were washed three times with PBS, the wells were subsequently aspirated using vacuum. To each screening well 80 μ L of the PBMC suspension, 10 μ L of the anti-CD28 solution and 10 μ L of the 10x test compound solution was added, resulting in the final test concentration with 0.5% DMSO. All outer wells were filled with assay medium to prevent evaporation. Plates were incubated for 5 days at 37 °C and 5% CO₂.

After incubation the plates were spun down at 1500 rpm for 4 minutes and the supernatant was collected. Subsequently, the IL-17A levels in the supernatants was determined using an IL-17 ELISA kit (human IL-17 DuoSet, R&D systems) according to manufacturer's protocol.

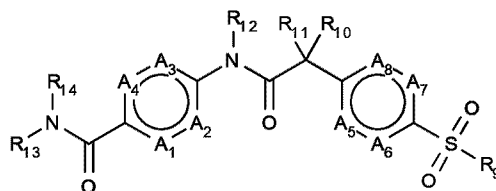
The half maximum inhibitory concentration (IC₅₀) values for the test compounds were calculated from the IL-17A signal using GraphPad Prism software (GraphPad Software).

The tested examples **2, 5, 6, 11, 13, 16, 17, 18, 21** and **44** were found to have mean pIC₅₀ values above or equal to 7.

The tested examples **11** and **16** were found to have mean pIC₅₀ values above or equal to 8.

Claims

1. A compound according to Formula I



(Formula I)

or a pharmaceutically acceptable salt thereof wherein:

- A₁-A₈ are N or CR₁-CR₈, respectively, with the proviso that no more than two of the four positions A in A₁-A₄ can be simultaneously N and that no more than two of the four positions A in A₅-A₈ can be simultaneously N;
- R₁-R₈ are independently H, halogen, amino, C(1-3)alkoxy, (di)C(1-3)alkylamino or C(1-6)alkyl;
- R₉ is C(1-6)alkyl;
- R₁₀ and R₁₁ are independently H, F, methyl, ethyl, hydroxy or methoxy or R₁₀ and R₁₁ together is carbonyl, all alkyl groups, if present, optionally being substituted with one or more F;
- R₁₂ is H or C(1-6)alkyl;
- R₁₃ is C(3-6)cycloalkyl, C(3-6)cycloalkylC(1-3)alkyl, C(2-5)heterocycloalkyl, C(2-5)heterocycloalkylC(1-3)alkyl, C(6-10)aryl, C(6-10)arylC(1-3)alkyl, C(1-9)hetero-aryl or C(1-9)heteroarylC(1-3)alkyl, all groups optionally substituted with one or more halogen, amino, hydroxy, cyano, C(1-3)alkoxy, C(1-3)alkoxycarbonyl, (di)C(1-3)alkylamino or C(1-3)alkyl;
- R₁₄ is H, C(1-6)alkyl, C(2-6)alkenyl, C(3-6)cycloalkyl, C(3-6)cycloalkylC(1-3)alkyl, C(2-5)heterocycloalkyl, C(2-5)heterocycloalkylC(1-3)alkyl, C(6-10)aryl, C(6-10)arylC(1-3)alkyl, C(1-9)heteroaryl or C(1-9)heteroarylC(1-3)alkyl, all groups optionally substituted with one or more halogen, amino, hydroxy, cyano, C(1-3)alkoxy, C(1-3)alkoxycarbonyl, (di)C(1-3)alkylamino or C(1-3)alkyl;
- or R₁₃ and R₁₄ are fused and form a ring having 5 to 7 atoms by joining R₁₃ being C(1-6)alkyl or C(2-6)alkenyl with an independent substituent within the definition of R₁₄, all groups optionally substituted with one or more halogen, amino,

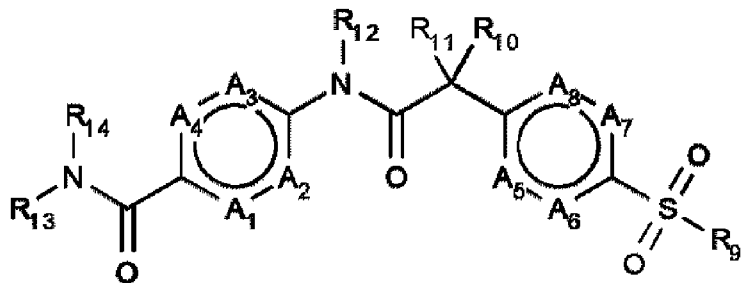
hydroxy, cyano, C(1-3)alkoxy, C(1-3)alkoxycarbonyl, (di)C(1-3)alkylamino or C(1-3)alkyl.

2. The compound according to claim 1 wherein all of the positions A in A₁-A₈ are carbon.
3. The compound according to claim 1 wherein one of the positions A in A₁-A₈ is N, the remaining position A being carbon.
4. The compound according to claim 1 wherein either position A₁ or A₂ is N and the remaining positions A in A₁-A₈ are CR₁-CR₈.
5. The compound according to claim 1 wherein either position A₆ or A₇ is N and the remaining positions A in A₁-A₈ are CR₁-CR₈.
6. The compound according to any one of claims 1-3 wherein R₁-R₈ are independently H, halogen or methyl.
7. The compound according to any one of claims 1-4 where R₉ is C(1-3)alkyl.
8. The compound according to any one of claims 1-5 wherein R₁₀ and R₁₁ are both H.
9. The compound according to any one of claims 1-6 where R₁₂ is H.
10. The compound according to any one of claims 1-7 where R₁₃ is C(3-6)cycloalkyl, C(3-6)cycloalkylC(1-3)alkyl, C(2-5)heterocycloalkyl, C(4)heterocycloalkyl-C(1-3)alkyl, C(6)aryl, C(6)arylC(1-3)alkyl, C(1-5)heteroaryl or C(1-5)heteroaryl-C(1-3)alkyl, all groups optionally substituted with one or more halogen, amino, hydroxy, cyano, C(1-3)alkoxy, C(1-3)alkoxycarbonyl, (di)C(1-3)alkylamino or C(1-3)alkyl.
11. The compound according to any one of claims 1-8 where R₁₄ is H, C(1-6)alkyl, C(2-6)alkenyl, C(3-6)cycloalkyl, C(3-6)cycloalkylC(1-3)alkyl, C(4)heterocycloalkyl, C(2-5)heterocycloalkylC(1-3)alkyl, C(6)aryl, C(6)arylC(1-3)alkyl, C(1-5)heteroaryl or C(1-5)heteroarylC(1-3)alkyl, all groups optionally substituted with one or more halogen, amino, hydroxy, cyano, C(1-3)alkoxy, C(1-3)alkoxycarbonyl, (di)C(1-3)alkylamino or C(1-3)alkyl.

12. The compound according to any one of claims 1-7 where R₁₃ and R₁₄ are fused and form a ring having 5 to 7 atoms by joining R₁₃ being C(1-6)alkyl or C(2-6)alkenyl with an independent R₁₄ substituent selected from C(3-6)cycloalkyl, C(3-6)cycloalkylC(1-3)alkyl, C(2-5)heterocycloalkyl, C(2-5)heterocycloalkyl-C(1-3)alkyl, C(6)aryl, C(6)arylC(1-3)alkyl, C(1-5)heteroaryl or C(1-5)heteroaryl-C(1-3)alkyl, all groups optionally substituted with one or more halogen, amino, hydroxy, cyano, C(1-3)alkoxy, C(1-3)alkoxycarbonyl, (di)C(1-3)alkylamino or C(1-3)alkyl.
13. The compound selected from claim 1 which is selected from the group of:
- 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-methyl-*N*-(5-methyl-1,2-oxazol-3-yl)benzamide;
 - N*-(1,3-dimethyl-1*H*-pyrazol-5-yl)-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethylbenzamide;
 - 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-*N*-(3-methyl-1,2-oxazol-5-yl)benzamide;
 - 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-*N*-(5-methyl-1,3,4-thiadiazol-2-yl)benzamide;
 - 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-(5-methyl-1,2-oxazol-3-yl)-*N*-propylbenzamide;
 - N*-(1,3-dimethyl-1*H*-pyrazol-5-yl)-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-propylbenzamide;
 - 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-2-fluoro-*N*-phenylbenzamide;
 - 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-3-fluoro-*N*-phenylbenzamide;
 - 2-chloro-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-*N*-phenylbenzamide;
 - 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-*N*-(1,2-oxazol-3-yl)benzamide;
 - 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-phenyl-*N*-(2,2,2-trifluoroethyl)benzamide;
 - 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-3-methyl-*N*-phenylbenzamide;
 - N*-(4-methyl-5-methyl-1,3-thiazol-2-yl)-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethylbenzamide;
 - N*-(dimethyl-1,2-oxazol-4-yl)-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethylbenzamide;
 - 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-2-methyl-*N*-phenylbenzamide;
 - N*-tert-butyl-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-phenylbenzamide;
 - 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-(4-methylphenyl)-*N*-[2-(oxolan-2-yl)propan-2-yl]benzamide;
 - 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-[2-(oxolan-2-yl)propan-2-yl]-*N*-phenylbenzamide;
 - N*-cyclopropyl-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-phenylbenzamide;
 - N*-cyclobutyl-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-phenylbenzamide;
 - N*-(3,3-difluorocyclobutyl)-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-phenylbenzamide;

- . 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-phenyl-*N*-(1,1,1-trifluoropropan-2-yl)benzamide
 - . 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-methyl-*N*-(pyridin-2-yl)benzamide;
 - . 6-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-*N*-phenylpyridine-3-carboxamide;
 - 5 . *N*-benzyl-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-propylbenzamide;
 - . *N*-benzyl-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-methylbenzamide;
 - . *N*-(cyclopropylmethyl)-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-propylbenzamide;
 - . 2-[4-(ethanesulfonyl)phenyl]-*N*-[4-(1,2,3,4-tetrahydroquinoline-1-carbonyl)phenyl]acetamide;
 - 10 . 2-[4-(ethanesulfonyl)phenyl]-*N*-[4-(2-phenylpyrrolidine-1-carbonyl)phenyl]acetamide;
 - . 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-methyl-*N*-phenylbenzamide;
 - . 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-propyl-*N*-(pyridin-3-yl)benzamide;
 - . 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-*N*-(pyridin-3-yl)benzamide;
 - . 2-[4-(ethanesulfonyl)phenyl]-*N*-[4-(2-phenylpiperidine-1-carbonyl)phenyl]acetamide;
 - 15 . 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-*N*-phenylbenzamide;
 - . *N,N*-dicyclobutyl-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}benzamide;
 - . 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-ethyl-*N*-[(5-methyl-1,2-oxazol-3-yl)methyl]benzamide;
 - . 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-(furan-2-ylmethyl)-*N*-methylbenzamide;
 - 20 . *N,N*-dibenzyl-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}benzamide;
 - . 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-(oxolan-3-yl)-*N*-(pyridin-2-yl)benzamide;
 - . *N*-cyclopropyl-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-(pyridin-2-yl)benzamide;
 - . *N*-cyclobutyl-4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-(pyridin-2-yl)benzamide;
 - . 4-{2-[4-(ethanesulfonyl)phenyl]acetamido}-*N*-(1-hydroxy-2-methylpropan-2-yl)-*N*-(4-methylphenyl)benzamide;
 - 25 . 4-{2-[6-(ethanesulfonyl)pyridin-3-yl]acetamido}-*N*-ethyl-2-fluoro-*N*-phenylbenzamide;
 - . *N*-tert-butyl-4-{2-[6-(ethanesulfonyl)pyridin-3-yl]acetamido}-*N*-phenylbenzamide and
 - . 2-chloro-4-{2-[6-(ethanesulfonyl)pyridin-3-yl]acetamido}-*N*-ethyl-*N*-phenylbenzamide.
- 30 14. The compound according to any one of claims 1 to 13 or a pharmaceutically acceptable salt thereof for use in the treatment of ROR γ -mediated autoimmune diseases or ROR γ -mediated inflammatory diseases.
15. A pharmaceutical composition which comprises a compound of Formula I according to
- 35 any one of claims 1 to 13 or a pharmaceutically acceptable salt thereof and one or more pharmaceutically acceptable excipients.
16. A pharmaceutical composition according to claim 14, which further comprises at least one additional therapeutically active agent.

17. The compound according to any one of claims 1 to 13 of a pharmaceutically acceptable salt thereof for use in the treatment or prevention of multiple sclerosis, inflammatory bowel disease, Crohn's disease, psoriasis, rheumatoid arthritis, asthma, osteoarthritis, Kawasaki disease, Hashimoto's thyroiditis, cancer, or mucosal leishmaniasis.
- 5
18. Use of the pharmaceutical composition of claim 15 or 16 in the treatment of ROR γ -mediated autoimmune diseases or ROR γ -mediated inflammatory diseases.
19. Use of the pharmaceutical composition of claim 15 or 16 in the treatment of multiple
- 10 sclerosis, inflammatory bowel disease, Crohn's disease, psoriasis, rheumatoid arthritis, asthma, osteoarthritis, Kawasaki disease, Hashimoto's thyroiditis, cancer or mucosal leishmaniasis.
20. Use of the compound of any one of claims 1 to 13 in the treatment of ROR γ -mediated
- 15 autoimmune diseases or ROR γ -mediated inflammatory diseases.
21. Use of the compound of any one of claims 1 to 13 in the treatment of multiple sclerosis, inflammatory bowel disease, Crohn's disease, psoriasis, rheumatoid arthritis, asthma, osteoarthritis, Kawasaki disease, Hashimoto's thyroiditis, cancer or mucosal
- 20 leishmaniasis.
22. Use of the compound of any one of claims 1 to 13 in the manufacture of a medicament for treatment of ROR γ -mediated autoimmune diseases or ROR γ -mediated inflammatory diseases.
- 25
23. Use of the compound of any one of claims 1 to 13 in the manufacture of a medicament for treatment of multiple sclerosis, inflammatory bowel disease, Crohn's disease, psoriasis, rheumatoid arthritis, asthma, osteoarthritis, Kawasaki disease, Hashimoto's thyroiditis, cancer or mucosal leishmaniasis.
- 30



(Formula I)