



(11) **EP 2 935 228 B9**

(12) **CORRECTED EUROPEAN PATENT SPECIFICATION**

(15) Correction information:
Corrected version no 1 (W1 B1)
Corrections, see
Drawings
Drawing(s) replaced or added

(51) Int Cl.:
C07D 249/12 ^(2006.01) **C07D 401/06** ^(2006.01)
A61K 31/4196 ^(2006.01) **A61P 35/00** ^(2006.01)
A61P 31/12 ^(2006.01)

(48) Corrigendum issued on:
06.12.2017 Bulletin 2017/49

(86) International application number:
PCT/US2013/074197

(45) Date of publication and mention of the grant of the patent:
02.08.2017 Bulletin 2017/31

(87) International publication number:
WO 2014/099503 (26.06.2014 Gazette 2014/26)

(21) Application number: **13863783.0**

(22) Date of filing: **10.12.2013**

(54) **TRIAZOLONE COMPOUNDS AND USES THEREOF**

TRIAZOLONVERBINDUNGEN UND VERWENDUNGEN DAVON

COMPOSÉS DE TRIAZOLONE ET LEURS UTILISATIONS

(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

- **JACINTHO, Jason, Duarte**
San Diego, CA 92116 (US)
- **BACCEI, Jill, Melissa**
Poway, CA 92064 (US)
- **STEARNS, Brian, Andrew**
Encinitas, CA 92024 (US)
- **CLARK, Ryan, Christopher**
San Diego, CA 92126 (US)

(30) Priority: **20.12.2012 US 201261739906 P**

(43) Date of publication of application:
28.10.2015 Bulletin 2015/44

(73) Proprietor: **Inception 2, Inc.**
San Diego, CA 92121 (US)

(74) Representative: **Plougmann Vingtoft a/s**
Rued Langgaards Vej 8
2300 Copenhagen S (DK)

(72) Inventors:

- **STOCK, Nicholas, Simon**
Encinitas, CA 92024 (US)
- **CHEN, Austin, Chih-yu**
San Marcos, CA 92078 (US)
- **BRAVO, Yalda, Mostofi**
San Diego, CA 92104 (US)

(56) References cited:
EP-A1- 2 330 098 **WO-A1-00/12489**
WO-A2-02/38553 **WO-A2-2012/037299**
US-A1- 2004 116 491 **US-A1- 2010 022 540**

EP 2 935 228 B9

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).

Description**FIELD OF THE INVENTION**

5 **[0001]** This invention is directed to novel triazolones, or pharmaceutically acceptable salts thereof, useful in the treatment of prostate, breast, colon, pancreatic, human chronic lymphocytic leukemia, melanoma and other cancers. The invention disclosed herein enables methods of treating prostate, breast, ovarian, liver, kidney, colon, pancreatic, human chronic lymphocytic leukemia, melanoma and other cancers comprising administration of selective PPAR α antagonists. The compounds and pharmaceutical compositions of the invention are also useful in the treatment of viral infections, such as HCV infections and HIV infections.

BACKGROUND OF THE INVENTION

15 **[0002]** While tremendous strides have been made in the treatment of various cancers, in many cases, cancer treatment continues to be a matter of administering one or more anti-cancer agents that are marginally less chemotoxic to healthy cells than they are to the cancer in question. In recognition of this problem, there has been substantial research effort aimed at identifying, understanding and taking advantage of phenotypical behavior peculiar to certain cancer cells. It has long been observed that most cancer cell types generate energy for cellular processes through aerobic glycolysis rather than through oxidative phosphorylation as found in the normal cell. This process, which became known as the "Warburg effect", is highly energy inefficient and requires cancer cell mitochondria to resort to glucose fermentation to make up the energy deficit. Since perhaps the mid-1990's researchers have sought to identify methods of treating cancer that take advantage of the "Warburg effect" and associated aspects of cancer cell mitochondrial metabolism. See, for example, Wang, et al., Small mitochondrial-targeting molecules as anti-cancer agents, *Mol. Aspects Med.* 2010 February; 31(1): 75-92.

25 **[0003]** Samudio, et al., *J. Clin. Invest.* 120: 142-156 (2010), disclosed that in certain leukemia cell lines "mitochondrial uncoupling - the continuing reduction of oxygen without ATP synthesis - has recently been shown in leukemic cells to circumvent the ability of oxygen to inhibit glycolysis, and may promote the metabolic preference for glycolysis by shifting from pyruvate oxidation to fatty acid oxidation (FAO)." Samudio, *et. al.*, also provided data indicating that inhibition of FAO could sensitize human leukemia cells to apoptosis, and further that inhibition of FAO may prove useful in the treatment of leukemia.

35 **[0004]** PPAR α is known to be an important regulator of fatty acid oxidation. See Pyper, et al., *Nucl. Recept. Signal.* 8:e002., e002 (2010). It has been reported that the expression of the PPAR α gene can be higher in human chronic lymphocyte leukemia (CLL) making this cancer type sensitive to therapies aimed at reducing FAO (Samudio et al., *J. Clin. Invest.* 120:142-156 (2010)). This effect may generalize to several cancer types. For example, ovarian cancer and breast cancer (Linher-Melville et al., 2011, *BMC*, 4;11:56), thrive in an adipose rich environment and as a result can be negatively impacted by targeted therapies that reduce fatty acid metabolism (Nieman et al., 2011, *Nat Med.* 2011 Oct 30;17(11):1498-503). Still other cancers that rely on FAO include prostate cancer (Liu, *Prostate Cancer Prostatic Dis.* 2006; 9(3):230-4), colon cancer (Holla et al., 2011, *JCB* 286(34):30003-30009), pancreatic cancer (Khasawneh et al., 2009, *PNAS* 106(9):3354-3359) and lung cancer (Zaugg et al., 2011, *Genes and Development*, 25:1041-1051).

40 **[0005]** GW6471 (Xu et al., *Nature* 415, 813-817 (2002) and MK-866 (Kehrer et al., *Biochem. J.* 356, 899-906 (2001) have been identified as antagonists of PPAR α . Moreover, MK-866, whose primary activity is as an inhibitor of FLAP, has been disclosed to induce apoptosis in a human chronic lymphocytic leukemia cell line in a FLAP-independent manner; and has also been disclosed to induce apoptosis in prostate and glioblastoma cell lines.

45 **[0006]** It is our belief that in cancers that rely heavily on FAO, antagonism of PPAR α by small molecules provides a panoply of anti-cancer treatment opportunities to: reduce or halt proliferation; decrease or reverse immunosuppression; enhance apoptosis; and increase susceptibility of cancerous cells to other anti-cancer agents. These cancers include prostate, breast, colon and pancreatic cancer, among others.

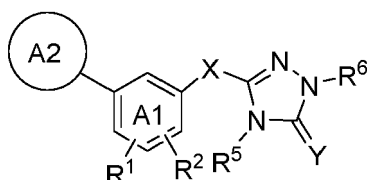
50 **[0007]** Chronic myeloid leukemia (CML) is model of hematopoietic stem cell (HSC) disease. In 2008, Ito *et al.* disclosed evidence linking the loss of promyelocytic leukemia (PML) gene expression with favorable outcomes in CML (*Nature*, 2008 June 19; 453 (7198) 1072-1078). More recently Ito *et al.* disclosed that in the PML pathway, loss of PPAR δ and accompanying inhibition of mitochondrial FAO induced loss of hematopoietic stem cell (HSC) maintenance (*Nature Medicine*, doi:10.1038/nm.2882). Moreover, Carracedo *et al.* disclosed that whereas PML expression allowed luminal filling in 3D basement membrane breast cancer, the effect was reversed by inhibition of FAO (*J. Clin. Invest.* 2012;122(9):3088-3100). This and other evidence supports our view that inhibition of fatty acid oxidation, via antagonism of PPAR's (including PPAR α), will prove effective in inhibiting asymmetric leukemia stem cell differentiation, and therefore, prove effective in preventing the onset of and/or recurrence of acute and chronic myeloid leukemia, as well as other cancers.

55 **[0008]** PPAR α antagonists have also been shown to inhibit HCV replication and thereby prove useful in the treatment

of HCV infection (Rakic et al., Chem. & Biol. 13, 23-30 (January 2006)). In some embodiments, PPAR modulators have been shown to inhibit viral transcription and replication and thereby prove useful in the treatment of viral diseases (Capeau et al., PPAR Research Volume 2009, Article ID 393408, 2 pages). In some embodiments, PPAR α antagonists are useful in the treatment of HIV infection. PPAR α antagonists have also been disclosed to be useful in the treatment of metabolic disorders (WO2012/027482A2). Metabolic disorders include, but are not limited to diabetes, obesity, metabolic syndrome, impaired glucose tolerance, syndrome X, and cardiovascular disease.

SUMMARY OF THE INVENTION

[0009] The invention disclosed herein is directed to compounds of Formula I



Formula I

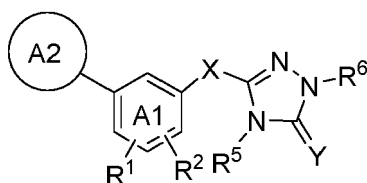
and pharmaceutically acceptable salts thereof, which are useful in the treatment of prostate, breast, colon, pancreatic, human chronic lymphocytic leukemia, melanoma, and other cancers. The invention also includes pharmaceutical compositions comprising a therapeutically effective amount of compound of Formula I, or a pharmaceutically acceptable salt thereof. The invention disclosed herein enables methods of treating prostate, breast, ovarian, liver, kidney, colon, pancreatic, human chronic lymphocytic leukemia, melanoma and other cancers. The invention disclosed herein is further enables methods of treating prostate, breast, ovarian, liver, kidney, colon, pancreatic, human chronic lymphocytic leukemia, melanoma and other cancers through the administration of a therapeutically effective amount of a selective PPAR α antagonist. The compounds and pharmaceutical compositions of the invention are also useful in the treatment of viral infections, such as HCV infections and HIV infections.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] Figure 1 shows the ability of Example 6 to inhibit the metastasis of B16F10 melanoma cells to the lung.

DETAILED DESCRIPTION OF THE INVENTION

[0011] In one aspect the invention is directed to a compound of Formula I

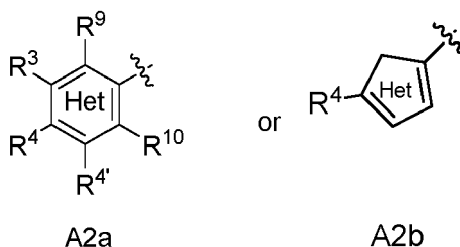


Formula I

or a pharmaceutical acceptable salt thereof wherein:

- A1 is phenyl or a 6-membered heteroaromatic ring having 1, 2 or 3 N in the heteroaromatic ring;
- A2 is selected from A2a or A2b

5



10 wherein A2a is phenyl or a 6 membered heteroaromatic ring having 1, 2 or 3 N in the heteroaromatic ring, and A2b is a 5 membered heteroaromatic ring having 1, 2 or 3 heteroatoms independently selected from O, S and X is selected from the group consisting of $-(CH_2)_2-$, $-(CH_2)_3-$, $-(CH_2)_4-$, $-(CH_2)_m-O-(CH_2)_n-$, $-(CH_2)_m-NH-(CH_2)_n-$, $-(CH_2)_m-S(=O)_o-(CH_2)_n-$, optionally mono- or di-substituted with halogen, wherein m and n are independently 0, 1, 2, 3 or 4, and each o is independently 0, 1 or 2;

15 Y is O ;

R¹ and R² are each independently selected from the group consisting of:

- (a) hydrogen,
- (b) halogen,
- 20 (c) CN,
- (d) CF₃,
- (e) -C₁₋₆alkyl,
- (f) -C₁₋₆alkyl-C(=O)OH,
- (g) -O-(R⁷),
- 25 (h) -S(=O)_oR⁷,
- (i) -N(R⁷)(R⁸),
- (j) -N(R⁷)-C(=O)-(R⁸),
- (k) -N(R⁷)-C(=O)-O-(R⁸),
- (l) -N(R⁷)S(=O)₂(R⁸),
- 30 (m) -C₃₋₆cycloalkyl,
- (n) -C(=O)(R⁷),
- (o) aryl,
- (p) heteroaryl,
- (q) -OC(=O)N(R⁷)(R⁸),
- 35 (r) -S(=O)₂N(R⁷)(R⁸),
- (s) -C(=O)N(R⁷)(R⁸), and
- (t) -C(R⁷)(R⁸)OH,

40 wherein the alkyl portion of choices (e) and (f), and the cycloalkyl portion of choice (m) are optionally substituted with halogen, and

wherein the aryl of choice (o) and the heteroaryl of choice (p) are optionally mono- or di-substituted with substituents selected from halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)_oC₁₋₆alkyl, -S(=O)_oC₃₋₆cycloalkyl, and CN;

R³ is selected from the group consisting of:

- (a) hydrogen,
- (b) halogen,
- (c) CN,
- (d) CF₃,
- 50 (e) -C₁₋₆alkyl,
- (f) -C₁₋₆alkyl-C(=O)OH,
- (g) -O-(R⁷),
- (h) -S(=O)_oR⁷,
- (i) -N(R⁷)(R⁸),
- 55 (j) -N(R⁷)-C(=O)-(R⁸),
- (k) -N(R⁷)-C(=O)-O-(R⁸),
- (l) -N(R⁷)S(=O)₂(R⁸),
- (m) -C₃₋₆cycloalkyl,

- (n) $-C(=O)(R^7)$,
 (o) aryl,
 (p) heteroaryl,
 (q) $-OC(=O)N(R^7)(R^8)$,
 5 (r) $-S(=O)_2N(R^7)(R^8)$,
 (s) $-C(=O)N(R^7)(R^8)$,
 (t) $-C(R^7)(R^8)OH$,
 (u) $-NHC(=O)-N(R^7)(R^8)$,
 (v) $-C_{3-6}cycloalkyl-COOH$,
 10 (w) heterocycle, and
 (x) $-C_{1-6}alkylC(=O)-N(R^7)(R^8)$,

wherein the alkyl portion of choices (e), (f) and (x), and the cycloalkyl portion of choices (m) and (v) are optionally substituted with halogen or hydroxyl, and

15 wherein the aryl of choice (o), the heteroaryl of choice (p), and the heterocycle of choice (w) are optionally mono- or di-substituted with substituents selected from halogen, nitro, $C_{1-6}alkyl$, $C_{1-6}alkoxy$, halo $C_{1-6}alkyl$, $C_{3-6}cycloalkyl$, $C_{3-6}cycloalkoxy$, $-NH(C_{1-6}alkyl)$, $-NH(C_{3-6}cycloalkyl)$, $-N(C_{1-6}alkyl)_2$, $-N(C_{3-6}cycloalkyl)_2$, $-S(=O)_oC_{1-6}alkyl$, $-S(=O)_oC_{3-6}cycloalkyl$, hydroxyl and CN;

R^4 and R^4' are each independently selected from the group consisting of:

- 20 (a) hydrogen,
 (b) $-N(R^7)(R^8)$,
 (c) $-N(R^7)S(=O)_2R^8$,
 (d) $-N(R^7)-C(=O)R^8$,
 25 (e) $-N(R^7)C(=O)OR^8$,
 (f) $-S(=O)_oR^7$,
 (g) $-S(=O)_2N(R^7)(R^8)$,
 (h) $-C(=O)R^7$,
 (i) $-C(=O)N(R^7)(R^8)$,
 30 (j) $-OC(=O)N(R^7)(R^8)$,
 (k) $-O-R^7$,
 (l) $-C(R^7)(R^8)OH$,
 (m) $-C_{1-4}alkyl-C(=O)NHS(=O)_2R^7$,
 (n) $-C_{1-4}alkyl-S(=O)_2NHC(=O)R^7$,
 35 (o) $-C_{1-4}alkyl-C(=O)-N(R^7)(R^8)$,
 (p) $-C_{1-4}alkyl-N(R^7)C(=O)(R^8)$,
 (q) $-C_{1-4}alkyl-N(R^7)S(=O)_2(R^8)$,
 (r) $-C_{1-4}alkyl-S(=O)_2N(R^7)(R^8)$,
 (s) $-C_{1-4}alkyl-N(R^7)C(=O)O(R^8)$,
 40 (t) $-C_{1-4}alkyl-O-C(=O)N(R^7)(R^8)$,
 (u) $-C_{1-4}alkyl-C(=O)(R^7)$,
 (v) $-C_{1-4}alkyl-C(R^7)(R^8)OH$,
 (w) $-C_{1-4}alkyl-O(R^7)$,
 (x) $-C_{1-6}alkyl-C(=O)OH$,
 45 (y) $-C_{2-6}alkenyl-C(=O)OH$,
 (z) $-C_{3-6}cycloalkyl-C(=O)OH$,
 (aa) $-C_{3-6}cycloalkyl-C(=O)NHS(=O)_2R^7$,
 (bb) $-C_{3-6}cycloalkyl-S(=O)_2NHC(=O)R^7$,
 (cc) $-C_{3-6}cycloalkyl-C(=O)-N(R^7)(R^8)$,
 50 (dd) $-C_{3-6}cycloalkyl-N(R^7)C(=O)(R^8)$,
 (ee) $-C_{3-6}cycloalkyl-N(R^7)S(=O)_2(R^8)$,
 (ff) $-C_{3-6}cycloalkyl-S(=O)_2N(R^7)(R^8)$,
 (gg) $-C_{3-6}cycloalkyl-N(R^7)C(=O)O(R^8)$,
 (hh) $-C_{3-6}cycloalkyl-O-C(=O)N(R^7)(R^8)$,
 55 (ii) $-C_{3-6}cycloalkyl-C(=O)(R^7)$,
 (jj) $-C_{3-6}cycloalkyl-C(R^7)(R^8)OH$,
 (kk) $-C_{3-6}cycloalkyl-O(R^7)$,
 (ll) $-C(=O)OH$,

(mm) aryl,
 (nn) heteroaryl,
 (oo) -C(=O)N(R⁷)S(=O)₂(R⁸),
 (pp) -S(=O)₂N(R⁷)C(=O)(R⁸),
 5 (qq) -NHS(=O)₂N(R⁷)(R⁸),
 (rr) -NHC(=O)N(R⁷)(R⁸),
 (ss) -CH(OH)-C(=O)-N(R⁷)(R⁸),
 (tt) -C(=O)-C(=O)-N(R⁷)(R⁸),
 10 (uu) -C₃₋₆cycloalkyl,
 (w) -CF₃,
 (ww) -C₁₋₆alkyl N(R⁷)(R⁸),
 (xx) -heterocycle,
 (yy) -C₁₋₆alkyl,
 (zz) halogen, and
 15 (aaa) -O-C₁₋₆alkyl-N(R⁷)(R⁸),

wherein the alkyl portion of choices (m), (n), (o), (p), (q), (r), (s), (t), (u), (v), (w), (x), (ww), (yy) and (aaa), the alkenyl portion of choice (y), and the cycloalkyl portion of choices (z), (aa), (bb), (cc), (dd), (ee), (ff), (gg), (hh), (ii), (jj), (kk) and (uu), are optionally mono- or di-substituted with halogen, CN, aryl, C₁₋₆alkyl, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₁₋₆alkoxy, or C₃₋₆cycloalkoxy, and
 20 wherein the aryl of choice (mm), the heteroaryl of choice (nn), and the heterocycle of choice (xx) are optionally mono- or di-substituted with substituents selected from halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₂C₁₋₆alkyl, -S(=O)₂C₃₋₆cycloalkyl, hydroxyl and CN, or
 25 wherein R³ and R⁴ or R⁴ and R^{4'} are joined together to form a 5- or 6-membered heterocyclic ring, said ring having one heteroatom selected from O and N, wherein said ring is optionally substituted with -C(=O)OH, or -C₁₋₆alkyl-C(=O)OH, with the proviso that at least one of R³, R⁴ and R^{4'} is other than hydrogen;
 R⁵ is selected from the group consisting of:

30 (a) hydrogen,
 (b) -C₁₋₆alkyl,
 (c) -C₁₋₄alkyl(R⁷),
 (d) aryl,
 (e) heteroaryl,
 35 (f) -C₃₋₆cycloalkyl,
 (g) -C₃₋₆cycloalkyl(R⁷),
 (h) -C₃₋₆cycloalkyl-O(R⁷),
 (i) -C₁₋₄alkyl-C₃₋₆cycloalkyl,
 (j) -C₁₋₆alkoxy, and
 40 (k) -C₃₋₆cycloalkoxy,

wherein the alkyl portion of choices (b), (c), (i) and (j), the cycloalkyl portion of choices (f), (g), (h), (i) and (k) are optionally substituted with halogen or C₁₋₄alkyl, and
 wherein the aryl of choice (d) and the heteroaryl of choice (e), are optionally mono- or di-substituted with substituents selected from halogen, nitro, C₁₋₆alkyl, CF₃, C₁₋₆alkoxy, halo C₁₋₆alkyl, aryl, heteroaryl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, and CN;
 45 R⁶ is selected from the group consisting of:

50 (a) hydrogen,
 (b) -C₁₋₆alkyl,
 (c) -C₁₋₆alkylaryl,
 (d) -C₁₋₆alkylheteroaryl,
 (e) -S(=O)₂C₁₋₆alkyl(R⁷),
 (f) -C(=O)C₁₋₆alkyl(R⁷),
 55 (g) -C₃₋₆cycloalkyl,
 (h) aryl,
 (i) heteroaryl,
 (j) -C(=O)C₃₋₆cycloalkyl(R⁷),

- (k) $-S(=O)_oC_{3-6}cycloalkyl(R^7)$, and
 (l) $-C_{1-6}alkyl(R^7)$,

wherein the alkyl portion of choices (b), (c), (d), (e), (f), and (1) and the cycloalkyl portion of choices (g), (j), and (k),
 5 are optionally substituted with halogen or $C_{1-4}alkyl$, and

wherein the aryl portion of choices (c) and (h), and the heteroaryl portion of choices (d) and (i), are optionally mono-
 or di-substituted with substituents selected from halogen, nitro, $-CF_3$, $C_{1-6}alkyl$, $C_{1-6}alkoxy$, halo $C_{1-6}alkyl$,
 $C_{3-6}cycloalkyl$, $C_{3-6}cycloalkoxy$, aryl, heteroaryl, heterocycle optionally substituted with halogen, $-NH(C_{1-6}alkyl)$,
 $-NH(C_{3-6}cycloalkyl)$, $-N(C_{1-6}alkyl)_2$, $-N(C_{3-6}cycloalkyl)_2$, $-S(=O)_oC_{1-6}alkyl$, $S(=O)_oC_{3-6}cycloalkyl$, and CN;

10 R^7 and R^8 are each independently selected from the following:

- (a) hydrogen,
 (b) $-C_{1-6}alkyl$,
 (c) $-C_{3-6}cycloalkyl$,
 15 (d) -aryl,
 (e) -heteroaryl,
 (f) $-C_{1-6}alkylaryl$,
 (g) $-C_{1-6}alkylheteroaryl$,
 (h) $-C(=O)C_{1-6}alkyl$,
 20 (i) $-S(=O)_o-aryl$,
 (j) $-C_{1-6}alkyl-C_{3-6}cycloalkyl$, and
 (k) CF_3 ,

wherein the alkyl of choices (b), (f), (g), (h), and (j), and the cycloalkyl of choices (c) and (j), are each optionally
 25 mono-, di- or tri-substituted with halogen, and

wherein the aryl portion of choices (d), (f) and (i), and the heteroaryl portion of choices (e) and (g), are each optionally
 mono- or di-substituted with substituents selected from halogen, $-C(=O)OH$, $-CF_3$, $-NHC(=O)CH_3$, nitro, $C_{1-6}alkyl$,
 $C_{1-6}alkoxy$, halo $C_{1-6}alkyl$, $C_{3-6}cycloalkyl$, $C_{3-6}cycloalkoxy$, $-NH(C_{1-3}alkyl)$, $-NH(C_{3-6}cycloalkyl)$, $-N(C_{1-3}alkyl)_2$,
 $-N(C_{3-6}cycloalkyl)_2$, $-S(=O)_oC_{1-4}alkyl$, $S(=O)_oC_{3-6}cycloalkyl$, aryl, heteroaryl, hydroxyl, and CN;

30 R^9 and R^{10} are each independently selected from the following

- (a) hydrogen,
 (b) $-C_{1-6}alkyl$,
 (c) $-C_{3-6}cycloalkyl$,
 35 (d) halogen,
 (e) $-OC_{3-6}cycloalkyl$,
 (f) CF_3 , and
 (g) $-C_{1-6}alkoxy$,

wherein the alkyl portion of choice (b) and the cycloalkyl portion of choices (c) and (e), are each optionally mono-,
 40 di- or tri- substituted with halogen. In the alternative, choice (g) of R^9 and R^{10} may also be mono-, di- or tri-substituted
 with halogen.

45 **[0012]** Within this aspect there is a genus wherein:

X is selected from the group consisting of $-(CH_2)_2-$, $-(CH_2)_3-$, $-(CH_2)_4-$, and $-(CH_2)_m-O-(CH_2)_n-$, optionally mono- or
 di-substituted with halogen, where $m + n$ is 2, 3 or 4.

50 **[0013]** Within this genus there is a sub-genus wherein:

X is selected from $-CH_2CH_2CH_2-$, or $-CF_2CH_2CH_2-$.

[0014] Within this aspect there is a genus wherein:

55 A1 is a substituted phenyl or substituted pyridine.

[0015] Within this genus there is a sub-genus wherein:

A2 is A2a.

[0016] Within this sub-genus there is a class wherein:

5 A2a is a substituted phenyl, substituted pyrimidine, substituted pyrazine, or substituted pyridine.

[0017] Within this aspect there is a genus wherein:

10 R¹ and R² are each independently selected from the group consisting of:

- (a) hydrogen,
- (b) halogen,
- (c) CN,
- (d) CF₃,
- 15 (e) -C₁₋₆alkyl,
- (f) -O-(R⁷),
- (g) -C₃₋₆cycloalkyl, and
- (h) -N(R⁷)(R⁸),

20 wherein the alkyl portion of choice (e) and the cycloalkyl portion of choice (g) are optionally substituted with halogen.

[0018] Within this genus there is a sub-genus wherein:

25 R¹ and R² are each independently selected from:

- (a) hydrogen,
- (b) halogen,
- (c) CF₃,
- (d) -C₁₋₆alkyl, and
- 30 (e) -O-(R⁷),

wherein the alkyl portion of choice (d) is optionally substituted with halogen.

[0019] Within this sub-genus there is a class wherein R¹ and R² are each hydrogen.

35 **[0020]** Within this aspect there is a genus wherein:

R³ is selected from the group consisting of:

- (a) hydrogen,
- (b) halogen,
- (c) CF₃,
- (d) -C₁₋₆alkyl,
- (e) -O-(R⁷),
- (f) -S(=O)₀R⁷,
- 45 (g) -C₃₋₆cycloalkyl,
- (h) aryl,
- (i) heteroaryl,
- (j) -S(=O)₂N(R⁷)(R⁸),
- (k) -C(R⁷)(R⁸)OH,
- 50 (l) heterocycle, and
- (m) -N(R⁷)S(=O)₂(R⁸),

wherein the alkyl portion of choice (d) and the cycloalkyl portion of choice (g) are optionally substituted with halogen or hydroxyl, and

55 wherein the aryl of choice (h), the heteroaryl of choice (i), and the heterocycle of choice (l) are optionally mono- or di-substituted with substituents selected from halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₆alkyl, -S(=O)₀C₃₋₆cycloalkyl, hydroxyl and CN.

[0021] Within this genus there is a sub-genus wherein:

R³ is selected from the group consisting of:

- 5 (a) hydrogen,
 (b) -O-(R⁷),
 (c) -N(R⁷)S(=O)₂(R⁸), and
 (d) -C₁₋₆alkyl,

10 wherein the alkyl portion of choice (d) is optionally substituted with halogen or hydroxyl.

[0022] Within this aspect there is a genus wherein:

R⁴ and R^{4'} are each independently selected from the group consisting of:

- 15 (a) hydrogen,
 (b) -N(R⁷)S(=O)₂R⁸,
 (c) -N(R⁷)-C(=O)R⁸,
 (d) -S(=O)₂R⁷,
 20 (e) -S(=O)₂N(R⁷)(R⁸),
 (f) -C(=O)N(R⁷)(R⁸),
 (g) -O-(R⁷),
 (h) -C(R⁷)(R⁸)OH,
 (i) -C₁₋₄alkyl-C(=O)NHS(=O)₂R⁷,
 25 (j) -C₁₋₄alkyl-S(=O)₂NHC(=O)R⁷,
 (k) -C₁₋₄alkyl-C(=O)-N(R⁷)(R⁸),
 (l) -C₁₋₄alkyl-N(R⁷)C(=O)(R⁸),
 (m) -C₁₋₄alkyl-N(R⁷)S(=O)₂(R⁸),
 (n) -C₁₋₄alkyl-S(=O)₂N(R⁷)(R⁸),
 30 (o) -C₁₋₄alkyl-C(R⁷)(R⁸)OH,
 (p) -C₁₋₄alkyl-O(R⁷),
 (q) -C₁₋₆alkyl-C(=O)OH,
 (r) -C₂₋₆alkenyl-C(=O)OH,
 (s) -C₃₋₆cycloalkyl-C(=O)OH,
 35 (t) -C₃₋₆cycloalkyl-C(=O)NHS(=O)₂R⁷,
 (u) -C₃₋₆cycloalkyl-S(=O)₂NHC(=O)R⁷,
 (v) -C₃₋₆cycloalkyl-C(=O)-N(R⁷)(R⁸),
 (w) -C₃₋₆cycloalkyl-N(R⁷)S(=O)₂(R⁸),
 (x) -C₃₋₆cycloalkyl-S(=O)₂N(R⁷)(R⁸),
 40 (y) -C₃₋₆cycloalkyl-N(R⁷)C(=O)O(R⁸),
 (z) -C₃₋₆cycloalkyl-C(R⁷)(R⁸)OH,
 (aa) -C₃₋₆cycloalkyl-O(R⁷),
 (bb) -C(=O)OH,
 (cc) aryl,
 45 (dd) heteroaryl,
 (ee) -C(=O)N(R⁷)S(=O)₂(R⁸),
 (ff) -S(=O)₂N(R⁷)C(=O)(R⁸),
 (gg) -NHS(=O)₂N(R⁷)(R⁸),
 (hh) -NHC(=O)N(R⁷)(R⁸),
 50 (ii) -C₃₋₆cycloalkyl,
 (jj) CF₃,
 (kk) heterocycle,
 (ll) -C₁₋₆alkyl, and
 (mm) halogen,

55 wherein the alkyl portion of choices (i), (j), (k), (l), (m), (n), (o), (p), (q), and (ll), the alkenyl portion of choice (r), and the cycloalkyl portion of choices (s), (t), (u), (v), (w), (x), (y), (z), and (aa) are optionally mono- or di-substituted with halogen, CN, aryl, C₁₋₆alkyl, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₁₋₆alkoxy, or C₃₋₆cycloalkoxy and,

wherein the aryl of choice (cc), the heteroaryl of choice (dd), and the heterocycle of choice (kk) are optionally mono- or di-substituted with substituents selected from halogen, hydroxyl, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₆alkyl, -S(=O)₀C₃₋₆cycloalkyl, and CN. In the alternative, choice (ii) of R⁴ and R^{4'} may also be mono- or di-substituted with halogen, CN, aryl, C₁₋₆alkyl, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₁₋₆alkoxy, or C₃₋₆cycloalkoxy halogen.

[0023] Within this genus there is a sub-genus wherein:

R⁴ and R^{4'} are each independently selected from the group consisting of:

- (a) hydrogen,
- (b) -N(R⁷)S(=O)₂R⁸,
- (c) -N(R⁷)-C(=O)R⁸,
- (d) -O-(R⁷),
- (e) -C(R⁷)(R⁸)OH,
- (f) -C₁₋₄alkyl-S(=O)₂NHC(=O)R⁷,
- (g) -C₁₋₄alkyl-N(R⁷)S(=O)₂(R⁸),
- (h) -C₁₋₄alkyl-S(=O)₂N(R⁷)(R⁸),
- (i) -C₁₋₄alkyl-O(R⁷),
- (j) -C₁₋₆alkyl-C(=O)OH,
- (k) -C₃₋₆cycloalkyl-C(=O)OH,
- (l) -C₃₋₆cycloalkyl-N(R⁷)S(=O)₂(R⁸),
- (m) -C₃₋₆cycloalkyl-S(=O)₂N(R⁷)(R⁸),
- (n) -C₃₋₆cycloalkyl-O(R⁷),
- (o) -C(=O)OH,
- (p) -C(=O)N(R⁷)S(=O)₂(R⁸),
- (q) -S(=O)₂N(R⁷)C(=O)(R⁸),
- (r) -NHS(=O)₂N(R⁷)(R⁸),
- (s) -C₃₋₆cycloalkyl,
- (t) CF₃,
- (u) heterocycle,
- (v) -C₁₋₆alkyl, and
- (w) halogen,

wherein the alkyl portion of choices (f), (g), (h), (i), (j), and (v), and the cycloalkyl portion of choices (k), (l), (m), (n), and (s), are optionally mono- or di-substituted with halogen, CN, aryl, C₁₋₆alkyl, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₁₋₆alkoxy, or C₃₋₆cycloalkoxy, and wherein the heterocycle of choice (u) is optionally mono- or di-substituted with substituents selected from halogen, hydroxyl, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₆alkyl, -S(=O)₀C₃₋₆cycloalkyl and CN.

[0024] Within this sub-genus there is class wherein:

R⁴ and R^{4'} are each independently selected from the group consisting of:

- (a) -C(R⁷)(R⁸)OH,
- (b) -N(R⁷)S(=O)₂R⁸,
- (c) -O-(R⁷),
- (d) -C₁₋₆alkyl-C(=O)OH,
- (e) -C(=O)OH,
- (f) -NHS(=O)₂N(R⁷)(R⁸),
- (g) -C₃₋₆cycloalkyl,
- (h) CF₃,
- (i) heterocycle,
- (j) -C₁₋₆alkyl, and
- (k) halogen,

wherein the alkyl portion of choices (d) and (j), and the cycloalkyl portion of choice (g) are optionally mono- or di-

substituted with halogen, CN, aryl, C₁₋₆alkyl, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₁₋₆alkoxy, or C₃₋₆cycloalkoxy, and wherein the heterocycle of choice (i) is optionally mono- or di-substituted with substituents selected from halogen, hydroxyl, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₆alkyl, -S(=O)₀C₃₋₆cycloalkyl, and CN.

5
[0025] Within this aspect there is a genus wherein:

R⁵ is selected from the group consisting of:

- 10 (a) hydrogen,
 (b) -C₁₋₆alkyl,
 (c) -C₁₋₄alkyl(R⁷),
 (d) aryl,
 (e) heteroaryl,
 15 (f) -C₃₋₆cycloalkyl, and
 (g) -C₁₋₄alkyl-C₃₋₆cycloalkyl,

wherein the alkyl portion of choices (b), (c), and (g), the cycloalkyl portion of choices (f) and (g), are optionally substituted with halogen or C₁₋₄alkyl, and

20 wherein the aryl of choice (d) and the heteroaryl of choice (e), is optionally mono- or di-substituted with substituents selected from halogen, nitro, C₁₋₆alkyl, CF₃, C₁₋₆alkoxy, halo C₁₋₆alkyl, aryl, heteroaryl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, and CN.

[0026] Within this genus there is a sub-genus wherein

25 R⁵ is selected from the group consisting of:

- (a) hydrogen,
 (b) -C₁₋₆alkyl, and
 (c) -C₁₋₄alkyl(R⁷),

30 wherein the alkyl portion of choices (b) and (c) is optionally substituted with halogen or C₁₋₄alkyl.

[0027] Within this aspect there is a genus wherein:

R⁶ is selected from the group consisting of:

- 35 (a) -C₁₋₆alkylaryl,
 (b) -C₁₋₆alkylheteroaryl,
 (c) -C₃₋₆cycloalkyl,
 (d) aryl,
 40 (e) heteroaryl, and
 (f) -C₁₋₆alkyl(R⁷),

wherein the alkyl portion of choices (a), (b) and (f), and the cycloalkyl portion of choice (c) are optionally substituted with halogen or C₁₋₄alkyl, and

45 wherein the aryl portion of choices (a) and (d), and the heteroaryl portion of choices (b) and (e), are optionally mono- or di-substituted with substituents selected from halogen, nitro, CF₃, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, aryl, heteroaryl, heterocycle optionally substituted with halogen, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₆alkyl, -S(=O)₀C₃₋₆cycloalkyl, and CN.

50 **[0028]** Within this genus there is a sub-genus wherein:

R⁶ is selected from the group consisting of:

- 55 (a) -C₁₋₆alkylaryl,
 (b) -C₁₋₆alkylheteroaryl, and
 (c) -C₁₋₆alkyl(R⁷),

wherein the alkyl portion of choices (a), (b), and (c) is optionally substituted with halogen or C₁₋₄alkyl, and wherein

the aryl portion of choice (a), and the heteroaryl portion of choice (b), are optionally mono- or di-substituted with substituents selected from halogen, nitro, CF₃, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, aryl, heteroaryl, heterocycle optionally substituted with halogen, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₆alkyl, -S(=O)₀C₃₋₆cycloalkyl, and CN.

5 [0029] Within this aspect there is a genus wherein:

R⁷ and R⁸ are each independently selected from the following:

- 10 (a) hydrogen,
 (b) -C₁₋₆alkyl,
 (c) -C₃₋₆cycloalkyl,
 (d) aryl,
 (e) heteroaryl, and
 15 (f) CF₃,

wherein the alkyl of choice (b) and the cycloalkyl of choice (c) are optionally mono-, di- or tri-substituted with halogen, and

wherein the aryl of choice (d) and the heteroaryl of choice (e) are optionally mono- or di-substituted with substituents selected from halogen, -C(=O)OH, CF₃, -NHC(=O)-CH₃, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₃alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₃alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₄alkyl, -S(=O)₀C₃₋₆cycloalkyl, aryl, heteroaryl, hydroxyl, and CN.

25 [0030] Within this aspect there is a genus wherein:

R⁹ and R¹⁰ are each independently

- 30 (a) hydrogen,
 (b) -C₁₋₆alkyl,
 (c) halogen,
 (d) CF₃, and
 (e) -C₁₋₆alkoxy,

wherein the alkyl of choice (b) is optionally mono-, di- or tri-substituted with halogen. In the alternative, the alkyl portion of choice (e) of R⁹ and R¹⁰ may also be mono-, di- or tri-substituted with halogen.

[0031] Within this aspect there is a genus wherein:

40 X is selected from the group consisting of -(CH₂)₂-, -(CH₂)₃-, -(CH₂)₄-, and -(CH₂)_m-O-(CH₂)_n-, optionally mono or di-substituted with halogen, where m + n is 2, 3 or 4;

Y is O;

A1 is a substituted phenyl or substituted pyridine;

A2 is A2a;

R¹ and R² are each independently selected from the group consisting of:

- 45 (a) hydrogen,
 (b) halogen,
 (c) CN,
 (d) CF₃,
 50 (e) -C₁₋₆alkyl,
 (f) -O-(R⁷),
 (g) -C₃₋₆cycloalkyl, and
 (h) -N(R⁷)(R⁸),

55 wherein the alkyl portion of choice (e) and the cycloalkyl portion of choice (g) are optionally substituted with halogen; R³ is selected from the group consisting of:

- (a) hydrogen,

- (b) halogen,
 (c) CF₃,
 (d) -C₁₋₆alkyl,
 (e) -O-(R⁷),
 (f) -S(=O)₀R⁷,
 (g) -C₃₋₆cycloalkyl,
 (h) aryl,
 (i) heteroaryl,
 (j) -S(=O)₂N(R⁷)(R⁸),
 (k) -C(R⁷)(R⁸)OH,
 (l) heterocycle, and
 (m) -N(R⁷)S(=O)₂(R⁸),

wherein the alkyl portion of choice (d) and the cycloalkyl portion of choice (g) are optionally substituted with halogen or hydroxyl, and

wherein the aryl of choice (h), the heteroaryl of choice (i), and the heterocycle of choice (l) are optionally mono- or di-substituted with substituents selected from halogen, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₆alkyl, -S(=O)₀C₃₋₆cycloalkyl, hydroxyl and CN;

R⁴ and R^{4'} are each independently selected from the group consisting of:

- (a) hydrogen,
 (b) -N(R⁷)S(=O)₂R⁸,
 (c) -N(R⁷)-C(=O)R⁸,
 (d) -S(=O)₀R⁷,
 (e) -S(=O)₂N(R⁷)(R⁸),
 (f) -C(=O)N(R⁷)(R⁸),
 (g) -O-(R⁷),
 (h) -C(R⁷)(R⁸)OH,
 (i) -C₁₋₄alkyl-C(=O)NHS(=O)₂R⁷,
 (j) -C₁₋₄alkyl-S(=O)₂NHC(=O)R⁷,
 (k) -C₁₋₄alkyl-C(=O)-N(R⁷)(R⁸),
 (l) -C₁₋₄alkyl-N(R⁷)C(=O)(R⁸),
 (m) -C₁₋₄alkyl-N(R⁷)S(=O)₂(R⁸),
 (n) -C₁₋₄alkyl-S(=O)₂N(R⁷)(R⁸),
 (o) -C₁₋₄alkyl-C(R⁷)(R⁸)OH,
 (p) -C₁₋₄alkyl-O(R⁷),
 (q) -C₁₋₆alkyl-C(=O)OH,
 (r) -C₂₋₆alkenyl-C(=O)OH,
 (s) -C₃₋₆cycloalkyl-C(=O)OH,
 (t) -C₃₋₆cycloalkyl-C(=O)NHS(=O)₂R⁷,
 (u) -C₃₋₆cycloalkyl-S(=O)₂NHC(=O)R⁷,
 (v) -C₃₋₆cycloalkyl-C(=O)-N(R⁷)(R⁸),
 (w) -C₃₋₆cycloalkyl-N(R⁷)S(=O)₂(R⁸),
 (x) -C₃₋₆cycloalkyl-S(=O)₂N(R⁷)(R⁸),
 (y) -C₃₋₆cycloalkyl-N(R⁷)C(=O)O(R⁸),
 (z) -C₃₋₆cycloalkyl-C(R⁷)(R⁸)OH,
 (aa) -C₃₋₆cycloalkyl-O(R⁷),
 (bb) -C(=O)OH,
 (cc) aryl,
 (dd) heteroaryl,
 (ee) -C(=O)N(R⁷)S(=O)₂(R⁸),
 (ff) -S(=O)₂N(R⁷)C(=O)(R⁸),
 (gg) -NHS(=O)₂N(R⁷)(R⁸),
 (hh) -NHC(=O)N(R⁷)(R⁸),
 (ii) -C₃₋₆cycloalkyl,
 (jj) CF₃,
 (kk) heterocycle,

(ll) -C₁₋₆alkyl, and
(mm) halogen,

wherein the alkyl portion of choices (i), (j), (k), (l), (m), (n), (o), (p), (q), and (ll), the alkenyl portion of choice (r), and the cycloalkyl portion of choices (s), (t), (u), (v), (w), (x), (y), (z), and (aa) are optionally mono- or di-substituted with halogen, CN, aryl, C₁₋₆alkyl, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₁₋₆alkoxy, or C₃₋₆cycloalkoxy and, wherein the aryl of choice (cc), the heteroaryl of choice (dd), and the heterocycle of choice (kk) are optionally mono- or di-substituted with substituents selected from halogen, hydroxyl, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₆alkyl, -S(=O)₀C₃₋₆cycloalkyl, and CN;
R⁵ is selected from the group consisting of:

(a) hydrogen,
(b) -C₁₋₆alkyl,
(c) -C₁₋₄alkyl(R⁷),
(d) aryl,
(e) heteroaryl,
(f) -C₃₋₆cycloalkyl, and
(g) -C₁₋₄alkyl-C₃₋₆cycloalkyl,

wherein the alkyl portion of choices (b), (c) and (g), the cycloalkyl portion of choices (f) and (g), are optionally substituted with halogen or C₁₋₄alkyl, and wherein the aryl of choice (d) and the heteroaryl of choice (e), are optionally mono- or di-substituted with substituents selected from halogen, nitro, C₁₋₆alkyl, CF₃, C₁₋₆alkoxy, halo C₁₋₆alkyl, aryl, heteroaryl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, and CN;
R⁶ is selected from the group consisting of:

(a) -C₁₋₆alkylaryl,
(b) -C₁₋₆alkylheteroaryl,
(c) C₃₋₆cycloalkyl,
(d) aryl,
(e) heteroaryl, and
(f) -C₁₋₆alkyl(R⁷),

wherein the alkyl portion of choices (a), (b) and (f), and the cycloalkyl portion of choice (c) are optionally substituted with halogen or C₁₋₄alkyl, and wherein the aryl portion of choices (a) and (d), and the heteroaryl portion of choices (b) and (e), are optionally mono- or di-substituted with substituents selected from halogen, nitro, CF₃, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, aryl, heteroaryl, heterocycle optionally substituted with halogen, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₆alkyl, -S(=O)₀C₃₋₆cycloalkyl, and CN;
R⁷ and R⁸ are each independently selected from the following:

(a) hydrogen,
(b) C₁₋₆alkyl,
(c) C₃₋₆cycloalkyl,
(d) aryl,
(e) heteroaryl, and
(f) CF₃,

wherein the alkyl of choice (b) and the cycloalkyl of choice (c) are optionally mono-, di- or tri-substituted with halo, and wherein the aryl of choice (d) and the heteroaryl of choice (e) are optionally mono- or di-substituted with substituents selected from halogen, -C(=O)OH, CF₃, -NHC(=O)-CH₃, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₃alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₃alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₄alkyl, -S(=O)₀C₃₋₆cycloalkyl, aryl, heteroaryl, hydroxyl, and CN;
and
R⁹ and R¹⁰ are each independently

(a) hydrogen,

- (b) -C₁₋₆alkyl,
- (c) halogen,
- (d) CF₃, and
- (e) C₁₋₆alkoxy,

5

wherein the alkyl of choice (b) is optionally mono-, di- or tri-substituted with halogen. In the alternative aspect, choice (ii) of R⁴ and R^{4'} may also be mono- or di-substituted with halogen, CN, aryl, C₁₋₆alkyl, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₁₋₆alkoxy, or C₃₋₆cycloalkoxy halogen; and the alkyl portion of choice (e) is optionally mono-, di- or tri-substituted with halogen and choice (e) of R⁹ and R¹⁰ may also be mono-, di- or tri-substituted with halogen

10

[0032] Within this genus there is a sub-genus wherein:

A₂ is A_{2a}, and A_{2a} is a substituted phenyl, substituted pyrimidine, substituted pyrazine, or substituted pyridine; R¹ and R² are each independently selected from:

15

- (a) hydrogen,
- (b) halogen,
- (c) CF₃,
- (d) C₁₋₆alkyl, and
- (e) -O-(R⁷),

20

wherein the alkyl portion of choice (d) is optionally substituted with halogen; R³ is selected from the group consisting of:

25

- (a) hydrogen,
- (b) -O-(R⁷),
- (c) -N(R⁷)S(=O)₂(R⁸), and
- (d) -C₁₋₆alkyl,

30

wherein the alkyl portion of choice (d) is optionally substituted with halogen or hydroxyl; R⁴ and R^{4'} are each independently selected from the group consisting of:

35

- (a) hydrogen,
- (b) -N(R⁷)S(=O)₂R⁸,
- (c) -N(R⁷)-C(=O)R⁸,
- (d) -O-(R⁷),
- (e) -C(R⁷)(R⁸)OH,
- (f) -C₁₋₄alkyl-S(=O)₂NHC(=O)R⁷,
- (g) -C₁₋₄alkyl-N(R⁷)S(=O)₂(R⁸),
- (h) -C₁₋₄alkyl-S(=O)₂N(R⁷)(R⁸),
- (i) -C₁₋₄alkyl-O(R⁷),
- (j) -C₁₋₆alkyl-C(=O)OH,
- (k) -C₃₋₆cycloalkyl-C(=O)OH,
- (l) -C₃₋₆cycloalkyl-N(R⁷)S(=O)₂(R⁸),
- (m) -C₃₋₆cycloalkyl-S(=O)₂N(R⁷)(R⁸),
- (n) -C₃₋₆cycloalkyl-O(R⁷),
- (o) -C(=O)OH,
- (p) -C(=O)N(R⁷)S(=O)₂(R⁸),
- (q) -S(=O)₂N(R⁷)C(=O)(R⁸),
- (r) -NHS(=O)₂N(R⁷)(R⁸),
- (s) -C₃₋₆cycloalkyl,
- (t) CF₃,
- (u) heterocycle,
- (v) -C₁₋₆alkyl, and
- (w) halogen,

40

45

50

55

wherein the alkyl portion of choices (f), (g), (h), (i), (j), and (v), and the cycloalkyl portion of choices (k), (l), (m), (n), and (s), are optionally mono- or di-substituted with halogen, CN, aryl, C₁₋₆alkyl, halo C₁₋₆alkyl, C₃₋₆cycloalkyl,

C₁₋₆alkoxy, or C₃₋₆cycloalkoxy, and
 wherein the heterocycle of choice (u) is optionally mono- or di-substituted with substituents selected from halogen,
 hydroxyl, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl),
 -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₆alkyl, -S(=O)₀C₃₋₆cycloalkyl and CN;
 R⁵ is selected from the group consisting of:

- (a) hydrogen,
 (b) -C₁₋₆alkyl, and
 (c) -C₁₋₄alkyl(R⁷),

wherein the alkyl portion of choices (b) and (c) is optionally substituted with halogen or C₁₋₄alkyl;
 R⁶ is selected from the group consisting of:

- (a) -C₁₋₆alkylaryl,
 (b) -C₁₋₆alkylheteroaryl, and
 (c) -C₁₋₆alkyl(R⁷),

wherein the alkyl portion of choices (a), (b), and (c) is optionally substituted with halogen or C₁₋₄alkyl, and wherein
 the aryl portion of choice (a), and the heteroaryl portion of choice (b), are optionally mono- or di-substituted with
 substituents selected from halogen, nitro, CF₃, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy,
 aryl, heteroaryl, heterocycle optionally substituted with halogen, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂,
 -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₆alkyl, -S(=O)₀C₃₋₆cycloalkyl, and CN.

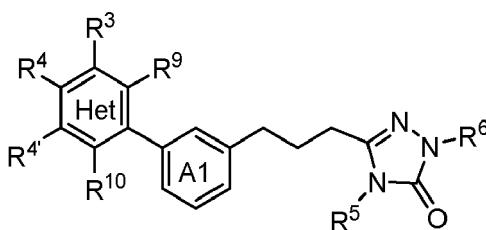
[0033] Within this sub-genus there is a class wherein:

R⁴ and R^{4'} are each independently selected from the group consisting of:

- (a) -C(R⁷)(R⁸)OH,
 (b) -N(R⁷)S(=O)₂R⁸,
 (c) -O-(R⁷),
 (d) -C₁₋₆alkyl-C(=O)OH,
 (e) -C(=O)OH,
 (f) -NHS(=O)₂N(R⁷)(R⁸),
 (g) C₃₋₆cycloalkyl,
 (h) CF₃,
 (i) heterocycle,
 (j) -C₁₋₆alkyl, and
 (k) halogen,

wherein the alkyl portion of choices (d) and (j), and the cycloalkyl portion of choice (g) are optionally mono- or di-
 substituted with halo, CN, aryl, C₁₋₆alkyl, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₁₋₆alkoxy, or C₃₋₆cycloalkoxy, and
 wherein the heterocycle of choice (i) is optionally mono- or di-substituted with substituents selected from halogen,
 hydroxyl, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl),
 -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₆alkyl, -S(=O)₀C₃₋₆cycloalkyl, and CN.

[0034] Within this class there is a sub-class wherein of Formula 1a



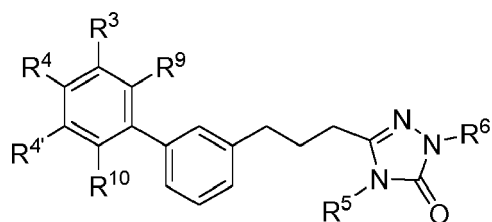
1a

or a pharmaceutically acceptable salt thereof.

[0035] Within this sub-class there is a sub-sub-class wherein of Formula 1b

5

10



1b

15 or a pharmaceutically acceptable salt thereof.

[0036] In some embodiments, R³ is not hydrogen. In some embodiments, R⁴ is not hydrogen. In some embodiments, R³ is not hydrogen; and R⁴ is not hydrogen.

[0037] In one aspect, described herein are the following compounds:

- 20 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid,
 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)acetic acid,
 3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-carboxylic acid,
 25 3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-carboxylic acid,
 1-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid,
 30 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid,
 1-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid,
 1-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)cyclopropanecarboxylic acid,
 35 3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-carboxylic acid,
 3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-carboxylic acid,
 40 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-propoxy-[1,1'-biphenyl]-3-yl)acetic acid,
 N-(6-(3-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-3-yl)benzenesulfonamide,
 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid,
 45 1-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methyl-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid,
 2-(4-(benzyloxy)-3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid,
 50 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-(cyclopropylmethoxy)-[1,1'-biphenyl]-3-yl)acetic acid,
 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-fluoro-[1,1'-biphenyl]-3-yl)acetic acid,
 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-6-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid,
 55 3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-propoxy-[1,1'-biphenyl]-3-carboxylic acid,
 N-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)me-

thyl)benzenesulfonamide,
 3-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)propanoic acid,
 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)-1,1-difluoropropyl)-4-ethoxy-[1,1'-
 5 biphenyl]-3-yl)acetic acid,
 N-(6-(3-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)-1,1-difluoropropyl)phenyl)pyridin-3-yl)benzenesulfonamide,
 2-(5-(6-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)pyridin-2-yl)-2-methoxy-phenyl)acetic acid,
 10 3-(3-(3'-(1*H*-tetrazol-5-yl)-[1,1'-biphenyl]-3-yl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one,
 2-(5-(4-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)pyrimidin-2-yl)-2-ethoxy-phenyl)acetic acid,
 2-(5-(6-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)pyrimidin-4-yl)-2-ethoxy-phenyl)acetic acid,
 15 (3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-methoxy-[1,1'-biphenyl]-4-yl)acetic acid,
 (3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-ethoxy-[1,1'-biphenyl]-4-yl)acetic acid,
 (3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-propoxy-[1,1'-biphenyl]-4-yl)acetic acid,
 20 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-hydroxy-[1,1'-biphenyl]-4-yl)acetic acid,
 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-isopropoxy-[1,1'-biphenyl]-3-yl)acetic acid,
 25 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-(2-(dimethylamino)ethoxy)-[1,1'-biphenyl]-3-yl)acetic acid,

or a pharmaceutically acceptable salt thereof.

[0038] In another aspect the invention is directed to a pharmaceutical composition comprising a compound of Formula I, or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier.

[0039] In another aspect the invention is directed to a method of treating a cancer which is negatively impacted by diminution in its metabolism of fatty acid, through the administration of a therapeutically effective amount of a compound of Formula I, or a pharmaceutically acceptable salt thereof.

[0040] Within this aspect there is a genus wherein the cancer is selected from prostate, breast, ovarian, liver, kidney, colon, pancreatic, human chronic lymphocytic leukemia, and melanoma.

[0041] In another aspect the invention is directed to a method of treating cancer involving the administration of a therapeutically effective amount of a compound of Formula I, or a pharmaceutically acceptable salt thereof.

[0042] In another aspect the invention is directed to a method of preventing the onset of and/or recurrence of acute and chronic myeloid leukemia, as well as other cancers through the administration of a therapeutically effective amount of a compound according to Claim 1, or a pharmaceutically acceptable salt thereof.

DEFINITIONS

[0043] The term "patient" includes mammals such as mice, rats, cows, sheep, pigs, rabbits, goats, horses, monkeys, dogs, cats, and humans.

[0044] The term "halo" or "halogen" refers to any radical of fluorine, chlorine, bromine or iodine.

[0045] The term "alkyl" refers to a saturated hydrocarbon chain that may be a straight chain or branched chain, containing the indicated number of carbon atoms. For example, C₁₋₆alkyl indicates that the group may have from 1 to 6 (inclusive) carbon atoms in it. Any atom can be optionally substituted, e.g., by one or more substituents. Examples of alkyl groups include without limitation methyl, ethyl, *n*-propyl, isopropyl, *n*-butyl, *sec*-butyl and *tert*-butyl.

[0046] The term "haloalkyl" refers to an alkyl group, in which at least one hydrogen atom is replaced by halo. In some embodiments, more than one hydrogen atom (e.g., 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, or 14) are replaced by halo. In these embodiments, the hydrogen atoms can each be replaced by the same halogen (e.g., fluoro) or the hydrogen atoms can be replaced by a combination of different halogens (e.g., fluoro and chloro). "Haloalkyl" also includes alkyl moieties in which all hydrogens have been replaced by halo (sometimes referred to herein as perhaloalkyl, e.g., perfluoroalkyl, such as trifluoromethyl). Any atom can be optionally substituted, e.g., by one or more substituents.

[0047] As referred to herein, the term "alkoxy" refers to a group of formula -O(alkyl). Alkoxy can be, for example, methoxy, ethoxy, propoxy, isopropoxy, butoxy, iso-butoxy, *sec*-butoxy, pentoxy, 2-pentoxy, 3-pentoxy, or hexyloxy.

Likewise, the term "thioalkoxy" refers to a group of formula -S(alkyl). The terms "haloalkoxy" and "halothioalkoxy" refer to -O(haloalkyl) and -S(haloalkyl), respectively. The term "sulfhydryl" refers to -SH.

[0048] The term "aralkyl" refers to an alkyl moiety in which an alkyl hydrogen atom is replaced by an aryl group. One of the carbons of the alkyl moiety serves as the point of attachment of the aralkyl group to another moiety. Any ring or chain atom can be optionally substituted e.g., by one or more substituents. Non-limiting examples of "aralkyl" include benzyl, 2-phenylethyl, and 3-phenylpropyl groups.

[0049] The term "alkenyl" refers to a straight or branched hydrocarbon chain containing the indicated number of carbon atoms and having one or more carbon-carbon double bonds. Any atom can be optionally substituted, e.g., by one or more substituents. Alkenyl groups can include, e.g., vinyl, allyl, 1-butenyl, and 2-hexenyl.

[0050] The term "heterocycle" or "heterocyclic", as used herein except where noted, represents a stable 4-, 5-, 6- or 7-membered monocyclic- or stable 6-, 7-, 8-, 9-, 10-, 11-, or 12-membered fused bicyclic heterocyclic ring system which comprises at least one non-aromatic (i.e. saturated or partially unsaturated) ring which consists of carbon atoms and from one to four heteroatoms selected from the group consisting of N, O and S, wherein the nitrogen and sulfur heteroatoms may optionally be oxidized, and wherein the nitrogen heteroatom may optionally be quaternized. In the case of a "heterocycle" which is a bicyclic group, the second ring may also be a non-aromatic ring which consists of carbon atoms and from one to four heteroatoms selected from the group consisting of N, O and S, as defined above, or the second ring may be a benzene ring, or a "cycloalkyl", or a "cycloalkenyl", as defined immediately below. Examples of such heterocyclic groups include, but are not limited to, azetidine, chroman, dihydrofuran, dihydropyran, dioxane, dioxolane, hexahydroazepine, imidazolidine, imidazoline, indoline, isochroman, isoindoline, isothiazoline, isothiazolidine, isoxazoline, isoxazolidine, morpholine, oxazoline, oxazolidine, oxetane, piperazine, piperidine, pyran, pyrazolidine, pyrazoline, pyrrolidine, pyrroline, tetrahydrofuran, tetrahydropyran, thiamorpholine, thiazoline, thiazolidine, thiomorpholine and N-oxides thereof.

[0051] The term "cycloalkyl" refers to a fully saturated monocyclic, bicyclic, tricyclic, or other polycyclic hydrocarbon groups. Any atom can be optionally substituted, e.g., by one or more substituents. A ring carbon serves as the point of attachment of a cycloalkyl group to another moiety. Cycloalkyl moieties can include, e.g., cyclopropyl, cyclobutyl, cyclopentyl, cyclohexyl, cycloheptyl, adamantyl, and norbornyl (bicyclo[2.2.1]heptyl).

[0052] The term "cycloalkenyl" refers to partially unsaturated monocyclic, bicyclic, tricyclic, or other polycyclic hydrocarbon groups. A ring carbon (e.g., saturated or unsaturated) is the point of attachment of the cycloalkenyl substituent. Any atom can be optionally substituted e.g., by one or more substituents. Cycloalkenyl moieties can include, e.g., cyclopentenyl, cyclohexenyl, cyclohexadienyl, or norbornenyl.

[0053] The term "cycloalkylene", as used herein, refers to a divalent monocyclic cycloalkyl group having the indicated number of ring atoms.

[0054] The term "heterocycloalkylene", as used herein, refers to a divalent monocyclic heterocyclyl group having the indicated number of ring atoms.

[0055] The term "aryl" as used herein, is intended to mean any stable monocyclic or bicyclic carbon ring of up to 7 members in each ring, wherein at least one ring is aromatic. Examples of such aryl elements include phenyl, naphthyl, tetrahydronaphthyl, indanyl, or biphenyl.

[0056] The term "heteroaryl", as used herein except where noted, represents a stable 5, 6 or 7-membered monocyclic- or stable 9 or 10-membered fused bicyclic ring system which comprises at least one aromatic ring, -which consists of carbon atoms and from one to three heteroatoms selected from the group consisting of N, O and S wherein the nitrogen and sulfur heteroatoms may optionally be oxidized, and the nitrogen heteroatom may optionally be quaternized. In the case of a "heteroaryl" which is a bicyclic group, the second ring need not be aromatic and need not comprise a heteroatom. Accordingly, "heteroaryl" includes, for example, a stable 5, 6 or 7-membered monocyclic aromatic ring consisting of carbon atoms and from one to four heteroatoms, as defined immediately above, fused to a benzene ring, or fused to a "heterocycle", "cycloalkyl", or a "cycloalkenyl", as defined above. Examples of such heteroaryl groups include, but are not limited to, benzimidazole, benzisothiazole, benzisoxazole, benzofuran, isobenzofuran, benzothiazole, benzothioophene, benzotriazole, benzoxazole, carboline, cinnoline, furan, furazan, imidazole, indazole, indole, indolizine, isoquinoline, isothiazole, isoxazole, naphthyridine, oxadiazole, oxazole, phthalazine, pteridine, purine, pyrazine, pyrazole, pyridazine, pyridine, pyrimidine, pyrrole, quinazoline, quinoline, quinoxaline, tetrazole, thiadiazole, thiazole, thiophene, triazine, triazole, and N-oxides thereof.

[0057] The term "acyl", as used herein, refers to those groups derived from an organic acid by removal of the hydroxy portion of the acid. Accordingly, acyl is meant to include, for example, acetyl, propionyl, butyryl, decanoyl, pivaloyl, benzoyl and the like.

COMPOUND FORMS AND SALTS

[0058] The compounds of this invention may contain one or more stereocenters and thus occur as racemates and racemic mixtures, enantiomerically-enriched mixtures, single enantiomers, individual diastereomers and diastereomeric

mixtures. The compounds of this invention may also be represented in multiple tautomeric forms, in such instances, the invention expressly includes all tautomeric forms of the compounds described herein, even though only a single tautomeric form may be represented. All such isomeric forms of such compounds are expressly included in the present invention.

[0059] The compounds of this invention include the compounds themselves, as well as their salts and their prodrugs, if applicable. A salt, for example, can be formed between an anion and a positively charged substituent (e.g., ammonium) on a compound described herein. Suitable anions include chloride, bromide, iodide, sulfate, nitrate, phosphate, citrate, methanesulfonate, trifluoroacetate, and acetate. Likewise, a salt can also be formed between a cation and a negatively charged substituent (e.g., carboxylate) on a compound described herein. Suitable cations include sodium ion, potassium ion, magnesium ion, calcium ion, and an ammonium cation such as tetramethylammonium ion.

[0060] As used herein, "pharmaceutically acceptable salts" refer to derivatives wherein the parent compound is modified by making acid or base salts thereof. Examples of pharmaceutically acceptable salts include, but are not limited to, mineral or organic acid salts of basic residues such as amines; alkali or organic salts of acidic residues such as carboxylic acids; and the like. The pharmaceutically acceptable salts include the conventional non-toxic salts or the quaternary ammonium salts of the parent compound formed, for example, from non-toxic inorganic or organic acids. For example, such conventional non-toxic salts include those derived from inorganic acids such as hydrochloric, hydrobromic, sulfuric, sulfamic, phosphoric, nitric and the like; and the salts prepared from organic acids such as acetic, propionic, succinic, glycolic, stearic, lactic, malic, tartaric, citric, ascorbic, pantoic, maleic, hydroxymaleic, phenylacetic, glutamic, benzoic, salicylic, sulfanilic, 2-acetoxybenzoic, fumaric, toluenesulfonic, methanesulfonic, ethane disulfonic, oxalic, isethionic, and the like.

[0061] When the compound of the present invention is basic, salts may be prepared from pharmaceutically acceptable non-toxic acids, including inorganic and organic acids. Such acids include acetic, benzenesulfonic, benzoic, camphorsulfonic, citric, ethanesulfonic, fumaric, gluconic, glutamic, hydrobromic, hydrochloric, isethionic, lactic, maleic, malic, mandelic, methanesulfonic, mucic, nitric, pantoic, pantothenic, phosphoric, succinic, sulfuric, tartaric, p-toluenesulfonic acid, and the like. In one aspect of the invention the salts are citric, hydrobromic, hydrochloric, maleic, phosphoric, sulfuric, fumaric, and tartaric acids.

[0062] When the compound of the present invention is acidic, salts may be prepared from pharmaceutically acceptable non-toxic bases, including inorganic and organic bases. Such salts that may be prepared include a lithium salt, sodium salt, potassium salt, magnesium salt, calcium salt, dicyclohexylamine salt, N-methyl-D-glucamine salt, tris(hydroxymethyl)methylamine salt, arginine salt, lysine salt, and the like.

[0063] Lists of suitable salts are found in Remington's Pharmaceutical Sciences, 17th ed., Mack Publishing Company, Easton, Pa., 1985, p. 1418; Journal of Pharmaceutical Science, 66, 2 (1977); and "Pharmaceutical Salts: Properties, Selection, and Use A Handbook; Wermuth, C. G. and Stahl, P. H. (eds.) Verlag Helvetica Chimica Acta, Zurich, 2002 [ISBN 3-906390-26-8].

[0064] The compounds may be radiolabeled with radioactive isotopes, such as for example tritium, iodine-125 or carbon-14. All isotopic variations of the compounds of the invention, whether radioactive or not, are intended to be encompassed within the scope of the invention.

[0065] In some embodiments, hydrogen atoms of the compounds described herein may be replaced with deuterium atoms.

[0066] In some embodiments, compounds of Formula I are prepared as prodrugs. Prodrugs are generally drug precursors that, following administration to a subject and subsequent absorption, are converted to an active, or a more active species via some process, such as conversion by a metabolic pathway. Examples of prodrugs include C₁₋₆ alkyl esters of carboxylic acid groups, which, upon administration to a subject, are capable of providing active compounds.

PHARMACEUTICAL COMPOSITIONS

[0067] The term "pharmaceutically acceptable carrier" refers to a carrier or adjuvant that may be administered to a patient, together with a compound of this invention, or a pharmaceutically acceptable salt thereof, and which does not destroy the pharmacological activity thereof and is nontoxic when administered in doses sufficient to deliver a therapeutic amount of the compound.

[0068] The term "composition" as used herein is intended to encompass a product comprising the specified ingredients in the specified amounts, as well as any product which results, directly or indirectly, from combination of the specified ingredients in the specified amounts. Such term in relation to pharmaceutical composition, is intended to encompass a product comprising the active ingredient(s), and the inert ingredient(s) that make up the carrier, as well as any product which results, directly or indirectly, from combination, complexation or aggregation of any two or more of the ingredients, or from dissociation of one or more of the ingredients, or from other types of reactions or interactions of one or more of the ingredients. Accordingly, the pharmaceutical compositions of the present invention encompass any composition made by admixing a compound of the present invention, or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier. By "pharmaceutically acceptable" it is meant the carrier, diluent or excipient must be

compatible with the other ingredients of the formulation and not deleterious to the recipient thereof.

[0069] The amount administered depends on the compound formulation, route of administration, etc. and is generally empirically determined in routine trials, and variations will necessarily occur depending on the target, the host, and the route of administration, etc. Generally, the quantity of active compound in a unit dose of preparation may be varied or adjusted from about 1, 3, 10 or 30 to about 30, 100, 300 or 1000 mg, according to the particular application. For convenience, the total daily dosage may be divided and administered in portions during the day if desired.

USES

[0070] In one aspect the invention disclosed herein is directed to compounds of Formula I and pharmaceutically acceptable salts thereof, which are useful in the treatment of prostate, breast, ovarian, liver, kidney, colon, pancreatic, human chronic lymphocytic leukemia, melanoma and other cancers. In another aspect the invention is directed to a method of preventing the onset of and/or recurrence of acute and chronic myeloid leukemia, as well as other cancers. The invention also includes pharmaceutical compositions comprising a therapeutically effective amount of compound of Formula I, or a pharmaceutically acceptable salt thereof. The invention disclosed herein enables methods of treating prostate, breast, ovarian, liver, kidney, colon, pancreatic, human chronic lymphocytic leukemia, melanoma and other cancers. The invention disclosed herein is further enables methods of treating prostate, breast, colon, pancreatic, human chronic lymphocytic leukemia, melanoma and other cancers comprising administration of a therapeutically effective amount of a selective PPAR α antagonist. The methods include administering to the subject an effective amount of a compound of Formula (I) (and/or a compound of any of the other formulae described herein) or a salt (e.g., a pharmaceutically acceptable salt) thereof as defined anywhere herein. In another aspect, the use of a compound of Formula (I) (and/or a compound of any of the other formulae described herein) or a salt (e.g., a pharmaceutically acceptable salt) thereof as defined anywhere herein in the preparation of, or for use as, a medicament for the treatment (e.g., controlling, alleviating, or slowing the progression of) or prevention (e.g., delaying the onset of or reducing the risk of developing) of one or more diseases, disorders, or conditions caused by, or associated with, prostate, breast, ovarian, liver, kidney, colon, pancreatic, human chronic lymphocytic leukemia, melanoma and other cancers.

[0071] In one aspect the invention enables a method of treating a cancer which is negatively impacted by diminution in its metabolism via fatty acid oxidation, comprising administration of a therapeutically effective amount of a compound of Formula I (and/or a compound of any of the other formulae described herein) or a salt (e.g., a pharmaceutically acceptable salt). In another aspect, the invention enables a method of treating a cancer having a metabolism that is reliant on fatty acid oxidation, comprising administration of a therapeutically effective amount of a compound of Formula I (and/or a compound of any of the other formulae described herein), or a pharmaceutically acceptable salt thereof.

ADMINISTRATION

[0072] The compounds and compositions described herein can, for example, be administered orally, parenterally (e.g., subcutaneously, intracutaneously, intravenously, intramuscularly, intraarticularly, intraarterially, intrasynovially, intrasternally, intrathecally, intralesionally and by intracranial injection or infusion techniques), by inhalation spray, topically, rectally, nasally, buccally, vaginally, via an implanted reservoir, by injection, subdermally, intraperitoneally, transmucosally, or in an ophthalmic preparation, with a dosage ranging from about 0.01 mg/kg to about 1000 mg/kg, (e.g., from about 0.01 to about 100 mg/kg, from about 0.1 to about 100 mg/kg, from about 1 to about 100 mg/kg, from about 1 to about 10 mg/kg) every 4 to 120 hours, or according to the requirements of the particular drug. The interrelationship of dosages for animals and humans (based on milligrams per meter squared of body surface) is described by Freireich et al., Cancer Chemother. Rep. 50, 219 (1966). Body surface area may be approximately determined from height and weight of the patient. See, e.g., Scientific Tables, Geigy Pharmaceuticals, Ardsley, N.Y., 537 (1970). In certain embodiments, the compositions are administered by oral administration or by injection. The methods include the administration of an effective amount of compound or compound composition to achieve the desired or stated effect. Typically, the pharmaceutical compositions of this invention will be administered from about 1 to about 6 times per day or alternatively, as a continuous infusion. Such administration can be used as a chronic or acute therapy.

[0073] Lower or higher doses than those recited above may be required. Specific dosage and treatment regimens for any particular patient will depend upon a variety of factors, including the activity of the specific compound employed, the age, body weight, general health status, sex, diet, time of administration, rate of excretion, drug combination, the severity and course of the disease, condition or symptoms, the patient's disposition to the disease, condition or symptoms, and the judgment of the treating physician.

[0074] Dosage forms include from about 0.05 milligrams to about 2,000 milligrams (e.g., from about 0.1 milligrams to about 1,000 milligrams, from about 0.1 milligrams to about 500 milligrams, from about 0.1 milligrams to about 250 milligrams, from about 0.1 milligrams to about 100 milligrams, from about 0.1 milligrams to about 50 milligrams, or from about 0.1 milligrams to about 25 milligrams) of a compound of Formula I (and/or a compound of any of the other formulae

described herein) or a salt (e.g., a pharmaceutically acceptable salt) thereof as defined anywhere herein. The dosage forms can further include a pharmaceutically acceptable carrier and/or an additional therapeutic agent.

[0075] In one aspect the compounds of the invention may be co-administered with one or more additional anti-cancer agents. The additional anti-cancer agents include, but are not limited to alkylating agents such as cyclophosphamide, chlorambucil, mecloreethamine, ifosfamide, or melphalan; antimetabolites such as methotrexate, cytarabine, fludarabine, 6-mercaptopurine, azathioprene, pyrimidines, or 5-fluorouracil; antimetotic agents such as vincristine, paclitaxel, vinorelbine or docetaxel; a topoisomerase inhibitors such as doxorubicin or irinotecan; platinum derivatives such as cisplatin, carboplatin or oxaliplatin; hormone therapeutics such as tamoxifen; aromatase inhibitors such as bicalutamide, anastrozole, exemestane or letrozole; signaling inhibitors such as imatinib, gefitinib or erlotinib; monoclonal antibodies such as rituximab, trastuzumab, gemtuzumab or ozogamicin; differentiating agents such as tretinoin or arsenic trioxide; antiangiogenic agents such as bevacizumab, sorafenib or sunitinib; biologic response modifiers such as interferon-alpha; topoisomerase inhibitors such as camptothecins (including irinotecan and topotecan), amsacrine, etoposide, etoposide phosphate, or teniposide; cytotoxic antibiotics such as actinomycin, anthracyclines including doxorubicin, daunorubicin, valrubicin, idarubicin, epirubicin, bleomycin, plicamycin or mitomycin; vinca alkaloids such as vincristine, vinblastine, viorelbine or vindesine; or podophyllotoxins such as etoposide and teniposide; or mTOR inhibitors such as rapamycin, temsirolimus and everolimus.

[0076] Other anti-cancer agents for use in combination with the compounds include one or more of the following: abiraterone, adriamycin, dactinomycin, bleomycin, vinblastine, cisplatin, acivicin; aclarubicin; acodazole hydrochloride; acronine; adozelesin; aldesleukin; altretamine; ambomycin; ametantrone acetate; aminoglutethimide; amsacrine; anastrozole; anthramycin; asparaginase; asperlin; azacitidine; azetepa; azotomycin; batimastat; benzodepa; bicalutamide; bisantrene hydrochloride; bisnafide dimesylate; bizelesin; bleomycin sulfate; brequinar sodium; bropirimine; busulfan; cactinomycin; calusterone; caracemide; carbetimer; carboplatin; carmustine; carubicin hydrochloride; carzelesin; cedefingol; chlorambucil; cirolemycin; cladribine; crisnatol mesylate; cyclophosphamide; cytarabine; dacarbazine; daunorubicin hydrochloride; decitabine; dexormaplatin; dezaguanine; dezaguanine mesylate; diaziquone; doxorubicin; doxorubicin hydrochloride; droloxifene; droloxifene citrate; dromostanolone propionate; duazomycin; edatrexate; eflornithine hydrochloride; elsamitucin; enloplatin; enpromate; epiropidine; epirubicin hydrochloride; erbulozole; esorubicin hydrochloride; estramustine; estramustine phosphate sodium; etanidazole; etoposide; etoposide phosphate; etoprine; everolimus; fadrozole hydrochloride; fazarabine; fenretinide; floxuridine; fludarabine phosphate; fluorouracil; flurocitabine; fosquidone; fostriecin sodium; gemcitabine; gemcitabine hydrochloride; hydroxyurea; idarubicin hydrochloride; ifosfamide; iimofosine; interleukin 11 (including recombinant interleukin 11, or r1L2), interferon alfa-2a; interferon alfa-2b; interferon alfa-n1; interferon alfa-n3; interferon beta-1a; interferon gamma-1b; ioprolatin; irinotecan hydrochloride; lanreotide acetate; letrozole; leuprolide acetate; liarozole hydrochloride; lometrexol sodium; lomustine; losoxantrone hydrochloride; masoprocol; maytansine; mechlorethamine hydrochloride; megestrol acetate; melengestrol acetate; melphalan; menogaril; mercaptopurine; metformin, methotrexate; methotrexate sodium; metoprine; meturedepa; mitindomide; mitocarcin; mitocromin; mitogillin; mitomalcin; mitomycin; mitosper; mitotane; mitoxantrone hydrochloride; mycophenolic acid; nocodazole; nogalamycin; ormaplatin; oxisuran; pegaspargase; peliomycin; pentamustine; peplomycin sulfate; perfosfamide; pipobroman; piposulfan; piroxantrone hydrochloride; plicamycin; plomestane; porfimer sodium; porfiromycin; prednimustine; procarbazine hydrochloride; puromycin; puromycin hydrochloride; pyrazofurin; rapamycin; riboprine; roglitimide; safangol; safangol hydrochloride; semustine; simtrazene; sparfosate sodium; sparsomycin; spirogermanium hydrochloride; spiromustine; spiroplatin; streptonigrin; streptozocin; sulofenur; talisomycin; tecogalan sodium; tegafur; teloxantrone hydrochloride; temoporfin; temsirolimus; teniposide; teroxirone; testolactone; thiamiprine; thioguanine; thiotepa; tiazofurin; tirapazamine; toremifene citrate; trestolone acetate; triciribine phosphate; trimetrexate; trimetrexate glucuronate; triptorelin; tubulozole hydrochloride; uracil mustard; uredepa; vapreotide; verteporfin; vinblastine sulfate; vincristine sulfate; vindesine; vindesine sulfate; vinepidine sulfate; vinyglycinate sulfate; vinleurosine sulfate; vinorelbine tartrate; vinrosidine sulfate; vinzolidine sulfate; vorozole; zeniplatin; zinostatin; zorubicin hydrochloride.

[0077] In certain embodiments, the additional agents may be administered separately, as part of a multiple dose regimen, from the compounds of this invention (e.g., sequentially, or on different overlapping schedules with the administration of one or more compounds of Formula (I) (and/or a compound of any of the other formulae including any subgenera or specific compounds thereof)). In other embodiments, these agents may be part of a single dosage form, mixed together with the compounds of this invention in a single composition. In still another embodiment, these agents can be given as a separate dose that is administered at about the same time as one or more compounds of Formula (I) (and/or a compound of any of the other formulae including any subgenera or specific compounds thereof) are administered (e.g., simultaneously with the administration of one or more compounds of Formula (I) (and/or a compound of any of the other formulae including any subgenera or specific compounds thereof)). When the compositions of this invention include a combination of a compound of the formulae described herein and one or more additional therapeutic or prophylactic agents, both the compound and the additional agent can be present at dosage levels of between about 1 to 100%, and more preferably between about 5 to 95% of the dosage normally administered in a monotherapy regimen.

[0078] The compositions of this invention may contain any conventional non-toxic pharmaceutically-acceptable car-

riers, adjuvants or vehicles. In some cases, the pH of the formulation may be adjusted with pharmaceutically acceptable acids, bases or buffers to enhance the stability of the formulated compound or its delivery form.

[0079] The compositions of this invention may be orally administered in any orally acceptable dosage form including, but not limited to, capsules, tablets, emulsions and aqueous suspensions, dispersions and solutions. In the case of tablets for oral use, carriers which are commonly used include lactose and corn starch. Lubricating agents, such as magnesium stearate, are also typically added. For oral administration in a capsule form, useful diluents include lactose and dried corn starch. When aqueous suspensions and/or emulsions are administered orally, the active ingredient may be suspended or dissolved in an oily phase that is then combined with emulsifying and/or suspending agents. If desired, certain sweetening and/or flavoring and/or coloring agents may be added.

BIOLOGICAL FUNCTION

[0080] The utility of the invention can be demonstrated by one or more of the following methods or other methods known in the art:

Human PPAR α Reporter Assay

[0081] The screening of test compounds for agonist or antagonist activities against human PPAR α receptors was performed using a commercial kit, Human PPAR α Reporter Assay System (Indigo Biosciences, Cat. #IB00111).

[0082] This nuclear receptor assay system utilizes proprietary non-human mammalian cells engineered to provide constitutive, high-level expression of Human PPAR α . Because these cells incorporate a PPAR α -responsive luciferase reporter gene, quantifying expressed luciferase activity provides a sensitive surrogate measure of PPAR α activity in the treated cells. The primary application of this reporter assay system is in the screening of test samples to quantify any functional activity, either agonist or antagonist, that they may exert against human PPAR α . While this assay may be used to measure agonism, each of the Examples, infra, exhibits antagonism rather than agonism. Briefly, the reporter cells are dispensed into wells of the assay plate and then immediately dosed with test compounds. Following an overnight incubation, the treatment media are discarded and Luciferase Detection Reagent (LDR) is added. The intensity of light emission from the ensuing luciferase reaction provides a sensitive measure that is directly proportional to the relative level of PPAR α activation in the reporter cells.

Target Selectivity Assays

[0083] To determine species selectivity, a Mouse PPAR α Reporter Assay System was used (Indigo Biosciences, Cat. #M00111). Activity of test compounds to antagonize or agonize other isoforms of human PPAR, for example β/δ and γ , were assessed using the corresponding kits from Indigo Biosciences (Cat. #IB00121 and #IB00101, respectively). In addition to PPAR activity, compounds were also screened for activity against other nuclear hormone receptors including Estrogen Receptor β , Glucocorticoid Receptor and Thyroid Receptor β using commercially available kits (Indigo Biosciences, Cat. #IB00411, IB00201 and IB01101, respectively). Each assay system from Indigo Biosciences uses technology analogous to the human PPAR α kit, with the variance being that the cells used for each assay were engineered to over-express the receptor of interest. In addition, the appropriate receptor agonist (included with each kit) was used at \sim EC80 for assays in which antagonist potency was being assessed.

Target Selectivity - Counterscreen Assay Results

Example	PPAR alpha IC ₅₀ (nM)	PPAR beta/ delta IC ₅₀ (nM)	PPAR gamma IC ₅₀ (nM)	Thyroid Receptor β IC ₅₀ (nM)	Glucocorticoid Receptor IC ₅₀ (nM)	Estrogen Receptor β IC ₅₀ (nM)
6	58	13265	39845	30849	18191	19444

Measuring fatty acid oxidation using ^3H palmitate

[0084] Fatty acid oxidation is measured using ^3H palmitate metabolism into $^3\text{H}_2\text{O}$ as described previously (Nieman et al., 2011). Briefly, cells (e.g. HepG2, PC3 and CLL) are plated in growth media and allowed to adhere overnight. Cells are then treated with compound or 40 μM etomoxir (an inhibitor of fatty acid oxidation) as control. After treatment, cells are washed with DPBS followed by incubation in assay buffer (growth media, ^3H palmitate and compound). After incubation, media is collected and proteins precipitated with 5% trichloroacetic acid. The precipitate is pelleted by centrifugation and the supernatant collected. Any remaining ^3H palmitate in the supernatant is then removed by purification

over a Dowex anion exchange column. $^3\text{H}_2\text{O}$ is then measured by scintillation counting.

Measurement of cell viability

5 [0085] Purified CLL cells were cultured at 2×10^5 cells/200 μL of RPMI1640 supplemented with 10% FCS in 96-well plates under various treatment conditions. Determination of CLL cell viability was based on the analysis of mitochondrial transmembrane potential ($\Delta\Psi\text{m}$) using 3,3'-dihexyloxacarbocyanine iodide (DiOC6) (Invitrogen) and cell membrane permeability to propidium iodide (PI) (Sigma). For viability assays, 100 μL of the cell culture was collected at the indicated time points and transferred to polypropylene tubes containing 100 μL of 40 μM DiOC6 and 10 $\mu\text{g/mL}$ PI in culture media. 10 The cells were then incubated at 37 $^\circ\text{C}$ for 15 min and analyzed within 30 min by flow cytometry using an Accuri C6 flow cytometer. The percentage of viable cells was determined by gating on PI negative and DiOC6 bright cells.

In vivo PD model: PPAR alpha agonist-induced changes in liver gene expression

15 [0086] CD-1 mice were treated with test compound 1-2 hours prior to oral gavage with the PPAR alpha agonist WY14,643 (3 mg/kg). For the 1 day pharmacodynamic model, animals were euthanized 6 hours after agonist treatment. For the 3 day pharmacodynamic model, mice were dosed again with antagonist and WY14,643 on day 2 and day 3. In this case, mice were euthanized 6 hours following WY14,643 on day 3. Upon termination, blood was collected for DMPK analysis. Liver was collected, placed into Trizol and stored at -80 $^\circ\text{C}$ until processing. RNA was extracted from thawed 20 and homogenized tissue using standard Trizol RNA isolation methods. RT-PCR was performed on the extracted RNA using primers specific for PPAR alpha regulated genes. Quantitative PCR was performed on the resulting cDNA and expression was normalized to β -actin.

In vivo cancer model: B16F10 model of pulmonary metastasis

25 [0087] B16F10 cells were cultured in standard growth media, harvested when approximately 50% confluent and injected into C57BL/6 mice via the tail vein (50,000 cells per mouse in 200 μL). Mice were treated daily with test compound. On day 21, mice were euthanized. Lungs were harvested and placed into Fekete's solution overnight to facilitate visualization of the tumors. Black nodules were enumerated.

30 [0088] Figure 1 shows inhibition of metastasis of B16F10 melanoma cells to the lung following oral doses of Example 6 at 0.3, 3 and 30 mg/kg. Statistics were performed by ANOVA with Dunnett's Multiple Comparison Test post-hoc to determine statistical differences from vehicle treatment group. * denotes $P < 0.05$, while *** denotes $P < 0.001$.

SYNTHESIS

35 [0089] The starting materials used for the synthesis are either synthesized or obtained from commercial sources, such as, but not limited to, Sigma-Aldrich, Fluka, Acros Organics, Alfa Aesar, VWR Scientific, and the like. General methods for the preparation of compounds can be modified by the use of appropriate reagents and conditions for the introduction of the various moieties found in the structures are provided herein.

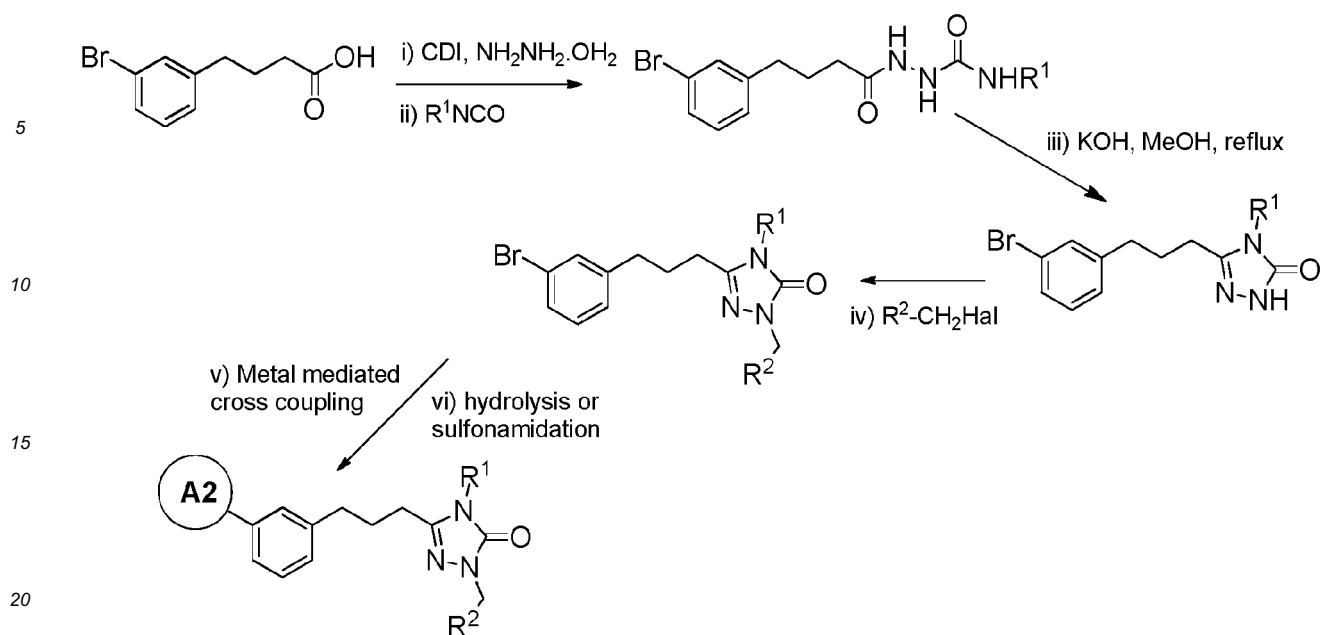
40 [0090] In some embodiments, compounds described herein are prepared as outlined in the following general synthetic scheme.

General Synthetic Scheme for Exemplary Compounds

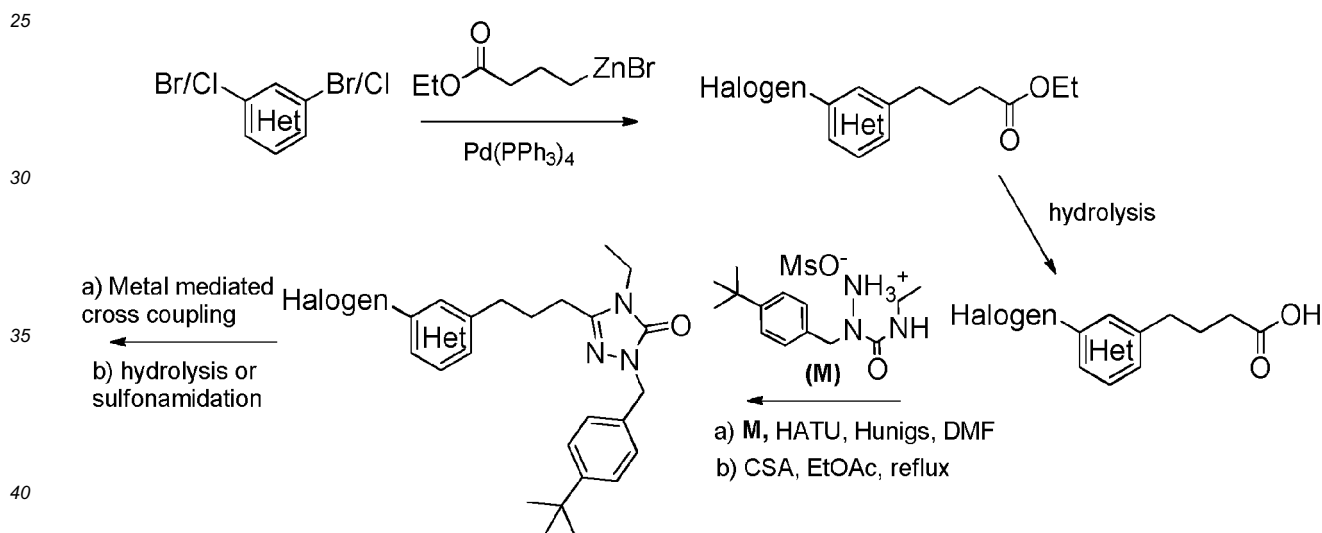
45 [0091]

50

55



[0092] For Heterocycle containing central rings:



Preparation of Intermediates

4-(3-Bromophenyl)butanoic acid

[0093]



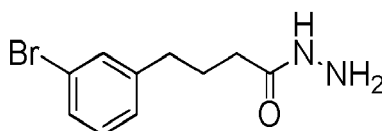
[0094] Step 1: To a solution of 3-bromobenzaldehyde (5.00 g, 27.0 mmol) in DMF (18 mL) was added sodium cyanide (331 mg, 6.8 mmol) and the resulting solution was heated at 45 °C for 30 min. A solution of acrylonitrile (1.55 mL, 23.7 mmol) in DMF (2 mL) was added dropwise over a period of 20 minutes and the heating continued for 3 hrs. The solution was allowed to cool after which AcOH (1 mL) was added, the reaction mixture partitioned between EtOAc and water, the organic phase extracted, dried (MgSO₄), filtered and evaporated *in vacuo*. The residue was purified using silica gel

chromatography (0 to 30% EtOAc in hexanes) to afford 3.1 g of 4-(3-bromophenyl)-4-oxobutanenitrile as a yellow oil.

[0095] Step 2: To a solution of the isolated nitrile (3.1 g, 13.0 mmol) in ethylene glycol (22 mL) was added water (0.5 mL), hydrazine monohydrate (1.5 mL) and potassium hydroxide (3.34 g). The reaction mixture was heated to 195 °C until analysis by LCMS indicated complete reaction, after which it was allowed to cool to room temperature, diluted with water and acidified to pH ~2 with 2N HCl. The resulting solution was extracted with EtOAc, dried (MgSO₄), filtered and evaporated *in vacuo*. Purification of the residue on silica gel (0 to 30% acetone in hexanes) afforded 2.9 g of the title acid.

4-(3-Bromophenyl)butanehydrazide:

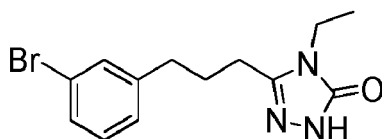
[0096]



[0097] To a solution of 4-(3-bromophenyl)butanoic acid (2.9 g, 11.9 mmol) in THF (50 mL) was added carbonyldiimidazole (2.32 g, 14.3 mmol) and stirred for 1.5 hrs. Hydrazine monohydrate (2.4 mL, ~4eq.) was added and the reaction was complete after 30 minutes as judged by LCMS analysis. The solution was partitioned between EtOAc and water, the organic phase extracted, dried (MgSO₄), filtered and evaporated to afford the title compound which was then used without further purification.

3-(3-(3-Bromophenyl)propyl)-4-ethyl-1H-1,2,4-triazol-5(4H)-one:

[0098]

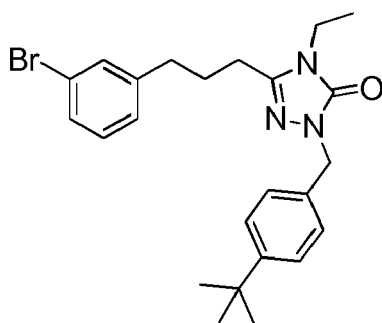


[0099] Step 1: The previously isolated 4-(3-bromophenyl)butanehydrazide (11.9 mmol) was dissolved in THF (50 mL) to which was added ethyl isocyanate (1.13 mL, 14.3 mmol). After stirring at room temperature for 12 hrs, the solution was evaporated to dryness to afford 2-(4-(3-bromophenyl)butanoyl)-N-ethylhydrazinecarboxamide which was then used without further purification.

[0100] Step 2: To a solution of the isolated carboxamide in MeOH (50 mL) was added KOH (6 g) and the reaction mixture was heated to reflux for 16 hrs. After complete reaction as judged by LCMS analysis, the solvent was removed and the residue diluted in DCM and acidified with 1N HCl with cooling. Extraction of the resulting mixture with DCM, drying of the organic phase (MgSO₄), filtration and evaporation of the filtrate *in vacuo* afforded crude 3-(3-(3-bromophenyl)propyl)-4-ethyl-1H-1,2,4-triazol-5(4H)-one which could be purified on silica gel (0 to 100% EtOAc in hexanes).

3-(3-(3-Bromophenyl)propyl)-1-(4-(tert-butyl)benzyl)-4-ethyl-1H-1,2,4-triazol-5(4H)-one:

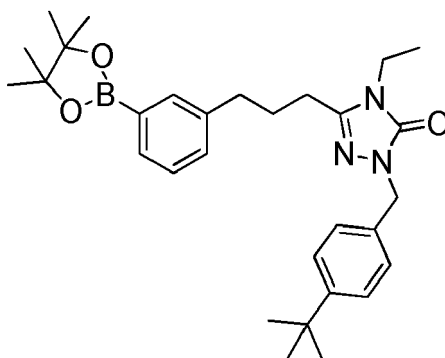
[0101]



[0102] To a solution of 3-(3-(3-bromophenyl)propyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (27.7 g, 89.3 mmol) in DMF (200 mL) was added potassium carbonate (40.0g, 288.7 mmol) followed by 4-*tert*-butylbenzylbromide (17.2 mL, 93.8 mmol) and the resulting suspension was stirred vigorously for 48 hrs at room temperature. The reaction mixture was diluted with EtOAc, washed with water (x2), dried (MgSO₄), filtered and evaporated *in vacuo*. Purification of the residue on silica gel (0 to 50% EtOAc in hexanes) afforded the title compound as a colorless oil.

1-(4-(*tert*-Butyl)benzyl)-4-ethyl-3-(3-(3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one:

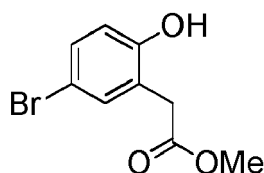
[0103]



[0104] To a solution of 3-(3-(3-bromophenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (11.7 g, 25.5 mmol) in dioxane (150 mL) was added potassium acetate (7.5 g, 76.5 mmol), bis(pinacolato)diboron (7.8 g, 30.7 mmol) and Pd(dppf)Cl₂ (750 mg). The resulting solution was sparged with dry nitrogen for 15 minutes and then heated to 85 °C for a period of 3 hrs. The solvent was removed *in vacuo* and the residue partitioned between EtOAc and water. The organic phase was separated, dried (MgSO₄), filtered and evaporated to give the crude boronate. This was further purified on silica gel, eluting with 0 to 50% EtOAc in hexanes, to afford the title boronate as a colorless oil.

Methyl 2-(5-bromo-2-hydroxyphenyl)acetate:

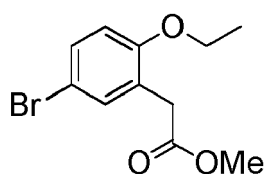
[0105]



[0106] To a solution of 2-(2-hydroxyphenyl)acetic acid (15.6 g, 103 mmol) in MeOH (350 mL) was added tetrabutylammonium tribromide (50 g, 103 mmol) in small portions over a 10 minute period. After stirring at ambient temperature for 24 hrs, the solvent was evaporated and the residue taken up in EtOAc, washed with 1N HCl, extracted with EtOAc, the organic phases dried (MgSO₄), filtered and evaporated. The residue was purified on silica gel eluting with a gradient of 30% EtOAc in hexanes to afford the title compound as a colorless solid.

Methyl 2-(5-bromo-2-ethoxyphenyl)acetate:

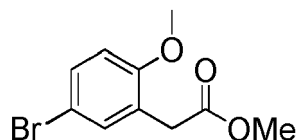
[0107]



[0108] To a solution of methyl 2-(5-bromo-2-hydroxyphenyl)acetate (1.0 g, 4.1 mmol) in DMF (8 mL) was added cesium carbonate (2.66 g, 8.2 mmol) and iodoethane (392 μ L, 4.9 mmol) and stirred at rt for 2 hrs. After completion, the reaction mixture was partitioned between EtOAc and water, the organic phase separated, washed with water, dried (MgSO_4), filtered and evaporated *in vacuo*. The residue was purified on silica gel eluting with a gradient of 0 to 10% EtOAc in hexanes to afford the title compound as a colorless oil.

Methyl 2-(5-bromo-2-methoxyphenyl)acetate

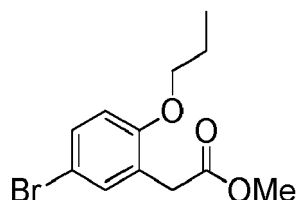
[0109]



[0110] Prepared in an analogous fashion to the aforementioned ethyl derivative using methyl iodide as electrophile.

Methyl 2-(5-bromo-2-propoxyphenyl)acetate

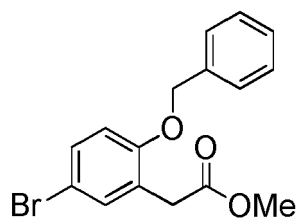
[0111]



[0112] Prepared in an analogous fashion to the aforementioned ethyl derivative using 1-bromopropane as electrophile.

Methyl 2-(2-(benzyloxy)-5-bromophenyl)acetate

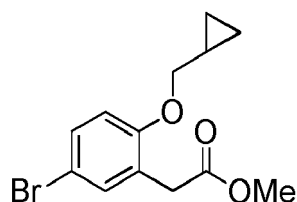
[0113]



[0114] Prepared in an analogous fashion to the aforementioned ethyl derivative using benzylbromide as electrophile.

Methyl 2-(5-bromo-2-(cyclopropylmethoxy)phenyl)acetate

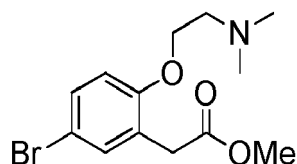
[0115]



[0116] Prepared in an analogous fashion to the aforementioned ethyl derivative using (bromomethyl)cyclopropane as electrophile.

Methyl 2-(5-bromo-2-(2-(dimethylamino)ethoxy)phenyl)acetate

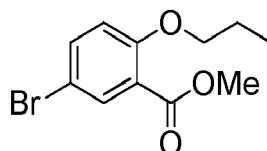
[0117]



[0118] Prepared in an analogous fashion to the aforementioned ethyl derivative using 2-chloro-*N,N*-dimethylamine hydrochloride as electrophile in the presence of catalytic amount of tetrabutylammonium iodide. Purified on silica using a 0 to 60% gradient of acetone in hexanes.

Methyl 5-bromo-2-propoxybenzoate

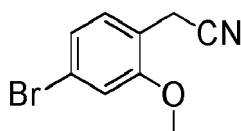
[0119]



[0120] Prepared in an analogous fashion to methyl 2-(5-bromo-2-ethoxyphenyl)acetate but starting with 5-bromo-methylsalicylate as starting material.

2-(4-Bromo-2-methoxyphenyl)acetonitrile

[0121]

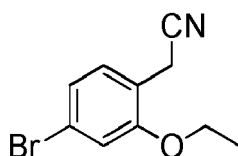


[0122] *Step 1:* To a solution of 5-bromo-2-methylphenol (1.5 g, 8.0 mmol) in DMF (10 mL) was added Cs_2CO_3 (3.9 g, 12.0 mmol) followed by iodomethane (0.55 mL, 8.8 mmol). The resulting suspension was stirred vigorously for 24 hrs after which it was diluted with EtOAc and washed with water. The organic phase was dried (MgSO_4), filtered, evaporated *in vacuo* and the residue purified on silica gel (0 to 5% EtOAc gradient in hexanes) to afford 4-bromo-2-methoxy-1-methylbenzene as a colorless oil.

[0123] *Step 2:* To a solution of 4-bromo-2-methoxy-1-methylbenzene (1.2 g, 6.0 mmol) in CCl_4 (15 mL) was added *N*-bromosuccinimide (1.17 g, 6.5 mmol) and benzoyl peroxide (50 mg). The resulting mixture was heated under reflux for 6 hrs, allowed to cool, evaporated and the residue purified on silica gel eluting with a gradient of 0 to 10% EtOAc in hexanes. The isolated bromide (440 mg, 1.6 mmol) was then dissolved in DMF (2 mL) and potassium cyanide (204 mg, 3.1 mmol) added. After stirring for 48 hrs at room temperature, the solution was diluted with EtOAc, washed with water, the organic phase separated, dried (MgSO_4), filtered and evaporated *in vacuo*. Purification of the residue on silica gel (0 to 10% EtOAc in hexanes) afforded the title compound.

2-(4-Bromo-2-ethoxyphenyl)acetonitrile

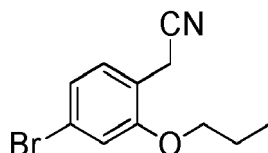
[0124]



[0125] Prepared in an analogous fashion to the methoxy derivative using iodoethane in Step 1.

2-(4-Bromo-2-propoxyphenyl)acetonitrile

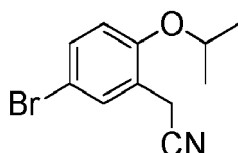
[0126]



[0127] Prepared in an analogous fashion to the methoxy derivative using 1-bromopropane in Step 1.

2-(5-Bromo-2-isopropoxyphenyl)acetonitrile

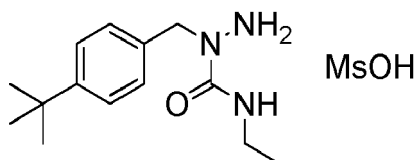
[0128]



[0129] Prepared in an analogous fashion to 2-(4-bromo-2-ethoxyphenyl)acetonitrile utilizing 4-bromo-2-methylphenol as starting material and alkylating the phenol under the following conditions: To a solution of 4-bromo-2-methylphenol (3.5 g, 18.7 mmol) in DMSO (10 mL) was added K_2CO_3 (5.2 g, 37.5 mmol) and 2-iodopropane (2.25 mL, 22.5 mmol) and the resulting suspension was heated to 60 °C in a sealed vial for 16 hrs. After complete reaction the solution was diluted in EtOAc, washed with water, the organic phase separated, dried ($MgSO_4$), filtered and evaporated *in vacuo*. The isolated residue was purified on silica gel (0 to 5% EtOAc in hexanes) to afford 4-bromo-1-isopropoxy-2-methylbenzene as a colorless oil.

1-(4-(*tert*-Butyl)benzyl)-*N*-ethylhydrazinecarboxamide, monomethanesulfonate (Intermediate M)

[0130]



[0131] *Step 1:* In a 500mL Parr shaker flask was dissolved (*E*)-*tert*-butyl 2-(4-(*tert*-butyl)benzylidene)hydrazine-carboxylate (15.0 g, 54.0 mmol, prepared according to the procedure described in Braden, T. M. et al., *Org. Process Res. Dev.* 2007, 11, 431-440) in *i*PrOH (75 mL) and EtOAc (25 mL). To this was then added Adam's catalyst (0.7 g, 0.3 mmol) and the resulting suspension was thoroughly deoxygenated *via* subsurface purging with nitrogen. The reaction vessel was then connected to a Parr shaker and the reaction suspension was shaken under 50 psi of H_2 for 3 days (or until no further consumption of hydrogen gas could be discerned). At this point, the excess H_2 was discharged from the vessel and the reaction was immediately quenched with DCM. The deactivated catalyst was then removed *via* filtration through a pad of DCM-wetted celite and the insolubles were washed thoroughly with DCM. The filtrate thus obtained was concentrated *in vacuo* to furnish a colorless oil. This residue was then transferred as an *i*PrOH (100 mL) solution to a

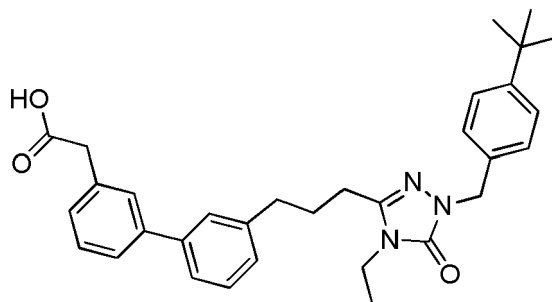
500mL Parr shaker flask and added another batch of Adam's catalyst (0.7 g, 0.3 mmol). After deoxygenation *via* sub-surface purging with nitrogen, the resulting suspension was shaken under 50 psi of H₂ for 2 more days. Finally, excess H₂ was discharged from the vessel and the reaction was quenched with DCM. The insolubles were then removed *via* filtration through a pad of DCM-wetted celite and the celite bed was washed thoroughly with DCM. Concentration of the filtrate thus obtained *in vacuo* furnished 15.1 g of *tert*-butyl 2-(4-(*tert*-butyl)benzyl)hydrazinecarboxylate (quantitative yield).

[0132] *Step 2:* In an oven-dried 1L RBF equipped with a magnetic stirrer was dissolved *tert*-butyl 2-(4-(*tert*-butyl)benzyl)hydrazinecarboxylate (15.1 g, 54.0 mmol) in anhydrous DCM (500 mL). To this was then added neat ethyl isocyanate (6.7 mL, 86 mmol) drop-wise over a period of 15 min and the resulting solution was allowed to stir under nitrogen at RT over 48 h. The volatiles were then removed *in vacuo* and the resulting residue was co-evaporated with heptanes (3 x 500 mL) to furnish 19.5 g of *tert*-butyl 2-(4-(*tert*-butyl)benzyl)-2-(ethylcarbamoyl)hydrazinecarboxylate (quantitative yield).

[0133] *Step 3:* In an oven-dried 1L RBF equipped with a magnetic stirrer was dissolved *tert*-butyl 2-(4-(*tert*-butyl)benzyl)-2-(ethylcarbamoyl)hydrazinecarboxylate (19.5 g, 54.0 mmol) in anhydrous DCM (500 mL). To this was then added neat MsOH (4.7 mL, 73 mmol) drop-wise over a period of 15 min and the resulting solution was allowed to stir under nitrogen at RT over 16 h. The volatiles were then *in vacuo* and the resulting residue was co-evaporated with DCM (3 x 500 mL) and MeOH (3 x 500 mL) to furnish 19.1 g (99% yield) of intermediate (**M**) as a pale yellow foam.

Example 1: 2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid

[0134]



[0135] *Step 1:* To a solution of 3-(3-(3-bromophenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (250 mg, 0.55 mmol) in a mixture of DME (5 mL) and water (2 mL) was added potassium carbonate (191 mg, 1.38 mmol) and 3-ethoxycarbonylmethylphenylboronic acid (191 mg, 0.66 mmol). After sparging the mixture with nitrogen, Pd(PPh₃)₄ (30 mg, cat.) was added and the reaction heated at 85 °C for 3 hrs. The reaction as allowed to cool, partitioned between EtOAc and water, the organic phase extracted, dried (MgSO₄), filtered and evaporated *in vacuo*. The residue was purified on silica gel eluting with a gradient of 0 to 60% EtOAc in hexanes to afford the ester of the title compound.

[0136] *Step 2:* To a solution of the aforementioned ester (200 mg, 0.37 mmol) in a mixture of THF (4 mL), MeOH (2 mL) and water (2 mL) was added lithium hydroxide monohydrate (100 mg, 2.4 mmol) and the reaction stirred at room temperature until complete ester hydrolysis was evident as determined by LCMS analysis. Solid citric acid was added to adjust pH to ~4 and the solution partitioned between EtOAc and water. The organic phase was extracted, dried (MgSO₄), filtered and evaporated to afford the title acid as a colorless solid.

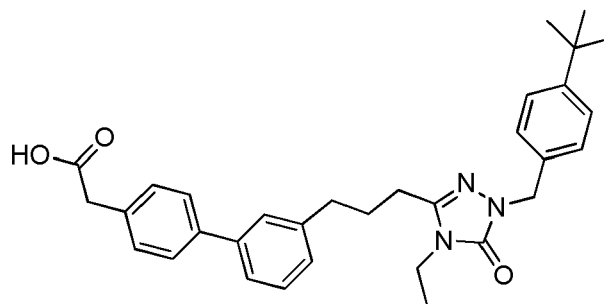
[0137] The following examples (2-4,6-11, 13, 15-19, 28-30, 32 and 33) were prepared in an analogous fashion to Example 1 using the requisite commercially available boronic acid (or pinacol ester) coupling partner and subsequent hydrolysis.

Example 2: 2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)acetic acid

[0138]

5

10

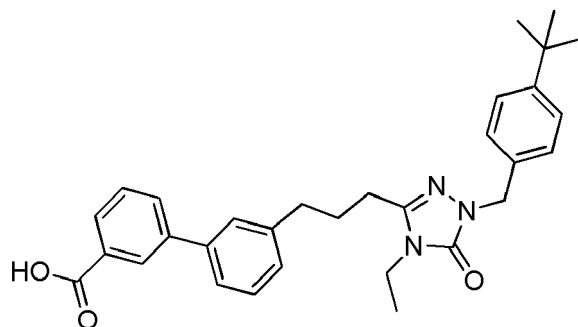


Example 3: 3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-carboxylic acid

15 [0139]

20

25



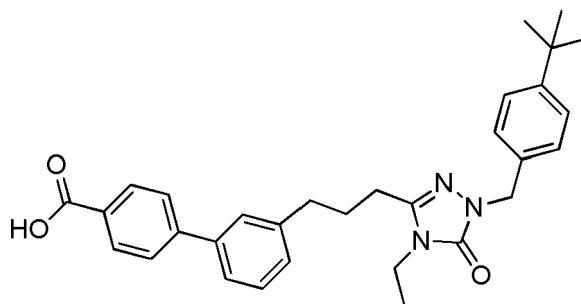
Example 4: 3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-carboxylic acid

30

[0140]

35

40



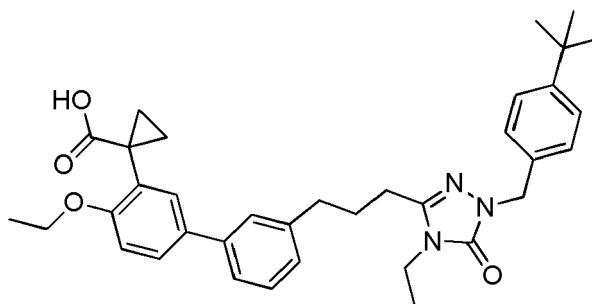
Example 5: 1-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid

45

[0141]

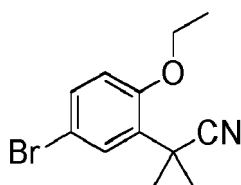
50

55



Preparation of 1-(5-bromo-2-ethoxyphenyl)cyclopropanecarbonitrile

[0142]



[0143] Step 1: To a solution of 4-bromo-2-methylphenol (5.0 g, 26.7 mmol) in DMF (20 mL) was added Cs_2CO_3 (13.0 g, 39.9 mmol) and iodoethane (2.6 mL, 32.5 mmol). The reaction was stirred vigorously for 24 hrs after which the suspension was partitioned between EtOAc and water, the organic phase extracted, wash with water, dried (MgSO_4), filtered and evaporated to afford 4-bromo-1-ethoxy-2-methylbenzene used without further purification.

[0144] Step 2: To a solution of 4-bromo-1-ethoxy-2-methylbenzene (5.0 g, 23.1 mmol) in CCl_4 (80 mL) was added N-bromosuccinimide (4.93 g, 27.6 mmol) and benzoyl peroxide (100 mg, cat.). The reaction mixture was then heated to reflux for a period of 3 hrs after which it was allowed to cool, partially evaporated then filtered to remove the succinimide. The filtrate was then evaporated to dryness to afford the benzylbromide which was used without further purification.

[0145] Step 3: To the crude 4-bromo-2-(bromomethyl)-1-ethoxybenzene (23.1 mmol) isolated previously was added DMF (20 mL) and potassium cyanide (2.26 g, 34.7 mmol) and the slurry stirred at room temperature for 48 hrs. The reaction mixture was partitioned between EtOAc and water, the organic phase separated, dried (MgSO_4), filtered and evaporated to afford a mixture of the mono and bis cyanomethyl derivatives. Purification of the mixture using silica gel chromatography (0 to 10% EtOAc in hexanes) afforded 2.5 g of 2-(5-bromo-2-ethoxyphenyl)acetonitrile.

[0146] Step 4: To 2-(5-bromo-2-ethoxyphenyl)acetonitrile (1.0 g, 4.16 mmol) in 2 mL of aqueous KOH (50%) was added tetrabutylammonium bromide (200 mg) and 1,2-dibromoethane (541 μL , 6.2 mmol) and heated in a sealed vial at 50 °C with vigorous stirring for 4 hrs. The mixture was partitioned between EtOAc and 1N HCl, the organic phase separated, dried (MgSO_4), filtered and evaporated *in vacuo*. The afforded 1-(5-bromo-2-ethoxyphenyl)cyclopropanecarbonitrile was used without further purification.

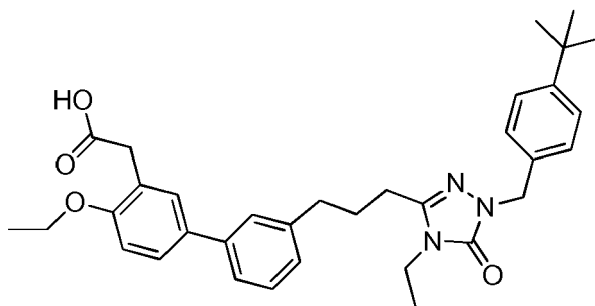
[0147] Example 5 was prepared analogously to example 1 using 1-(5-bromo-2-ethoxyphenyl)cyclopropanecarbonitrile as the coupling partner. Furthermore, hydrolysis of the resulting nitrile after cross-coupling was performed using KOH in ethylene glycol and water at 150 °C.

Example 6: 2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid

[0148]

5

10

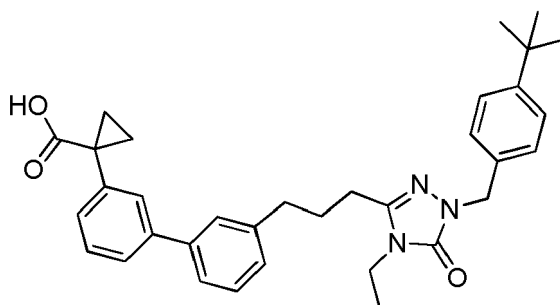


Example 7: 1-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid

15 [0149]

20

25



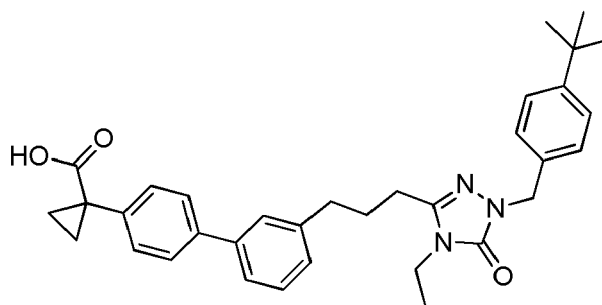
Example 8: 1-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)cyclopropanecarboxylic acid

30

[0150]

35

40



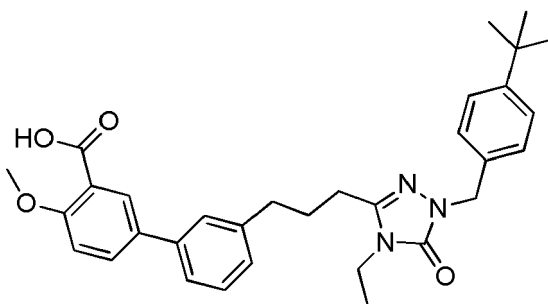
Example 9: 3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-carboxylic acid

45

[0151]

50

55



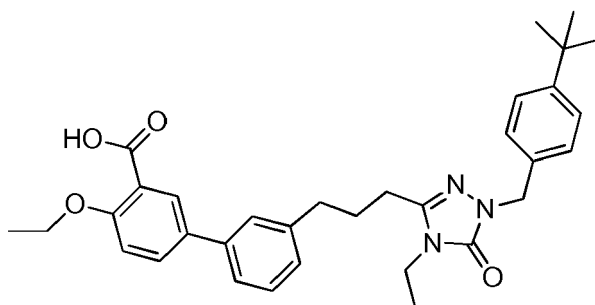
Example 10: 3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-carboxylic acid

[0152]

5

10

15

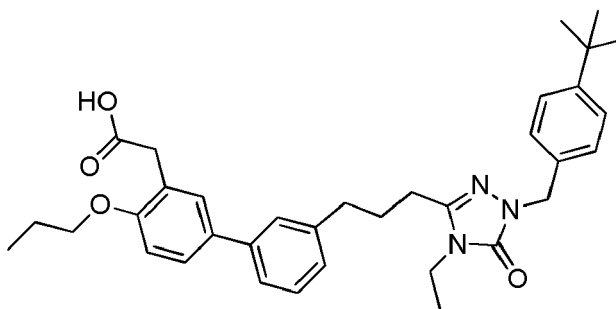
**Example 11: 2-(3-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-propoxy-[1,1'-biphenyl]-3-yl)acetic acid**

[0153]

20

25

30

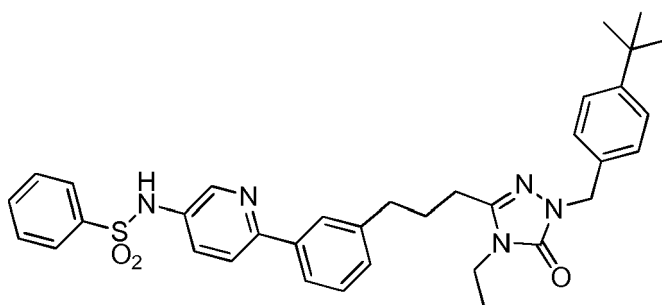
**Example 12: *N*-(6-(3-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-3-yl)benzenesulfonamide**

[0154]

35

40

45



[0155] *Step 1:* To a solution of 3-(3-(3-bromophenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (300 mg, 0.6 mmol) in a mixture of DME (5.5 mL) and water (2.5 mL) was added potassium carbonate (250 mg, 1.80 mmol) and 3-amino-6-bromopyridine (135 mg, 0.78 mmol). After sparging the mixture with nitrogen, Pd(PPh₃)₄ (30 mg, cat.) was added and the reaction heated at 85 °C for 6 hrs. The reaction was allowed to cool, partitioned between EtOAc and water, the organic phase extracted, dried (MgSO₄), filtered and evaporated *in vacuo*. The residue was purified on silica gel eluting with a gradient of 0 to 60% EtOAc in hexanes to afford 3-(3-(3-(5-aminopyridin-2-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one.

[0156] *Step 2:* To a solution of the isolated 3-(3-(3-(5-aminopyridin-2-yl)phenyl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (50 mg, 0.106 mmol) in pyridine (0.8 mL) was added benzenesulfonyl chloride (14 μL, 0.106

mmol). After stirring for 48 hrs, the reaction mixture was diluted with EtOAc, washed with water, dried (MgSO_4), filtered and evaporated *in vacuo*. The isolated residue was purified on silica gel eluting with a gradient of 0 to 5% MeOH in CHCl_3 to afford the title compound.

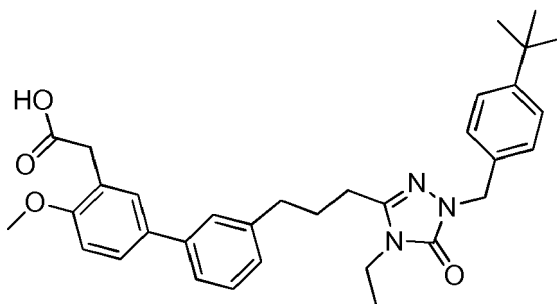
5 **Example 13: 2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid**

[0157]

10

15

20



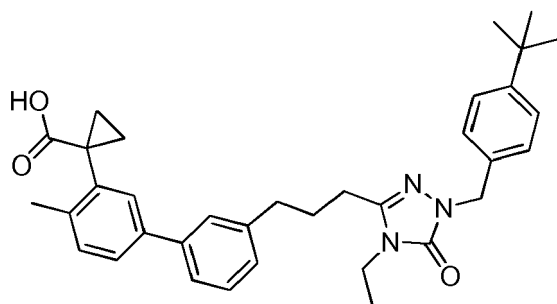
25 **Example 14: 1-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-methyl-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid**

[0158]

25

30

35

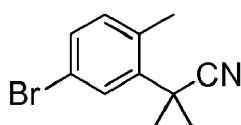


Preparation of 1-(5-bromo-2-methylphenyl)cyclopropanecarbonitrile

[0159]

40

45



[0160] *Step 1:* To a suspension of LiAlH_4 (0.75 g, 3.11 mmol) in diethyl ether (8 mL) at 0 °C was added a solution of methyl 5-bromo-2-methylbenzoate (949 mg, 4.14 mmol) in diethyl ether (2 mL) dropwise. The reaction mixture was allowed to slowly warm to rt, then quenched with EtOAc, partitioned between EtOAc and 2N HCl and extracted (EtOAc). The organic phase was washed with water, dried (MgSO_4), filtered and evaporated *in vacuo* to afford the crude alcohol which can be used without further purification.

Step 2: To the aforementioned alcohol (818 mg, 4.1 mmol) in diethyl ether (10 mL) cooled to 0 °C was added PBr_3 (0.2 mL, 2.07 mmol) and stirred at 0 °C for 1 hr. The reaction was then quenched with water, diluted with ether, washed with sodium bicarbonate solution, the organic phase separated and dried (MgSO_4), filtered and evaporated yielding 726 mg of the benzyl bromide.

Step 3: To 4-bromo-2-(bromomethyl)-1-methylbenzene (726 mg, 2.75 mmol) in DMF (8 mL) was added sodium cyanide (142 mg, 2.89 mmol) and the resulting suspension heated to 50 °C for 4 hrs. The reaction mixture was diluted with EtOAc, washed with water then brine, dried (MgSO_4), filtered and evaporated *in vacuo*. The isolated residue was purified

on silica gel eluting with a gradient of 0 to 50% EtOAc in hexanes to afford 2-(5-bromo-2-methylphenyl)acetonitrile.

[0161] Steo 4: 1-(5-bromo-2-methylphenyl)cyclopropanecarbonitrile was then prepared analogously to the method described in Example 5, Step 4.

[0162] Example 14 was completed under the same conditions as described for Example 5.

5

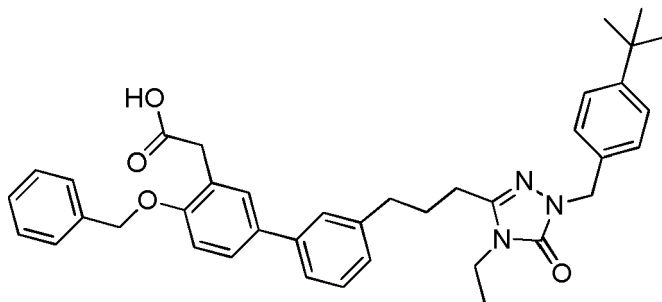
Example 15: 2-(4-(Benzyloxy)-3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid

[0163]

10

15

20



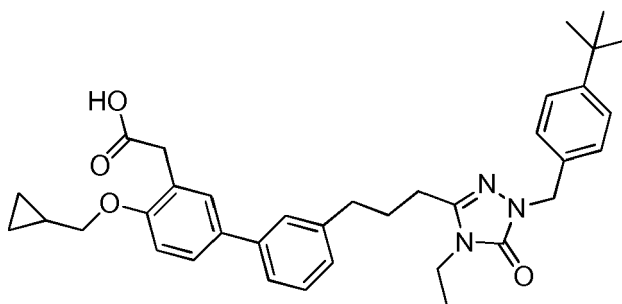
Example 16: 2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-(cyclopropylmethoxy)-[1,1'-biphenyl]-3-yl)acetic acid

[0164]

25

30

35



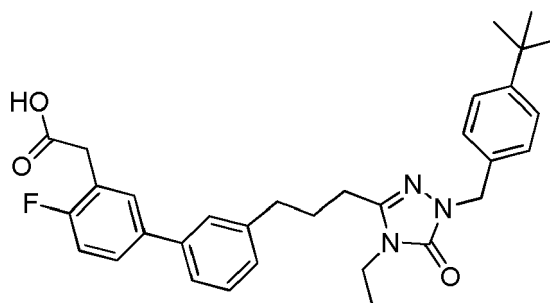
Example 17: 2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-fluoro-[1,1'-biphenyl]-3-yl)acetic acid

40

[0165]

45

50



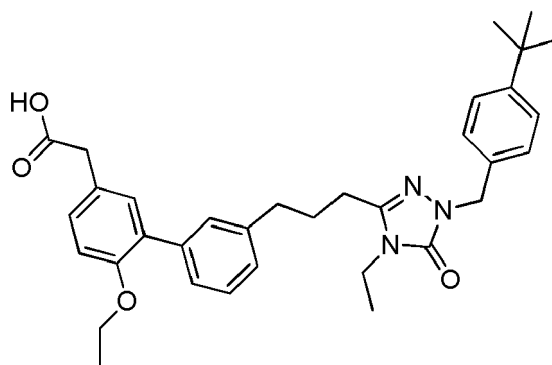
Example 18: 2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-6-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid

55

[0166]

5

10



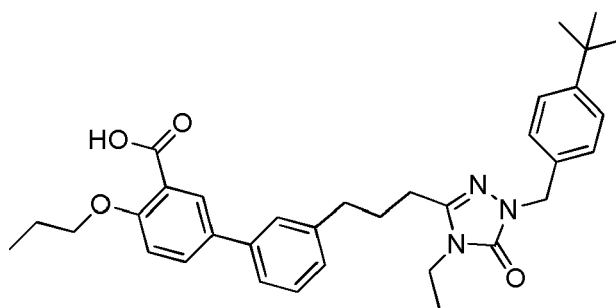
15

Example 19: 3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-propoxy-[1,1'-biphenyl]-3-carboxylic acid

[0167]

20

25



30

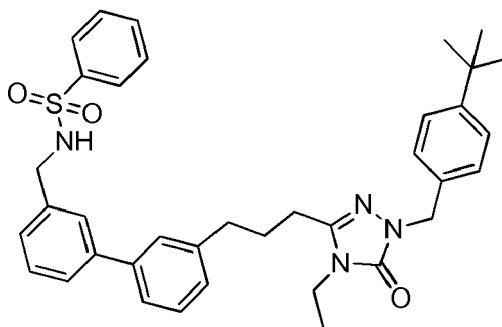
Example 20: N((3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)methyl)benzenesulfonamide

[0168]

35

40

45



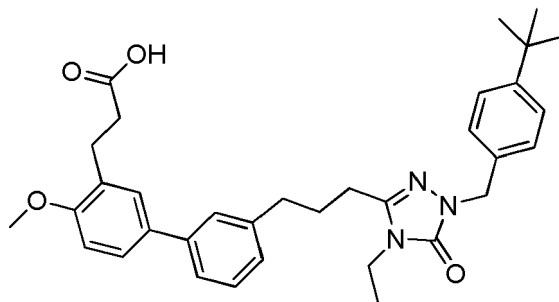
[0169] Step 1: A mixture of 1-(4-(*tert*-butyl)benzyl)-4-ethyl-3-(3-(3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)propyl)-1H-1,2,4-triazol-5(4H)-one (223 mg, 0.443 mmol), 3-bromobenzyl amine (98 mg, 0.532 mmol, 1.2 eq) and potassium carbonate (183 mg, 1.33 mmol, 3eq) were taken up in DME (2 mL) and water (1 mL) solution. To this tetrakis(triphenylphosphine)palladium(0) (52 mg, 0.0443 mmol, 0.1 eq) was added and the resulting mixture was stirred at 85 °C under an atmosphere of N₂ for 24 hr. The reaction mixture was cooled to room temperature and the solvent was removed under vacuum. The crude material was partitioned between water and EtOAc. The aqueous layer was extracted with EtOAc (3 x 20 mL) and the organic layer was dried over anhydrous Na₂SO₄. The solvent was evaporated in vacuum to obtain the crude product. The crude product was purified on flash column chromatography (silica gel, 0-70% EtOAc, 10% Methanol, 2.5% triethylamine/Hexanes) to afford a white solid (84 mg, 40% yield) LC-MS: 483 (M+H)⁺.

[0170] Step 2: A mixture of 3-(3-(3'-(aminomethyl)-[1,1'-biphenyl]-3-yl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1H-1,2,4-triazol-5(4H)-one (35 mg, 0.0726 mmol) and benzene sulfonylchloride (10 μL, 0.0798 mmol, 1.1 eq) was stirred

in pyridine (1 mL) at room temperature for 24 hr. The mixture was poured onto dichloromethane (40 mL) and washed with saturated CuSO_4 , water, and brine. The combined organic layers were dried over anhydrous Na_2SO_4 , filtered and evaporated under vacuum to obtain the crude product. The crude product was purified on reverse phase HPLC to afford a white foam (10 mg, 33 %). LC-MS: 623 (M+H)⁺.

Example 21: 3-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)propanoic acid

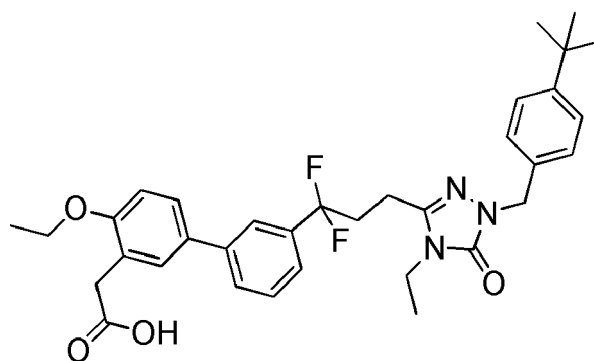
[0171]



[0172] A mixture of 1-(4-(*tert*-butyl)benzyl)-4-ethyl-3-(3-(3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)propyl)-1*H*-1,2,4-triazol-5(4*H*)-one (70 mg, 0.139 mmol), 3-(5-bromo-2-methoxyphenyl) propanoic acid (43 mg, 0.167 mmol, 1.2 eq) and potassium phosphate tribasic (118 mg, 0.556 mmol, 4 eq) were taken up in DME (2 mL) and water (1 mL) solution. To this tris(dibenzylideneacetone)dipalladium(0) (4 mg, .0034 mmol, 0.025 eq) and 2-dicyclohexylphosphino-2',6'-dimethoxybiphenyl (5 mg, 0.011 mmol, 0.08 eq) were added and the resulting mixture was stirred at 85 °C under an atmosphere of N_2 for 24 hr. The reaction mixture was cooled to room temperature and the solvent was removed under vacuum. The crude material was partitioned between water and EtOAc. The aqueous layer was extracted with EtOAc (3 x 20 mL) and the organic layer was dried over anhydrous Na_2SO_4 . The solvent was evaporated in vacuum to obtain the crude product. The crude product was purified on reverse phase HPLC to afford a white solid (10 mg, 13% yield) LC-MS: 556 (M+H)⁺.

Example 22: 2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)-1,1-difluoropropyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid

[0173]



[0174] *Step 1:* To a solution of 4-(3-bromophenyl)-4-oxobutanenitrile (1.11 g, 4.66 mmol) in toluene (10 mL) was added Deoxyfluor (8.63 mL, 23.31 mmol, 2.7 M solution in Toluene) followed by EtOH (0.16 mL, 2.80 mmol). The mixture was stirred at 80 °C for 16 hrs. The solution was cooled to rt and diluted with diethyl ether and a solution of saturated aqueous NaHCO_3 . The organic layer was separated and washed sequentially with saturated aqueous NaHCO_3 , 1 M aqueous HCl, and water. The organics were concentrated and residue was purified by column chromatography using 0%-65% gradient EtOAc/Hexanes as eluent to afford 0.570 g (47% yield) of 4-(3-bromophenyl)-4,4-difluorobutanenitrile.

[0175] *Step 2:* 4-(3-Bromophenyl)-4,4-difluorobutanenitrile (0.57 g, 2.19 mmol), ethylene glycol (20 mL), water (2 mL), and KOH (0.701 g, 17.53 mmol) were combined and heated at 80 °C for 16 hrs. The solution was cooled to rt, diluted

with EtOAc and quenched with 1M aqueous HCl. The organics were separated and washed sequentially with 0.1M aqueous HCl and brine, filtered through a Na₂SO₄/paper plug and concentrated. The organics were concentrated and residue was purified by column chromatography using 0%-50% gradient acetone/hexanes as eluent to afford 0.386 g (63% yield) of 4-(3-bromophenyl)-4,4-difluorobutanoic acid.

[0176] Step 3: 4-(3-Bromophenyl)-4,4-difluorobutanoic acid (0.20 g, 0.717 mmol), Hunig's base (0.33 mL, 1.86 mmol) and 2-(7-aza-1*H*-benzotriazole-1-yl)-1,1,3,3-tetramethyluronium hexafluorophosphate (0.327 g, 0.86 mmol) were combined in anhydrous DMF (7 mL). The reaction solution was stirred for 40 min at rt, then intermediate (M) (0.248 g, 0.717 mmol) was added. The resulting solution was allowed to stir at rt for 16 h. The reaction mixture was then diluted with EtOAc and 1 N aq. HCl. The organics were separated and washed sequentially with saturated aqueous NaHCO₃, water, and brine. The organic extract was then dried over sodium sulfate and filtered. Concentration of the filtrate afforded crude 2-(4-(3-bromophenyl)-4,4-difluorobutanoyl)-1-(4-(*tert*-butyl)benzyl)-*N*-ethylhydrazinecarboxamide, which was used as is in the next step.

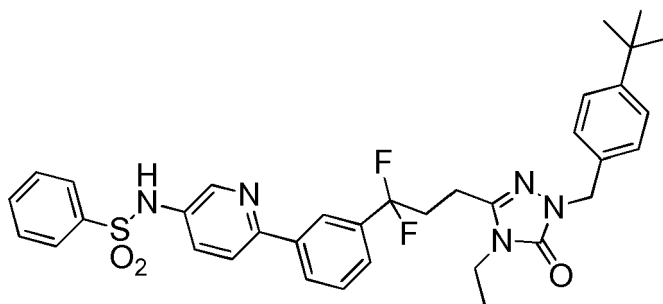
[0177] Step 4: To an EtOAc solution (8 mL) of 2-(4-(3-bromophenyl)-4,4-difluorobutanoyl)-1-(4-(*tert*-butyl)benzyl)-*N*-ethylhydrazinecarboxamide (0.365 g, 0.717 mmol) was added camphorsulfonic acid (0.18 g, 0.717 mmol) and the resulting solution was heated at reflux for 16 h. The reaction mixture was then diluted with EtOAc and 1 N aq. HCl. The organics were washed sequentially with 1M NaOH and water, and then concentrated. The residue was purified by column chromatography using 10%-90% gradient EtOAc/hexanes as eluent to afford 0.140 g (40% yield, two steps) of 3-(3-(3-bromophenyl)-3,3-difluoropropyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one.

[0178] Step 5: Under a nitrogen atmosphere, 3-(3-(3-bromophenyl)-3,3-difluoropropyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (0.040 g, 0.081 mmol) and methyl 2-(2-ethoxy-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)acetate (0.029 g, 0.089 mmol) were dissolved in dioxane (3 mL) to which was then added a solution of saturated aqueous NaHCO₃ (1 mL). The resulting solution was then subsurface purged with N₂ for 5 minutes after which, Pd(PPh)₄ (0.016 g, 0.014 mmol) was added. The resulting mixture was stirred in a sealed pressure vessel at 90 °C for 16 hrs. The solution was cooled to rt and diluted with EtOAc and water. The organics were washed once more with water and the solution was filtered through a Na₂SO₄/paper plug and concentrated. The residue was purified by preparatory TLC using 20% acetone/hexanes as eluent to afford 0.029 g of methyl 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)-1,1-difluoropropyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)acetate (59% yield).

[0179] Step 6: To a solution of methyl 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)-1,1-difluoropropyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)acetate (0.029 g, 0.048 mmol) in THF (1 mL) and MeOH (1 mL) was added water (0.62 mL) and 1M aq. LiOH (0.38 mL, 0.37 mmol). The resulting mixture was then stirred at 35 °C for 48 hrs. The solvents were evaporated and the residue treated with EtOAc and a 20% aq. solution of citric acid. The organic layer was separated and extracted with water (2X). The organics were concentrated to afford 0.029 g (100% yield) of the title compound as a brown solid. LCMS (ESI), M+H 592.

Example 23: *N*-(6-(3-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)-1,1-difluoropropyl)phenyl)pyridin-3-yl)benzenesulfonamide

[0180]

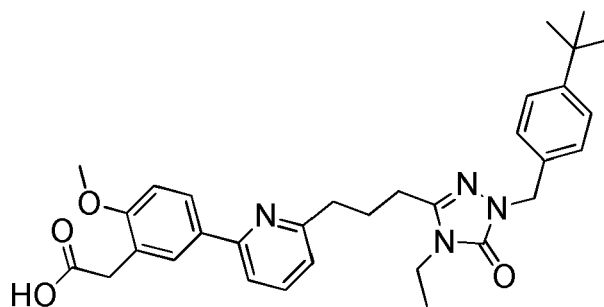


[0181] Step 1: 3-(3-(3-Bromophenyl)-3,3-difluoropropyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (0.110 g, 0.223 mmol), bis(pinacolato)diborane (0.074 g, 0.290 mmol), KOAc (0.066 g, 0.669 mmol) were dissolved in dioxane (4 mL) and the resulting solution was subsurface purged with N₂ for 5 minutes after which, Pd(dppf)Cl₂ (0.016 g, 0.014 mmol) was added. The resulting mixture was stirred in a sealed pressure vessel at 85 °C for 16 hrs. The solution was cooled to rt and diluted with DCM and water. The organics were washed once more with water and the solution was filtered through a Na₂SO₄ paper plug and concentrated. The residue was purified by preparatory TLC using 40% EtOAc/hexanes as eluent to afford 0.065 g of 1-(4-(*tert*-butyl)benzyl)-3-(3,3-difluoro-3-(3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)propyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (54% yield).

[0182] Step 2: Under a nitrogen atmosphere, 1-(4-(tert-butyl)benzyl)-3-(3,3-difluoro-3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)propyl)-4-ethyl-1H-1,2,4-triazol-5(4H)-one (0.065 g, 0.120 mmol) from the previous step and N-(6-bromopyridin-3-yl)benzenesulfonamide (0.042 g, 0.133 mmol) were dissolved in dioxane (3 mL). To this solution was then added a solution of saturated aqueous NaHCO₃ (1 mL) and the resulting biphasic mixture was then subsurface purged with N₂ for 5 minutes. Finally, Pd(PPh)₄ (0.014 g, 0.012 mmol) was added and the resulting mixture was stirred in a sealed pressure vessel at 85 °C for 16 hrs. The solution was cooled to rt, evaporated, and diluted with EtOAc and 1:1 brine/water. The organics were washed once more with water and brine. The organics were then filtered through a Na₂SO₄/paper plug and concentrated. The residue was purified by preparatory LCMS (C₁₈ reverse phase) using 0% to 100% CH₃CN/water as eluent to afford 0.013 g of the title compound (17% yield). LCMS (ESI), M+H 646.

Example 24: 2-(5-(6-(3-(1-(4-(tert-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)pyridin-2-yl)-2-methoxyphenyl)acetic acid

[0183]



[0184] Step 1: To a degassed (sparged) solution of 2-bromo-6-chloropyridine (2.0 g, 10.4 mmol) in THF (75 mL) was added Pd(PPh₃)₄ (200 mg) followed by a solution of (4-ethoxy-4-oxobutyl)zinc(II) bromide (0.5M in THF; 20.8 mL, 20.8 mmol). After stirring at room temperature for 2 hrs, the solution was poured on to a mixture of ice and 1N HCl, extracted with EtOAc, the organic phase separated, dried (MgSO₄), filtered and evaporated. The isolated residue was purified on silica gel (0 to 30% EtOAc in hexanes) to afford 1.4 g of ethyl 4-(6-chloropyridin-2-yl)butanoate.

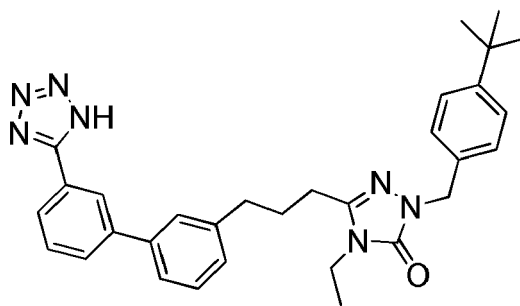
[0185] Step 2: Lithium hydroxide monohydrate (400 mg) was added to a solution of ethyl 4-(6-chloropyridin-2-yl)butanoate (1.4 g, 7.0 mmol) in a mixture of THF (20 mL), MeOH (8 mL) and water (8 mL). After stirring at room temperature for 1hr, the solution was diluted with EtOAc and water. Solid citric acid was then added until an acidic pH was attained and the organic phase separated, washed with water, dried (MgSO₄), filtered and evaporated to afford 4-(6-chloropyridin-2-yl)butanoic acid. The crude product thus obtained was used without further purification.

[0186] Step 3: To a solution of 4-(6-chloropyridin-2-yl)butanoic acid (600 mg, 3.0 mmol) in DMF (15 mL) was added HATU (1.3 g, 3.42 mmol) followed by DIPEA (1.6 mL) and stirred at RT for 30 minutes. Intermediate (M) (1.2 g, 3.47 mmol) was then added and the solution allowed to stir at rt for 24 hrs. The reaction mixture was partitioned between EtOAc and water, the organic phase separated, dried (MgSO₄) and filtered. To the filtrate was then added camphorsulfonic acid (697 mg, 3.0 mmol) and the resulting mixture was heated to reflux for 24 hrs. After cooling, the solution was neutralized following the addition of saturated aqueous NaHCO₃. The organic phase was then separated, dried (MgSO₄), filtered and evaporated *in vacuo*. The residue thus obtained was purified on silica gel, eluting with a gradient of 0 to 80% EtOAc in hexanes to afford 1-(4-(tert-butyl)benzyl)-3-(3-(6-chloropyridin-2-yl)propyl)-4-ethyl-1H-1,2,4-triazol-5(4H)-one.

[0187] Step 4: The title compound was then obtained as previously described for Example 1, whereby the requisite boronate was cross-coupled and the resulting ester was then hydrolyzed under the same conditions.

Example 25: 3-(3-(3'-(1H-Tetrazol-5-yl)-[1,1'-biphenyl]-3-yl)propyl)-1-(4-(tert-butyl)benzyl)-4-ethyl-1H-1,2,4-triazol-5(4H)-one

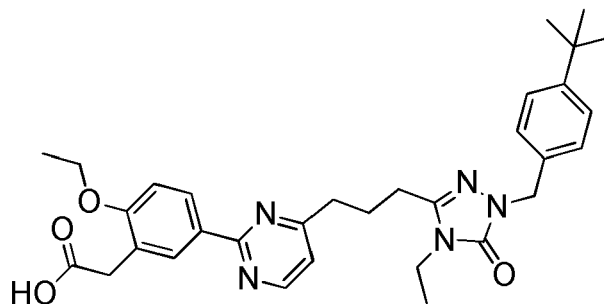
[0188]



[0189] A mixture of 3-(3-(3'-bromo-[1,1'-biphenyl]-3-yl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one (112 mg, 0.245 mmol), 3-(tetrazol-5yl)phenylboronic acid (46 mg, 0.245 mmol, 1.0 eq) and potassium phosphate tribasic (208 mg, 0.980 mmol, 4 eq) were taken up in a DME (2 mL) and water (1 mL) solution. To this was added tris(dibenzylideneacetone)dipalladium(0) (6 mg, .0061 mmol, 0.025 eq) and 2-dicyclohexylphosphino-2',6'-dimethoxybiphenyl (20 mg, 0.049 mmol, 0.2 eq), and the resulting mixture was stirred at 85 °C under an atmosphere of N₂ for 24 hr. The reaction mixture was cooled to room temperature and the solvent was removed under vacuum. The crude material was then partitioned between water and EtOAc. The aqueous layer was separated and extracted further with EtOAc (3 x 20 mL). The combined organic extracts were dried over anhydrous Na₂SO₄. The solvent was evaporated in vacuum to obtain the crude product. The crude product was purified on reverse phase HPLC to afford a white solid (20 mg, 16% yield) LC-MS: 521 (M+H)⁺.

Example 26: 2-(5-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)pyrimidin-2-yl)-2-ethoxyphenyl)acetic acid

[0190]



[0191] *Step 1:* To a THF solution of 2,4-dichloropyrimidine (1.00 g, 6.71 mmol) was added at 0 °C (4-ethoxy-4-oxobutyl)zinc(II) bromide (13.42 mL, 6.71 mmol, 0.5 M in THF) followed by Pd(PPh)₄ (0.194 g, 0.167 mmol). The reaction mixture thus obtained was then allowed to slowly warm to rt. By TLC, it was noted that this reaction had stalled after 1.5 hr, so another spatula tip of Pd(PPh)₄ was then added and reaction was allowed to continue at rt for another 16 hrs. The reaction mixture was then poured into ice-cold 0.5M aq. HCl solution and diluted with EtOAc and brine. The organics were separated, washed once more with water and then concentrated. The residue was purified by column chromatography using 0%-50% gradient EtOAc/hexanes as eluent to afford 0.930 g (60% yield) of ethyl 4-(2-chloropyrimidin-4-yl)butanoate.

[0192] *Step 2:* Under a nitrogen atmosphere, ethyl 4-(2-chloropyrimidin-4-yl)butanoate (0.193 g, 0.842 mmol) and ethyl 2-(2-ethoxy-5-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)acetonitrile (0.220 g, 0.766 mmol) were dissolved in dioxane (8 mL) to which was added a solution of saturated aqueous NaHCO₃ (4 mL). The resulting solution was then subsurface purged with N₂ for 5 minutes after which, Pd(PPh)₄ (0.088 g, 0.077 mmol) was added. The resulting mixture was stirred in a sealed pressure vessel at 85 °C for 16 hrs. The solution was cooled to rt, evaporated, and diluted with EtOAc and brine. The aqueous layer was extracted twice more with DCM and the combined organics were concentrated. The residue was purified by column chromatography using 0%-60% gradient EtOAc/hexanes as eluent to afford 0.144 g (54% yield) of 4-(2-(3-(cyanomethyl)-4-ethoxyphenyl)pyrimidin-4-yl)butanoate.

[0193] *Step 3:* To a solution of ethyl 4-(2-(3-(cyanomethyl)-4-ethoxyphenyl)pyrimidin-4-yl)butanoate (0.360 g, 1.02 mmol) in THF (8 mL) and MeOH (8 mL) was added 1M aq. LiOH (8.02 mL, 8.02 mmol). The resulting mixture was then stirred at rt for 1.5 hrs. The solvents were evaporated and the residue treated with EtOAc and a 20% aq. solution of citric acid. The organic layer was separated and washed with water (2X). The organics were then filtered through a Na₂SO₄/pa-

per plug and concentrated. The resulting crude 4-(2-(3-(cyanomethyl)-4-ethoxyphenyl)pyrimidin-4-yl)butanoic acid thus obtained was used directly in the next step.

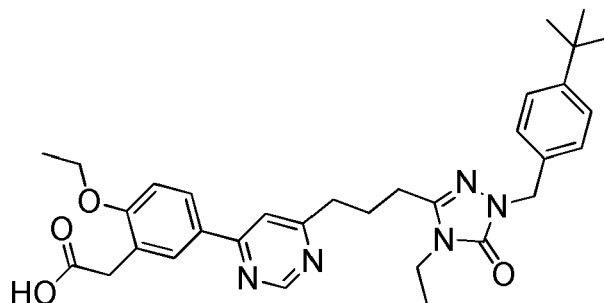
[0194] *Step 4:* 4-(2-(3-(Cyanomethyl)-4-ethoxyphenyl)pyrimidin-4-yl)butanoic acid (0.32 g, 0.984 mmol), Hunig's base (0.45 mL, 1.86 mmol) and 2-(7-aza-1*H*-benzotriazole-1-yl)-1,1,3,3-tetramethyluronium hexafluorophosphate (0.449 g, 1.18 mmol) were combined in anhydrous DMF (10 mL). The reaction solution was stirred for 40 min at rt before intermediate (M) (0.248 g, 0.717 mmol), dissolved in a minimal amount of DMF, was added dropwise. The resulting solution was allowed to stir at rt for 16 h. The reaction mixture was then evaporated and diluted with EtOAc and water. The organics were washed sequentially with saturated aqueous NaHCO₃ and brine, dried over sodium sulfate, filtered and the filtrate concentrated. The crude 1-(4-(*tert*-butyl)benzyl)-2-(4-(2-(3-(cyanomethyl)-4-ethoxyphenyl)pyrimidin-4-yl)butanoyl)-*N*-ethylhydrazinecarboxamide thus obtained was used as is in the next step.

[0195] *Step 5:* To an EtOAc solution (10 mL) of 1-(4-(*tert*-butyl)benzyl)-2-(4-(2-(3-(cyanomethyl)-4-ethoxyphenyl)pyrimidin-4-yl)butanoyl)-*N*-ethylhydrazinecarboxamide (0.547 g, 0.982 mmol) was added camphorsulfonic acid (0.228 g, 0.982 mmol) and the resulting solution was heated at reflux for 16 h. The reaction mixture was then diluted with EtOAc and brine. The organics were separated and washed sequentially with 1M NaOH, water, and brine. The organic extract was then dried over sodium sulfate, filtered and the filtrate concentrated. The residue was purified by column chromatography using 0%-50% gradient acetone/hexanes as eluent to afford 0.300 g (57% yield, three steps) of 2-(5-(4-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)pyrimidin-2-yl)-2-ethoxyphenyl)acetonitrile.

[0196] *Step 6:* To a solution of 2-(5-(4-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)pyrimidin-2-yl)-2-ethoxyphenyl)acetonitrile (0.100 g, 0.186 mmol) in ethylene glycol (6 mL) and water (1.5 mL) was added 18M KOH (0.104 mL, 1.86 mmol). The resulting mixture was then stirred at 120 °C for 16 hrs. The reaction was quenched with 1 M aq. HCl (1.86 mL, 1.86 mmol) and the residue was diluted with EtOAc and water. The organic layer was separated and washed further with water (2X). The organics were then filtered through a Na₂SO₄/paper plug and concentrated. The organics were concentrated to afford 0.095 g (92% yield) of the title compound as a yellow solid. LCMS (ESI), M+H 558.

Example 27: 2-(5-(6-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)pyrimidin-4-yl)-2-ethoxyphenyl)acetic acid

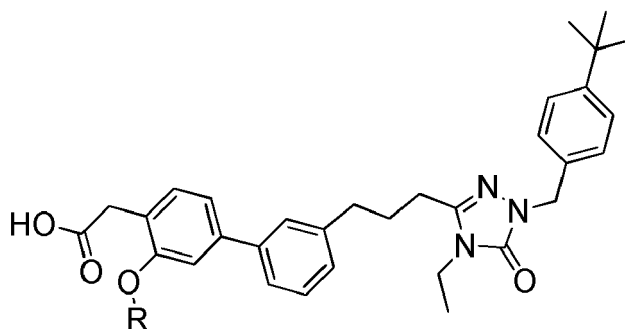
[0197]



[0198] The title compound was prepared in an analogous fashion to Example 26 but using instead the requisite commercially available 4,6-dichloropyrimidine in the first step. LCMS (ESI), M+H 558.

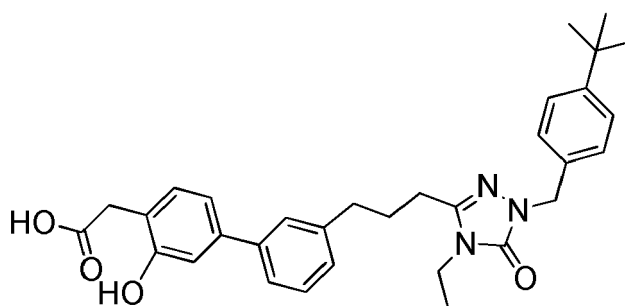
Examples 28 (R = Me), 29 (R = Et) and 30 (R = nPr); (3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-alkoxy-[1,1'-biphenyl]-4-yl)acetic acid

[0199]



Example 31: 2-(3'-(3-(1-(4-(tert-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-3-hydroxy-[1,1'-biphenyl]-4-yl)acetic acid

[0200]



[0201] Step 1: In a 75mL screw-cap reaction flask equipped with a magnetic stirrer was combined 1-(4-(tert-butyl)benzyl)-4-ethyl-3-(3-(3-(4,4,5,5-tetramethyl-1,3,2-dioxaborolan-2-yl)phenyl)propyl)-1H-1,2,4-triazol-5(4H)-one (300 mg, 0.60 mmol), methyl 2-(benzyloxy)-5-bromobenzoate (200 mg, 0.60 mmol) and K_3PO_4 (330 mg, 2.4 mmol) in DME (4 mL) and water (2 mL). The resulting biphasic mixture was then subsurface purged with N_2 for 15 min after which, $Pd_2(dba)_3$ (14 mg, 0.015 mmol) and 2-dicyclohexylphosphino-2',6'-dimethoxybiphenyl (25 mg, 0.060 mmol) were added in one rapid portion. The now golden-yellow biphasic suspension was subsurface purged with N_2 for another 15 min before the vessel was tightly sealed and then heated at 85 °C for 15 h. The now dark orange reaction suspension was allowed to cool to RT, diluted with tert-butyl methyl ether and washed sequentially with 10% aq. HCl, water and brine. The organic extract thus obtained was then dried over Na_2SO_4 , de-colored with activated charcoal and finally filtered through a pad of ether-wetted celite. The insolubles were rinsed further with tert-butyl methyl ether and the filtrate thus obtained was concentrated *in vacuo*. Purification of the crude product thus obtained by way of column chromatography (SiO_2 , gradient elution, 4:1 Hex: EtOAc \rightarrow EtOAc) furnished 2-(3-(benzyloxy)-3'-(3-(1-(4-(tert-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)acetate as a pale yellow oil (190 mg, 49% yield).

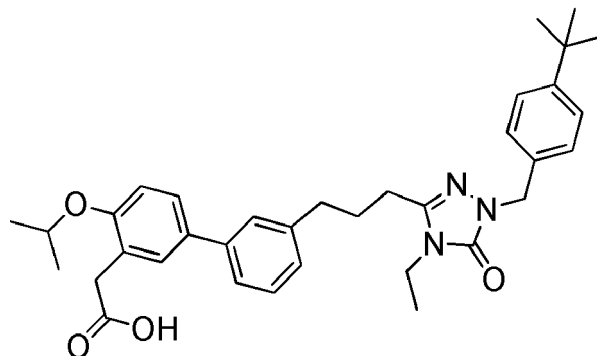
[0202] Step 2: In a 500mL Parr shaker flask was dissolved methyl 2-(3-(benzyloxy)-3'-(3-(1-(4-(tert-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)acetate (190 mg, 29 mmol) from the previous step in MeOH (10 mL). To this was then added Pd/C (10% wt/wt wet, 120 mg, 0.06 mmol) and the resulting suspension was thoroughly deoxygenated *via* subsurface purging with nitrogen. The reaction vessel was then connected to a Parr shaker and the reaction suspension was shaken under 50 psi of H_2 for 5 h. The excess H_2 was discharged from the vessel and the reaction was immediately quenched with DCM. The deactivated catalyst was then removed *via* filtration through a pad of DCM-wetted celite and the insolubles were washed thoroughly with DCM. The filtrate thus obtained was concentrated *in vacuo* to furnish a pale yellow solid. Purification of the crude product thus obtained by way of column chromatography (SiO_2 , gradient elution, 4:1 Hex: EtOAc \rightarrow EtOAc) furnished methyl 2-(3'-(3-(1-(4-(tert-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-3-hydroxy-[1,1'-biphenyl]-4-yl)acetate as a pale yellow solid (110 mg, 66% yield).

[0203] Step 3: In a 50mL RBF equipped with a magnetic stirrer was added methyl 2-(3'-(3-(1-(4-(tert-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-3-hydroxy-[1,1'-biphenyl]-4-yl)acetate (35 mg, 0.065 mmol) from the previous step in THF (1 mL) and MeOH (0.5 mL). To this was then added 2N aq. LiOH (0.2 mL, 0.4 mmol) and the resulting solution was stirred at RT for 16 h. The volatiles were then removed *in vacuo* and the resulting residue was acidified with 1 N aq. HCl and extracted with DCM (3 x 10 mL). The combined organic extracts were then washed further with water and brine, dried over Na_2SO_4 and filtered. Concentration of the filtrate thus obtained *in vacuo* furnished the

title compound as a white solid (33 mg, 66% yield). LC-MS: 528 (M+H)⁺, 526 (M-H)⁺.

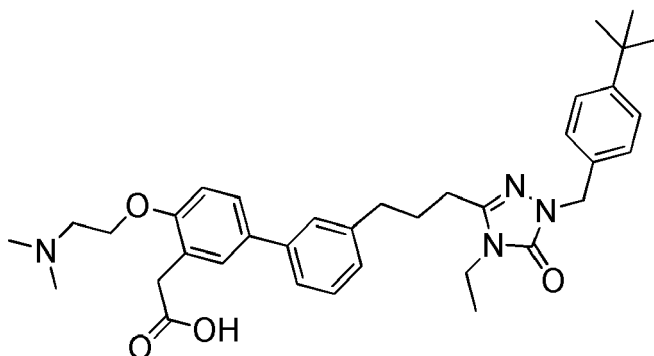
Example 32: 2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-isopropoxy-[1,1'-biphenyl]-3-yl)acetic acid

[0204]



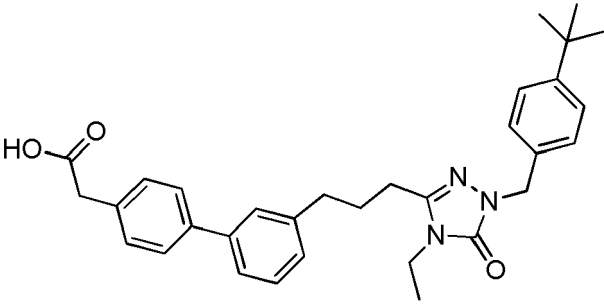
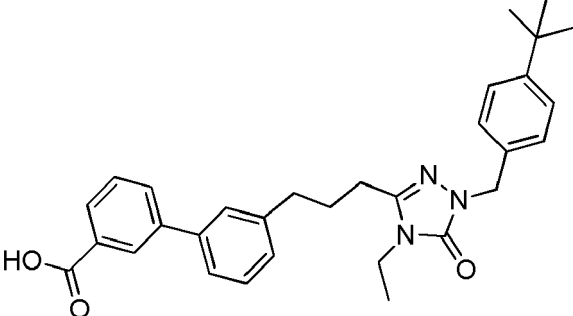
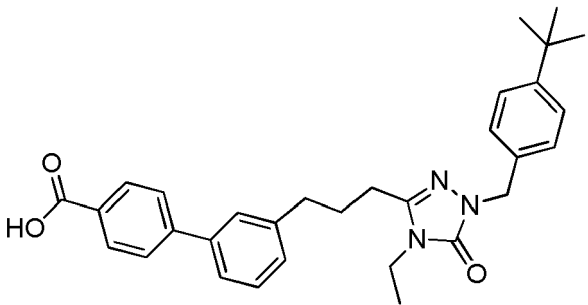
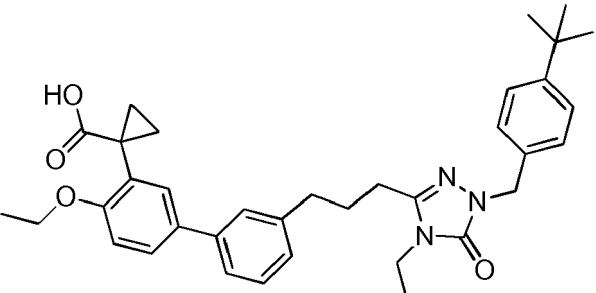
Example 33: 2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-(2-(dimethylamino)ethoxy)-[1,1'-biphenyl]-3-yl)acetic acid

[0205]



Example	Structure	Human PPAR α Reporter Assay - Luciferase IC ₅₀ (nM)	MS (ESI)
1		346	512 (M+H)

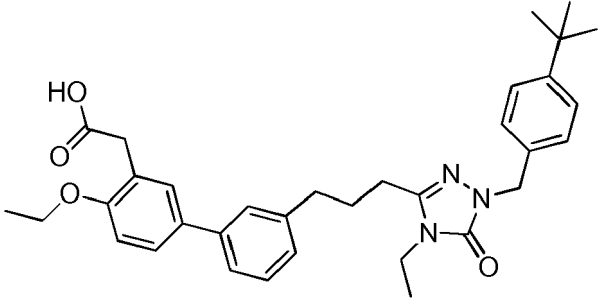
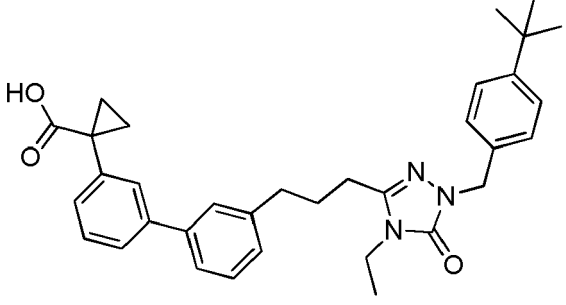
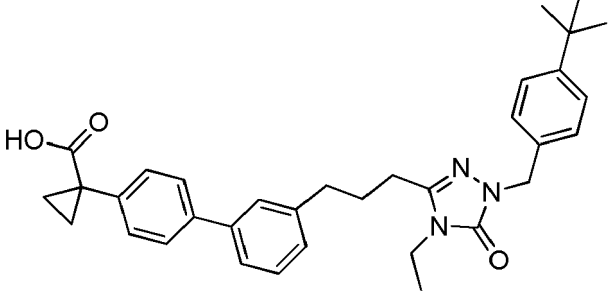
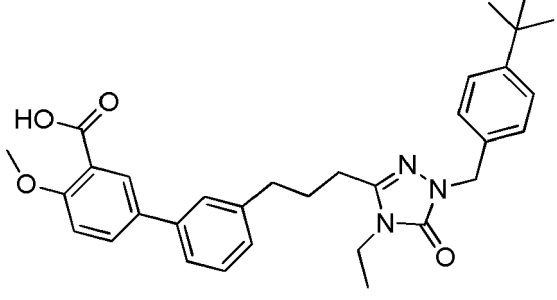
(continued)

Example	Structure	Human PPAR α Reporter Assay - Luciferase IC ₅₀ (nM)	MS (ESI)
5 10 15 2		324	512 (M+H)
20 25 3		1333	498 (M+H)
30 35 4		110	498 (M+H)
40 45 5		137	582 (M+H)

50

55

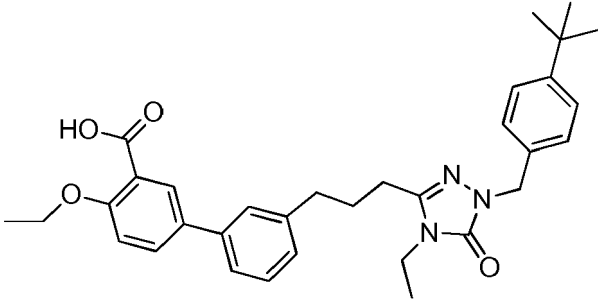
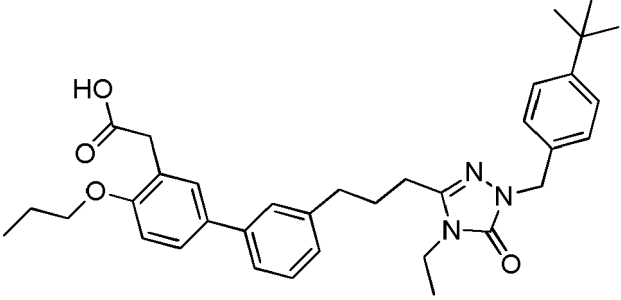
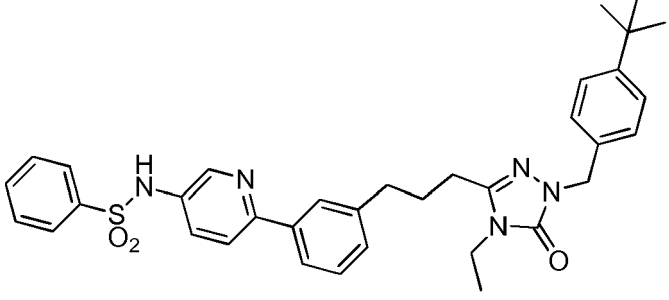
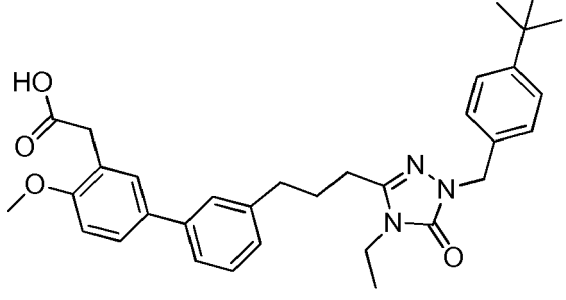
(continued)

Example	Structure	Human PPAR α Reporter Assay - Luciferase IC ₅₀ (nM)	MS (ESI)
5 10 15 6		58	554 (M-H)
20 25 7		77	538 (M+H)
30 35 8		487	538 (M+H)
40 45 9		548	528 (M+H)

50

55

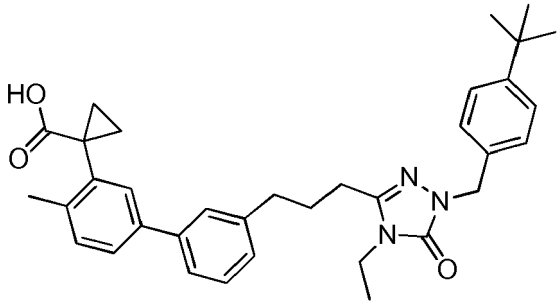
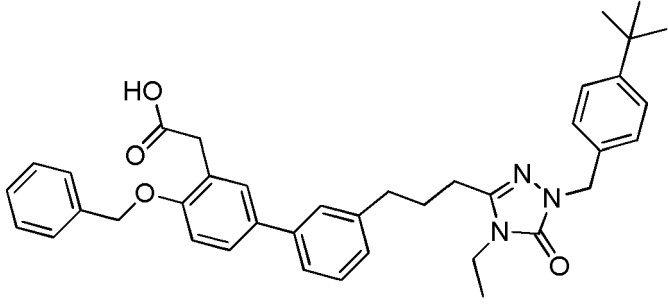
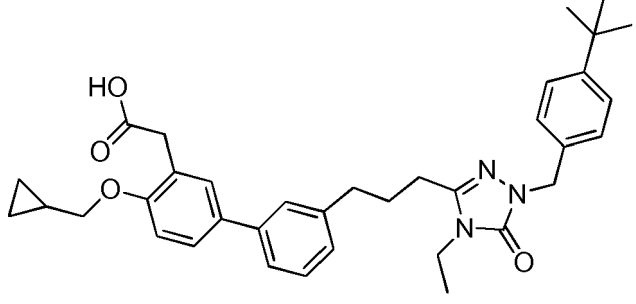
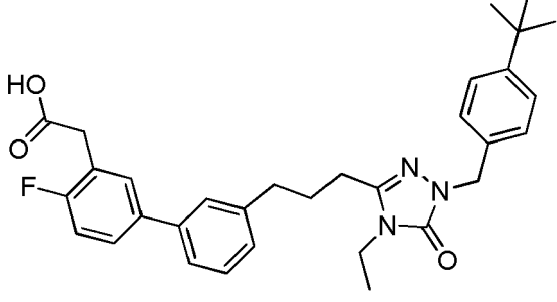
(continued)

Example	Structure	Human PPAR α Reporter Assay - Luciferase IC ₅₀ (nM)	MS (ESI)
5 10		211	542 (M+H)
20 11		48	570 (M+H)
30 12		302	610 (M+H)
40 13		197	542 (M+H)

50

55

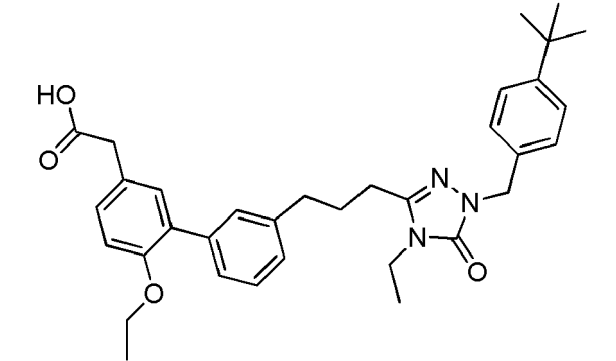
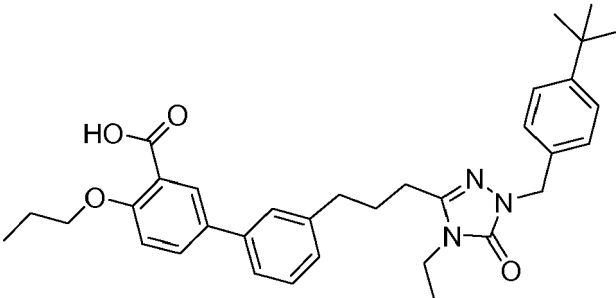
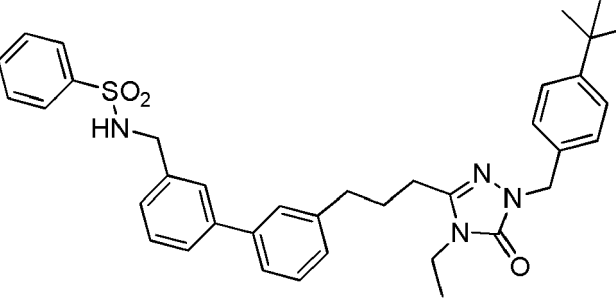
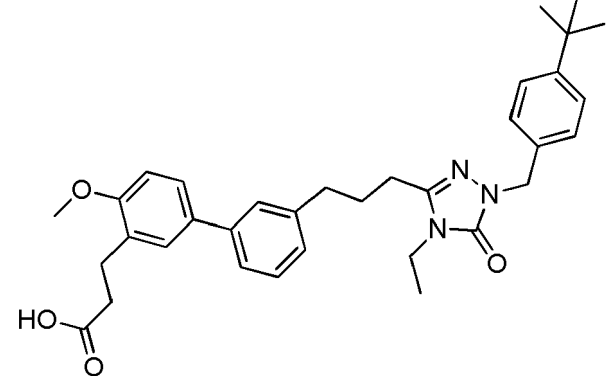
(continued)

Example	Structure	Human PPAR α Reporter Assay - Luciferase IC ₅₀ (nM)	MS (ESI)
5 10 14		234	552 (M+H)
20 15		122	618 (M+H)
30 16		141	582 (M+H)
40 17		83	530 (M+H)

50

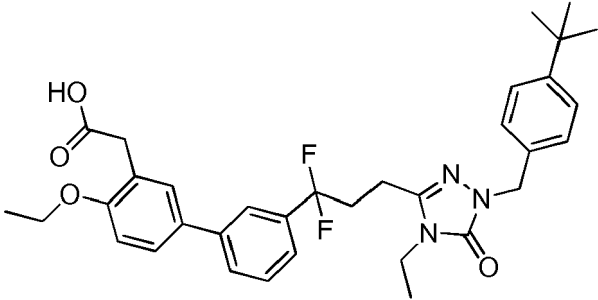
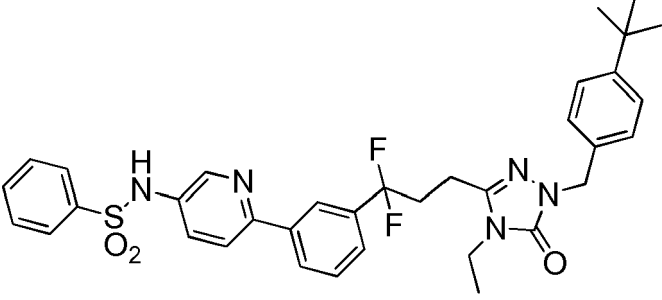
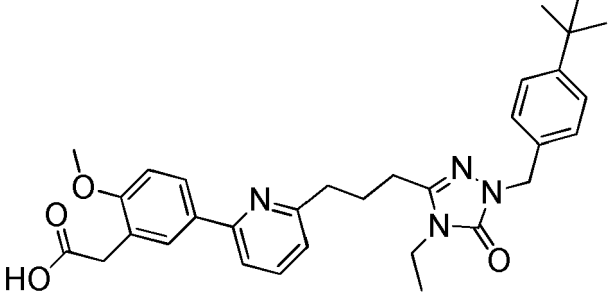
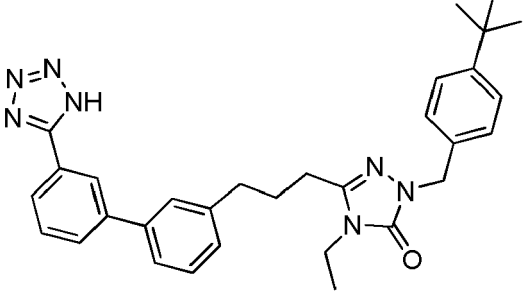
55

(continued)

Example	Structure	Human PPAR α Reporter Assay - Luciferase IC ₅₀ (nM)	MS (ESI)
5 10 15 18		750	556 (M+H)
20 25 19		119	556 (M+H)
30 35 40 20		896	623 (M+H)
45 50 21		610	556 (M+H)

55

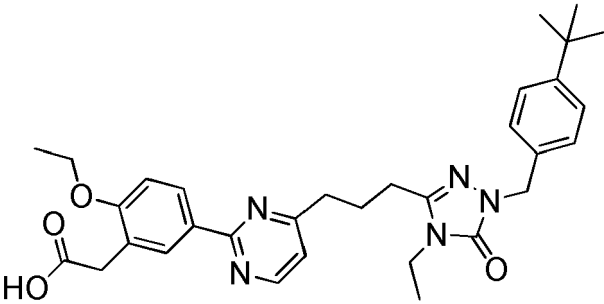
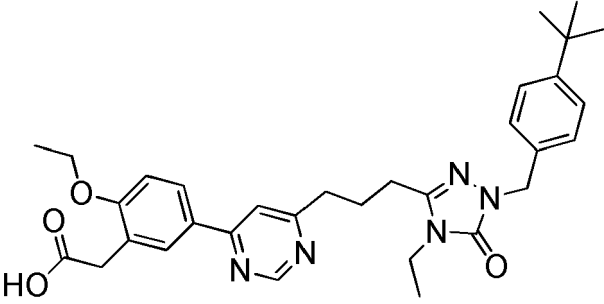
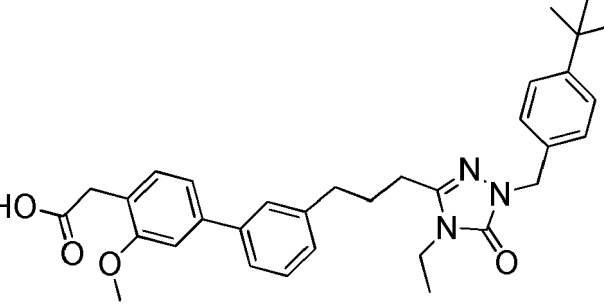
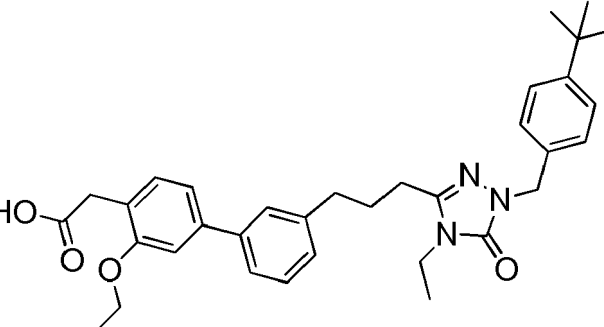
(continued)

Example	Structure	Human PPAR α Reporter Assay - Luciferase IC ₅₀ (nM)	MS (ESI)
5 10 22		64	592 (M+H)
20 23		659	646 (M+H)
30 24		2531	543 (M+H)
40 25		2293	521 (M+H)

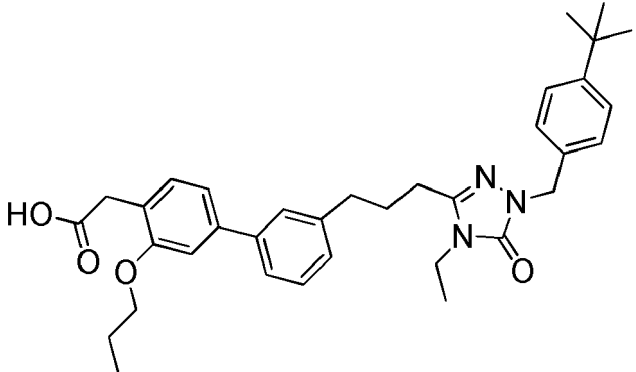
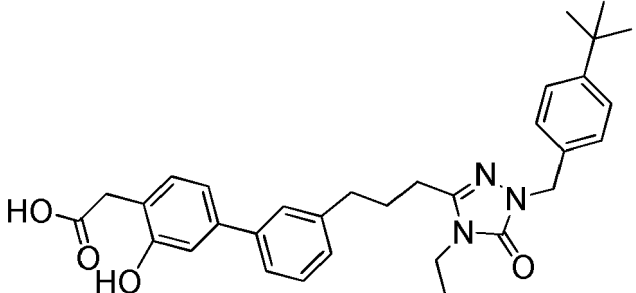
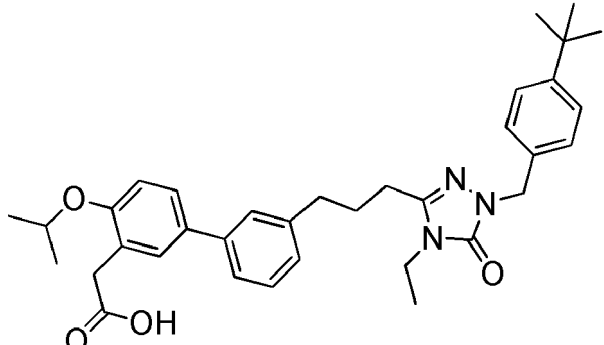
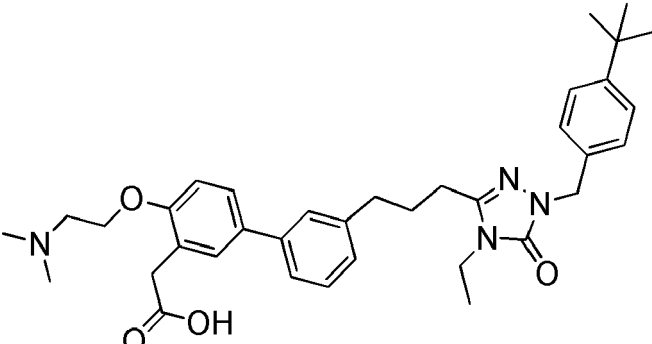
50

55

(continued)

Example	Structure	Human PPAR α Reporter Assay - Luciferase IC ₅₀ (nM)	MS (ESI)
26		1238	558 (M+H)
27		3431	558 (M+H)
28		140	542 (M+H)
29		59	556 (M+H)

(continued)

Example	Structure	Human PPAR α Reporter Assay - Luciferase IC ₅₀ (nM)	MS (ESI)
30		36	570 (M+H)
31			528 (M+H)
32			570 (M+H)
33			599 (M+H)

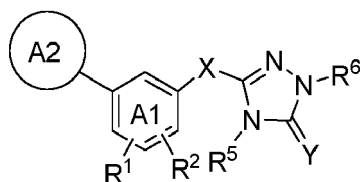
[0206] While preferred embodiments of the present invention have been shown and described herein, it will be obvious to those skilled in the art that such embodiments are provided by way of example only. Numerous variations, changes, and substitutions will now occur to those skilled in the art without departing from the invention. It is intended that the

following claims define the scope of the invention and that methods and structures within the scope of these claims be covered thereby.

5 **Claims**

1. A compound of Formula I

10



15

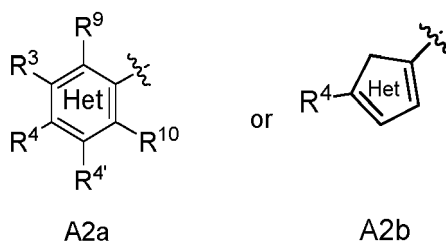
Formula I

or a pharmaceutical acceptable salt thereof wherein:

20

A1 is phenyl or a 6-membered heteroaromatic ring having 1, 2 or 3 N in the heteroaromatic ring;
A2 is selected from A2a or A2b

25



30

A2a

A2b

wherein A2a is phenyl or a 6 membered heteroaromatic ring having 1, 2 or 3 N in the heteroaromatic ring, and
A2b is a 5 membered heteroaromatic ring having 1, 2 or 3 heteroatoms independently selected from O, S and N;
X is selected from the group consisting of $-(CH_2)_2-$, $-(CH_2)_3-$, $-(CH_2)_4-$, and $-(CH_2)_m-O-(CH_2)_n-$, optionally mono-
or di-substituted with halogen, wherein m and n are independently 0, 1, 2, 3 or 4, with the proviso that m+n
is 2, 3 or 4;

35

Y is O;

R¹ and R² are each independently selected from the group consisting of:

40

- (a) hydrogen,
- (b) halogen,
- (c) CN,
- (d) CF₃,
- (e) -C₁₋₆alkyl,
- (f) -C₁₋₆alkyl-C(=O)OH,
- (g) -O-(R⁷),
- (h) -S(=O)₀R⁷,
- (i) -N(R⁷)(R⁸),
- (j) -N(R⁷)-C(=O)-(R⁸),
- (k) -N(R⁷)-C(=O)-O-(R⁸),
- (l) -N(R⁷)S(=O)₂(R⁸),
- (m) -C₃₋₆cycloalkyl,
- (n) -C(=O)(R⁷),
- (o) aryl,
- (p) heteroaryl,
- (q) -OC(=O)N(R⁷)(R⁸),
- (r) -S(=O)₂N(R⁷)(R⁸),

55

- (s) $-\text{C}(=\text{O})\text{N}(\text{R}^7)(\text{R}^8)$, and
 (t) $-\text{C}(\text{R}^7)(\text{R}^8)\text{OH}$,

wherein the alkyl portion of choices (e) and (f), and the cycloalkyl portion of choice (m) are optionally substituted with halogen, and

wherein the aryl of choice (o) and the heteroaryl of choice (p) are optionally mono- or di-substituted with substituents selected from halogen, nitro, C_{1-6} alkyl, C_{1-6} alkoxy, halo C_{1-6} alkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkoxy, $-\text{NH}(\text{C}_{1-6}\text{alkyl})$, $-\text{NH}(\text{C}_{3-6}\text{cycloalkyl})$, $-\text{N}(\text{C}_{1-6}\text{alkyl})_2$, $-\text{N}(\text{C}_{3-6}\text{cycloalkyl})_2$, $-\text{S}(=\text{O})_o\text{C}_{1-6}\text{alkyl}$, $-\text{S}(=\text{O})_o\text{C}_{3-6}\text{cycloalkyl}$, and CN;

R^3 is selected from the group consisting of:

- (a) hydrogen,
 (b) halogen,
 (c) CN,
 (d) CF_3 ,
 (e) $-\text{C}_{1-6}\text{alkyl}$,
 (f) $-\text{C}_{1-6}\text{alkyl}-\text{C}(=\text{O})\text{OH}$,
 (g) $-\text{O}(\text{R}^7)$,
 (h) $-\text{S}(=\text{O})_o\text{R}^7$,
 (i) $-\text{N}(\text{R}^7)(\text{R}^8)$,
 (j) $-\text{N}(\text{R}^7)-\text{C}(=\text{O})-(\text{R}^8)$,
 (k) $-\text{N}(\text{R}^7)-\text{C}(=\text{O})-\text{O}-(\text{R}^8)$,
 (l) $-\text{N}(\text{R}^7)\text{S}(=\text{O})_2(\text{R}^8)$,
 (m) $-\text{C}_{3-6}\text{cycloalkyl}$,
 (n) $-\text{C}(=\text{O})(\text{R}^7)$,
 (o) aryl,
 (p) heteroaryl,
 (q) $-\text{OC}(=\text{O})\text{N}(\text{R}^7)(\text{R}^8)$,
 (r) $-\text{S}(=\text{O})_2\text{N}(\text{R}^7)(\text{R}^8)$,
 (s) $-\text{C}(=\text{O})\text{N}(\text{R}^7)(\text{R}^8)$,
 (t) $-\text{C}(\text{R}^7)(\text{R}^8)\text{OH}$,
 (u) $-\text{NHC}(=\text{O})-\text{N}(\text{R}^7)(\text{R}^8)$,
 (v) $-\text{C}_{3-6}\text{cycloalkyl}-\text{COOH}$,
 (w) heterocycle, and
 (x) $-\text{C}_{1-6}\text{alkylC}(=\text{O})-\text{N}(\text{R}^7)(\text{R}^8)$,

wherein the alkyl portion of choices (e), (f) and (x), and the cycloalkyl portion of choices (m) and (v) are optionally substituted with halogen or hydroxyl, and

wherein the aryl of choice (o), the heteroaryl of choice (p), and the heterocycle of choice (w) are optionally mono- or di-substituted with substituents selected from halogen, nitro, C_{1-6} alkyl, C_{1-6} alkoxy, halo C_{1-6} alkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkoxy, $-\text{NH}(\text{C}_{1-6}\text{alkyl})$, $-\text{NH}(\text{C}_{3-6}\text{cycloalkyl})$, $-\text{N}(\text{C}_{1-6}\text{alkyl})_2$, $-\text{N}(\text{C}_{3-6}\text{cycloalkyl})_2$, $-\text{S}(=\text{O})_o\text{C}_{1-6}\text{alkyl}$, $-\text{S}(=\text{O})_o\text{C}_{3-6}\text{cycloalkyl}$, hydroxyl and CN;

R^4 and R^4 are each independently selected from the group consisting of:

- (a) hydrogen,
 (b) $-\text{N}(\text{R}^7)(\text{R}^8)$,
 (c) $-\text{N}(\text{R}^7)\text{S}(=\text{O})_2\text{R}^8$,
 (d) $-\text{N}(\text{R}^7)-\text{C}(=\text{O})\text{R}^8$,
 (e) $-\text{N}(\text{R}^7)\text{C}(=\text{O})\text{OR}^8$,
 (f) $-\text{S}(=\text{O})_o\text{R}^7$,
 (g) $-\text{S}(=\text{O})_2\text{N}(\text{R}^7)(\text{R}^8)$,
 (h) $-\text{C}(=\text{O})\text{R}^7$,
 (i) $-\text{C}(=\text{O})\text{N}(\text{R}^7)(\text{R}^8)$,
 $-\text{OC}(=\text{O})\text{N}(\text{R}^7)(\text{R}^8)$,
 (k) $-\text{O}-\text{R}^7$,
 (l) $-\text{C}(\text{R}^7)(\text{R}^8)\text{OH}$,
 (m) $-\text{C}_{1-4}\text{alkyl}-\text{C}(=\text{O})\text{NHS}(=\text{O})_2\text{R}^7$,
 (n) $-\text{C}_{1-4}\text{alkyl}-\text{S}(=\text{O})_2\text{NHC}(=\text{O})\text{R}^7$,

- (o) $-C_{1-4}alkyl-C(=O)-N(R^7)(R^8)$,
 (p) $-C_{1-4}alkyl-N(R^7)C(=O)(R^8)$,
 (q) $-C_{1-4}alkyl-N(R^7)S(=O)_2(R^8)$,
 (r) $-C_{1-4}alkyl-S(=O)_2N(R^7)(R^8)$,
 5 (s) $-C_{1-4}alkyl-N(R^7)C(=O)O(R^8)$
 (t) $-C_{1-4}alkyl-O-C(=O)N(R^7)(R^8)$
 (u) $-C_{1-4}alkyl-C(=O)(R^7)$,
 (v) $-C_{1-4}alkyl-C(R^7)(R^8)OH$,
 (w) $-C_{1-4}alkyl-O(R^7)$,
 10 (x) $-C_{1-6}alkyl-C(=O)OH$,
 (y) $-C_{2-6}alkenyl-C(=O)OH$,
 (z) $-C_{3-6}cycloalkyl-C(=O)OH$,
 (aa) $-C_{3-6}cycloalkyl-C(=O)NHS(=O)_2R^7$,
 (bb) $-C_{3-6}cycloalkyl-S(=O)_2NHC(=O)R^7$,
 15 (cc) $-C_{3-6}cycloalkyl-C(=O)-N(R^7)(R^8)$,
 (dd) $-C_{3-6}cycloalkyl-N(R^7)C(=O)(R^8)$,
 (ee) $-C_{3-6}cycloalkyl-N(R^7)S(=O)_2(R^8)$,
 (ff) $-C_{3-6}cycloalkyl-S(=O)_2N(R^7)(R^8)$,
 (gg) $-C_{3-6}cycloalkyl-N(R^7)C(=O)O(R^8)$,
 20 (hh) $-C_{3-6}cycloalkyl-O-C(=O)N(R^7)(R^8)$,
 (ii) $-C_{3-6}cycloalkyl-C(=O)(R^7)$,
 (jj) $-C_{3-6}cycloalkyl-C(R^7)(R^8)OH$,
 (kk) $-C_{3-6}cycloalkyl-O(R^7)$,
 (ll) $-C(=O)OH$,
 25 (mm) aryl,
 (nn) heteroaryl,
 (oo) $-C(=O)N(R^7)S(=O)_2(R^8)$,
 (pp) $-S(=O)_2N(R^7)C(=O)(R^8)$,
 (qq) $-NHS(=O)_2N(R^7)(R^8)$,
 30 (rr) $-NHC(=O)N(R^7)(R^8)$,
 (ss) $-CH(OH)-C(=O)-N(R^7)(R^8)$,
 (tt) $-C(=O)-C(=O)-N(R^7)(R^8)$,
 (uu) $-C_{3-6}cycloalkyl$,
 (vv) $-CF_3$,
 35 (ww) $-C_{1-6}alkyl N(R^7)(R^8)$,
 (xx) -heterocycle,
 (yy) $-C_{1-6}alkyl$,
 (zz) halogen, and
 (aaa) $-O-C_{1-6}alkyl-N(R^7)(R^8)$,

40 wherein the alkyl portion of choices (m), (n), (o), (p), (q), (r), (s), (t), (u), (v), (w), (x), (ww), (yy) and (aaa), the alkenyl portion of choice (y), and the cycloalkyl portion of choices (z), (aa), (bb), (cc), (dd), (ee), (ff), (gg), (hh), (ii), (jj), (kk) and (uu), are optionally mono- or di-substituted with halogen, CN, aryl, $C_{1-6}alkyl$, halo $C_{1-6}alkyl$, $C_{3-6}cycloalkyl$, $C_{1-6}alkoxy$, or $C_{3-6}cycloalkoxy$, and
 45 wherein the aryl of choice (mm), the heteroaryl of choice (nn), and the heterocycle of choice (xx) are optionally mono- or di-substituted with substituents selected from halogen, nitro, $C_{1-6}alkyl$, $C_{1-6}alkoxy$, halo $C_{1-6}alkyl$, $C_{3-6}cycloalkyl$, $C_{3-6}cycloalkoxy$, $-NH(C_{1-6}alkyl)$, $-NH(C_{3-6}cycloalkyl)$, $-N(C_{1-6}alkyl)_2$, $-N(C_{3-6}cycloalkyl)_2$, $-S(=O)_oC_{1-6}alkyl$, $-S(=O)_oC_{3-6}cycloalkyl$, hydroxyl and CN, or
 50 wherein R^3 and R^4 or R^4 and R^4 are joined together to form a 5- or 6-membered heterocyclic ring, said ring having one heteroatom selected from O and N, wherein said ring is optionally substituted with $-C(=O)OH$, or $-C_{1-6}alkyl-C(=O)OH$, with the proviso that at least one of R^3 , R^4 and R^4 is other than hydrogen;
 R^5 is selected from the group consisting of:

- 55 (a) hydrogen,
 (b) $-C_{1-6}alkyl$,
 (c) $-C_{1-4}alkyl(R^7)$,
 (d) aryl,
 (e) heteroaryl,

- (f) -C₃₋₆cycloalkyl,
 (g) -C₃₋₆cycloalkyl(R⁷),
 (h) -C₃₋₆cycloalkyl-O(R⁷),
 (i) -C₁₋₄alkyl-C₃₋₆cycloalkyl,
 (j) C₁₋₆alkoxy, and
 (k) C₃₋₆cycloalkoxy,

wherein the alkyl portion of choices (b), (c), (i) and (j), the cycloalkyl portion of choices (f), (g), (h), (i) and (k) are optionally substituted with halogen or C₁₋₄alkyl, and wherein the aryl of choice (d) and the heteroaryl of choice (e), are optionally mono- or di-substituted with substituents selected from halogen, nitro, C₁₋₆alkyl, CF₃, C₁₋₆alkoxy, halo C₁₋₆ alkyl, aryl, heteroaryl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, and CN; R⁶ is selected from the group consisting of:

- (a) hydrogen,
 (b) -C₁₋₆alkyl,
 (c) -C₁₋₆alkylaryl,
 (d) -C₁₋₆alkylheteroaryl,
 (e) -S(=O)₀C₁₋₆alkyl(R⁷),
 (f) -C(=O)C₁₋₆alkyl(R⁷),
 (g) -C₃₋₆cycloalkyl,
 (h) aryl,
 (i) heteroaryl,
 (j) -C(=O)C₃₋₆cycloalkyl(R⁷),
 (k) -S(=O)₀C₃₋₆cycloalkyl(R⁷), and
 (l) -C₁₋₆alkyl(R⁷),

wherein the alkyl portion of choices (b), (c), (d), (e), (f), and (l) and the cycloalkyl portion of choices (g), (j), and (k), are optionally substituted with halogen or C₁₋₄alkyl, and wherein the aryl portion of choices (c) and (h), and the heteroaryl portion of choices (d) and (i), are optionally mono- or di-substituted with substituents selected from halogen, nitro, -CF₃, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, aryl, heteroaryl, heterocycle optionally substituted with halogen, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₆alkyl, S(=O)₀C₃₋₆cycloalkyl, and CN; R⁷ and R⁸ are each independently selected from the following:

- (a) hydrogen,
 (b) -C₁₋₆alkyl,
 (c) -C₃₋₆cycloalkyl,
 (d) -aryl,
 (e) -heteroaryl,
 (f) -C₁₋₆alkylaryl,
 (g) -C₁₋₆alkylheteroaryl,
 (h) -C(=O)C₁₋₆alkyl,
 (i) -S(=O)₀-aryl,
 (j) -C₁₋₆alkyl-C₃₋₆cycloalkyl, and
 (k) CF₃,

wherein the alkyl of choices (b), (f), (g), (h), and (j), and the cycloalkyl of choices (c) and (j), are each optionally mono-, di- or tri-substituted with halogen, and wherein the aryl portion of choices (d), (f) and (i), and the heteroaryl portion of choices (e) and (g), are each optionally mono- or di-substituted with substituents selected from halogen, -C(=O)OH, -CF₃, -NHC(=O)CH₃, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₃alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₃alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₄alkyl, S(=O)₀C₃₋₆cycloalkyl, aryl, heteroaryl, hydroxyl, and CN; R⁹ and R¹⁰ are each independently selected from the following

- (a) hydrogen,
 (b) -C₁₋₆alkyl,
 (c) -C₃₋₆cycloalkyl,

- (d) halogen,
- (e) $-OC_{3-6}$ cycloalkyl,
- (f) CF_3 , and
- (g) C_{1-6} alkoxy,

5

wherein the alkyl portion of choice (b) and the cycloalkyl portion of choices (c) and (e), are each optionally mono-, di- or tri- substituted with halogen; and wherein each o is independently 0, 1 or 2.

2. A compound according Claim 1, or a pharmaceutically acceptable salt thereof, wherein:

10

X is selected from $-CH_2CH_2CH_2-$, or $-CF_2CH_2CH_2-$.

3. A compound according Claim 1, or a pharmaceutically acceptable salt thereof, wherein:

15

A2 is A2a and A2a is a substituted phenyl, substituted pyrimidine, substituted pyrazine, or substituted pyridine.

4. A compound according Claim 1, or a pharmaceutically acceptable salt thereof, wherein:

20

R^1 and R^2 are each independently selected from the group consisting of:

- (a) hydrogen,
- (b) halogen,
- (c) CN,
- (d) CF_3 ,
- (e) $-C_{1-6}$ alkyl,
- (f) $-O-(R^7)$,
- (g) $-C_{3-6}$ cycloalkyl, and
- (h) $-N(R^7)(R^8)$,

25

30

wherein the alkyl portion of choice (e) and the cycloalkyl portion of choice (g) are optionally substituted with halogen.

5. A compound according Claim 1, or a pharmaceutically acceptable salt thereof, wherein:

35

R^1 and R^2 are each hydrogen.

6. A compound according Claim 1, or a pharmaceutically acceptable salt thereof, wherein:

40

R^3 is selected from the group consisting of:

- (a) hydrogen,
- (b) $-O-(R^7)$,
- (c) $-N(R^7)S(=O)_2(R^8)$, and
- (d) $-C_{1-6}$ alkyl,

45

wherein the alkyl portion of choice (d) is optionally substituted with halogen or hydroxyl.

7. A compound according Claim 1, or a pharmaceutically acceptable salt thereof, wherein:

50

R^4 and $R^{4'}$ are each independently selected from the group consisting of:

- (a) hydrogen,
- (b) $-N(R^7)S(=O)_2R^8$,
- (c) $-N(R^7)-C(=O)R^8$,
- (d) $-S(=O)_oR^7$,
- (e) $-S(=O)_2N(R^7)(R^8)$,
- (f) $-C(=O)N(R^7)(R^8)$,
- (g) $-O-(R^7)$,

55

- (h) $-C(R^7)(R^8)OH$,
 (i) $-C_{1-4}alkyl-C(=O)NHS(=O)_2R^7$,
 (j) $-C_{1-4}alkyl-S(=O)_2NHC(=O)R^7$,
 (k) $-C_{1-4}alkyl-C(=O)-N(R^7)(R^8)$,
 5 (l) $-C_{1-4}alkyl-N(R^7)C(=O)(R^8)$,
 (m) $-C_{1-4}alkyl-N(R^7)S(=O)_2(R^8)$,
 (n) $-C_{1-4}alkyl-S(=O)_2N(R^7)(R^8)$,
 (o) $-C_{1-4}alkyl-C(R^7)(R^8)OH$,
 (p) $-C_{1-4}alkyl-O(R^7)$,
 10 (q) $-C_{1-6}alkyl-C(=O)OH$,
 (r) $-C_{2-6}alkenyl-C(=O)OH$,
 (s) $-C_{3-6}cycloalkyl-C(=O)OH$,
 (t) $-C_{3-6}cycloalkyl-C(=O)NHS(=O)_2R^7$,
 (u) $-C_{3-6}cycloalkyl-S(=O)_2NHC(=O)R^7$,
 15 (v) $-C_{3-6}cycloalkyl-C(=O)-N(R^7)(R^8)$,
 (w) $-C_{3-6}cycloalkyl-N(R^7)S(=O)_2(R^8)$,
 (x) $-C_{3-6}cycloalkyl-S(=O)_2N(R^7)(R^8)$,
 (y) $-C_{3-6}cycloalkyl-N(R^7)C(=O)O(R^8)$,
 (z) $-C_{3-6}cycloalkyl-C(R^7)(R^8)OH$,
 20 (aa) $-C_{3-6}cycloalkyl-O(R^7)$,
 (bb) $-C(=O)OH$,
 (cc) aryl,
 (dd) heteroaryl,
 (ee) $-C(=O)N(R^7)S(=O)_2(R^8)$,
 25 (ff) $-S(=O)_2N(R^7)C(=O)(R^8)$,
 (gg) $-NHS(=O)_2N(R^7)(R^8)$,
 (hh) $-NHC(=O)N(R^7)(R^8)$,
 (ii) $C_{3-6}cycloalkyl$,
 (jj) CF_3 ,
 30 (kk) heterocycle,
 (ll) $-C_{1-6}alkyl$, and
 (mm) halogen,

wherein the alkyl portion of choices (i), (j), (k), (l), (m), (n), (o), (p), (q), and (11), the alkenyl portion of choice (r),
 35 and the cycloalkyl portion of choices (s), (t), (u), (v), (w), (x), (y), (z), and (aa) are optionally mono- or di-substituted
 with halogen, CN, aryl, $C_{1-6}alkyl$, halo $C_{1-6}alkyl$, $C_{3-6}cycloalkyl$, $C_{1-6}alkoxy$, or $C_{3-6}cycloalkoxy$ and,
 wherein the aryl of choice (cc), the heteroaryl of choice (dd), and the heterocycle of choice (kk) are optionally mono-
 or di-substituted with substituents selected from halogen, hydroxyl, nitro, $C_{1-6}alkyl$, $C_{1-6}alkoxy$, halo $C_{1-6}alkyl$,
 40 $C_{3-6}cycloalkyl$, $C_{3-6}cycloalkoxy$, $-NH(C_{1-6}alkyl)$, $-NH(C_{3-6}cycloalkyl)$, $-N(C_{1-6}alkyl)_2$, $-N(C_{3-6}cycloalkyl)_2$,
 $-S(=O)_oC_{1-6}alkyl$, $-S(=O)_oC_{3-6}cycloalkyl$, and CN.

8. A compound according to Claim 1, or a pharmaceutically acceptable salt thereof wherein:

45 R^4 and R^4 are each independently selected from the group consisting of:

- (a) $-C(R^7)(R^8)OH$,
 (b) $-N(R^7)S(=O)_2R^8$,
 (c) $-O-(R^7)$,
 (d) $-C_{1-6}alkyl-C(=O)OH$,
 50 (e) $-C(=O)OH$,
 (f) $-NHS(=O)_2N(R^7)(R^8)$,
 (g) $-C_{3-6}cycloalkyl$,
 (h) CF_3 ,
 (i) heterocycle,
 55 (j) $-C_{1-6}alkyl$, and
 (k) halogen,

wherein the alkyl portion of choices (d) and (j), and the cycloalkyl portion of choice (g) are optionally mono- or

di-substituted with halogen, CN, aryl, C₁₋₆alkyl, halo C₁₋₆alkyl, C₃₋₆ cycloalkyl, C₁₋₆alkoxy, or C₃₋₆cycloalkoxy, and

wherein the heterocycle of choice (i) is optionally mono- or di-substituted with substituents selected from halogen, hydroxyl, nitro, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆ cycloalkyl, C₃₋₆cycloalkoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆ cycloalkyl)₂, -S(=O)₀C₁₋₆alkyl, -S(=O)₀C₃₋₆cycloalkyl, and CN.

9. A compound according Claim 1, or a pharmaceutically acceptable salt thereof, wherein:

R⁵ is selected from the group consisting of:

- (a) hydrogen,
- (b) -C₁₋₆alkyl, and
- (c) -C₁₋₄alkyl(R⁷),

wherein the alkyl portion of choices (b) and (c) is optionally substituted with halogen or C₁₋₄alkyl.

10. A compound according to Claim 1, or a pharmaceutically acceptable salt thereof, wherein:

R⁶ is selected from the group consisting of:

- (a) -C₁₋₆alkylaryl,
- (b) -C₁₋₆alkylheteroaryl, and
- (c) -C₁₋₆alkyl(R⁷),

wherein the alkyl portion of choices (a), (b), and (c) is optionally substituted with halogen or C₁₋₄alkyl, and wherein the aryl portion of choice (a), and the heteroaryl portion of choice (b), are optionally mono- or di-substituted with substituents selected from halogen, nitro, CF₃, C₁₋₆alkyl, C₁₋₆alkoxy, halo C₁₋₆alkyl, C₃₋₆cycloalkyl, C₃₋₆cycloalkoxy, aryl, heteroaryl, heterocycle optionally substituted with halogen, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆ cycloalkyl)₂, -S(=O)₀C₁₋₆alkyl, -S(=O)₀C₃₋₆cycloalkyl, and CN.

11. A compound according Claim 1, or a pharmaceutically acceptable salt thereof, wherein:

R⁹ and R¹⁰ are each independently

- (a) hydrogen,
- (b) -C₁₋₆alkyl,
- (c) halogen,
- (d) CF₃, and
- (e) C₁₋₆alkoxy,

wherein the alkyl of choice (b) is optionally mono-, di- or tri-substituted with halogen.

12. A compound according to Claim 11, or a pharmaceutically acceptable salt thereof, wherein:

A₂ is A_{2a}, and A_{2a} is a substituted phenyl, substituted pyrimidine, substituted pyrazine, or substituted pyridine; R¹ and R² are each independently selected from:

- (a) hydrogen,
- (b) halogen,
- (c) CF₃,
- (d) C₁₋₆alkyl, and
- (e) -O-(R⁷),

wherein the alkyl portion of choice (d) is optionally substituted with halogen;

R³ is selected from the group consisting of:

- (a) hydrogen,
- (b) -O-(R⁷),

- (c) $-N(R^7)S(=O)_2(R^8)$, and
 (d) $-C_{1-6}$ alkyl,

wherein the alkyl portion of choice (d) is optionally substituted with halogen or hydroxyl;
 R^7 and R^8 are each independently selected from the group consisting of:

- (a) $-C(R^7)(R^8)OH$,
 (b) $-N(R^7)S(=O)_2R^8$,
 (c) $-O-(R^7)$,
 (d) $-C_{1-6}$ alkyl- $C(=O)OH$,
 (e) $-C(=O)OH$,
 (f) $-NHS(=O)_2N(R^7)(R^8)$,
 (g) C_{3-6} cycloalkyl,
 (h) CF_3 ,
 (i) heterocycle,
 (j) $-C_{1-6}$ alkyl, and
 (k) halogen,

wherein the alkyl portion of choices (d) and (j), and the cycloalkyl portion of choice (g) are optionally mono- or di-substituted with halo, CN, aryl, C_{1-6} alkyl, halo C_{1-6} alkyl, C_{3-6} cycloalkyl, C_{1-6} alkoxy, or C_{3-6} cycloalkoxy, and wherein the heterocycle of choice (i) is optionally mono- or di-substituted with substituents selected from halogen, hydroxyl, nitro, C_{1-6} alkyl, C_{1-6} alkoxy, halo C_{1-6} alkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkoxy, $-NH(C_{1-6}$ alkyl), $-NH(C_{3-6}$ cycloalkyl), $-N(C_{1-6}$ alkyl) $_2$, $-N(C_{3-6}$ cycloalkyl) $_2$, $-S(=O)_oC_{1-6}$ alkyl, $-S(=O)_oC_{3-6}$ cycloalkyl, and CN; R^5 is selected from the group consisting of:

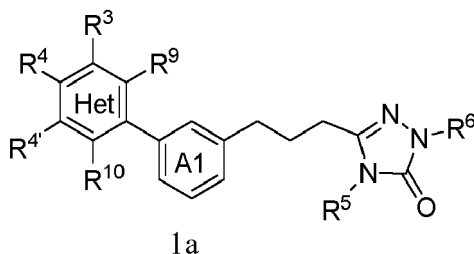
- (a) hydrogen,
 (b) $-C_{1-6}$ alkyl, and
 (c) $-C_{1-4}$ alkyl(R^7),

wherein the alkyl portion of choices (b) and (c) is optionally substituted with halogen or C_{1-4} alkyl;
 R^6 is selected from the group consisting of:

- (a) $-C_{1-6}$ alkylaryl,
 (b) $-C_{1-6}$ alkylheteroaryl, and
 (c) $-C_{1-6}$ alkyl(R^7),

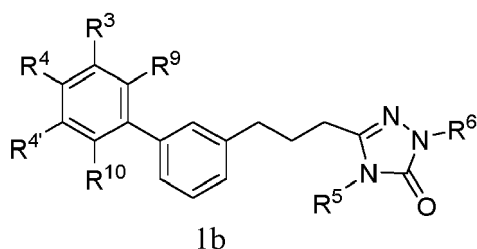
wherein the alkyl portion of choices (a), (b), and (c) is optionally substituted with halogen or C_{1-4} alkyl, and wherein the aryl portion of choice (a), and the heteroaryl portion of choice (b), are optionally mono- or di-substituted with substituents selected from halogen, nitro, CF_3 , C_{1-6} alkyl, C_{1-6} alkoxy, halo C_{1-6} alkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkoxy, aryl, heteroaryl, heterocycle optionally substituted with halogen, $-NH(C_{1-6}$ alkyl), $-NH(C_{3-6}$ cycloalkyl), $-N(C_{1-6}$ alkyl) $_2$, $-N(C_{3-6}$ cycloalkyl) $_2$, $-S(=O)_oC_{1-6}$ alkyl, $-S(=O)_oC_{3-6}$ cycloalkyl, and CN.

13. A compound according to Claim 12 of Formula 1a



or a pharmaceutically acceptable salt thereof.

14. A compound according to Claim 13 of Formula 1b



or a pharmaceutically acceptable salt thereof

15. A compound according to Claim 1 selected from the group consisting of:

2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid,

2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)acetic acid,

3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-carboxylic acid,

3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-carboxylic acid,

1-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid,

2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid,

1-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid,

1-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)cyclopropanecarboxylic acid,

3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-carboxylic acid,

3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-carboxylic acid,

2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-propoxy-[1,1'-biphenyl]-3-yl)acetic acid,

N-(6-(3-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-3-yl)benzenesulfonamide,

2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)acetic acid,

1-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methyl-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid,

2-(4-(benzyloxy)-3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)acetic acid,

2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-(cyclopropylmethoxy)-[1,1'-biphenyl]-3-yl)acetic acid,

2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-fluoro-[1,1'-biphenyl]-3-yl)acetic acid,

2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-6-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid,

3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-propoxy-[1,1'-biphenyl]-3-carboxylic acid,

N-((3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)methyl)benzenesulfonamide,

3-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)propanoic acid,

2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)-1,1-difluoropropyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid,

N-(6-(3-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)-1,1-difluoropropyl)phe-

nyl)pyridin-3-yl)benzenesulfonamide,

2-(5-(6-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)pyridin-2-yl)-2-methoxyphenyl)acetic acid,

3-(3-(3'-(1*H*-tetrazol-5-yl)-[1,1'-biphenyl]-3-yl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-5(4*H*)-one,

2-(5-(4-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)pyrimidin-2-yl)-2-ethoxyphenyl)acetic acid,

2-(5-(6-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)pyrimidin-4-yl)-2-ethoxyphenyl)acetic acid,

(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-methoxy-[1,1'-biphenyl]-4-yl)acetic acid,

(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-ethoxy-[1,1'-biphenyl]-4-yl)acetic acid,

(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-propoxy-[1,1'-biphenyl]-4-yl)acetic acid,

2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-hydroxy-[1,1'-biphenyl]-4-yl)acetic acid,

2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-isopropoxy-[1,1'-biphenyl]-3-yl)acetic acid, and

2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-(2-(dimethylamino)ethoxy)-[1,1'-biphenyl]-3-yl)acetic acid,

or a pharmaceutically acceptable salt thereof.

16. A compound according to claim 1 selected from the group consisting of

3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-carboxylic acid;

2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid;

1-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)cyclopropanecarboxylic acid;

2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-propoxy-[1,1'-biphenyl]-3-yl)acetic acid;

2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-fluoro-[1,1'-biphenyl]-3-yl)acetic acid;

2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)-1,1-difluoropropyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)acetic acid;

(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-ethoxy-[1,1'-biphenyl]-4-yl)acetic acid;

(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-propoxy-[1,1'-biphenyl]-4-yl)acetic acid,

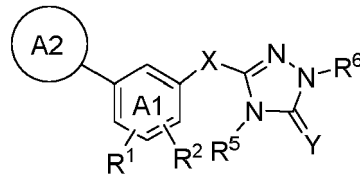
or a pharmaceutically acceptable salt thereof.

17. A pharmaceutical composition comprising a compound according to Claim 1, or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier.

18. A compound according to claim 1 for use in treating a cancer in a mammal which is negatively impacted by diminution in its metabolism of fatty acid, through the administration of a therapeutically effective amount of a compound of Claim 1, or a pharmaceutically acceptable salt thereof, to the mammal in need thereof, wherein said cancer is selected from prostate, breast, ovarian, liver, kidney, colon, pancreatic, human chronic lymphocytic leukemia and melanoma.

Patentansprüche

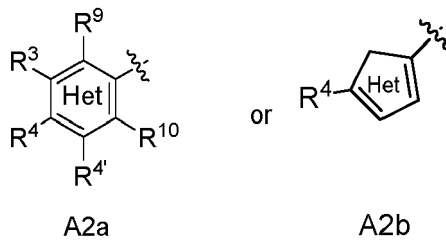
1. Verbindung der Formel I



Formel I

oder ein pharmazeutisch unbedenkliches Salz davon, wobei:

A1 Phenyl oder ein 6-gliedriger heteroaromatischer Ring mit 1, 2 oder 3 N in dem heteroaromatischen Ring ist; A2 aus A2a oder A2b ausgewählt wird



wobei A2a Phenyl oder ein 6-gliedriger heteroaromatischer Ring mit 1, 2 oder 3 N in dem heteroaromatischen Ring ist, und

A2b ein 5-gliedriger heteroaromatischer Ring mit 1, 2 oder 3 Heteroatomen, unabhängig ausgewählt aus O, S und N, ist;

X ausgewählt ist aus der Gruppe bestehend aus $-(CH_2)_2-$, $-(CH_2)_3-$, $-(CH_2)_4-$ und $-(CH_2)_m-O-(CH_2)_n-$, gegebenenfalls mono- oder disubstituiert mit Halogen, wobei m und n unabhängig 0, 1, 2, 3 oder 4 sind, unter der Voraussetzung, dass $m+n$ 2, 3 oder 4 ist;

Y O ist;

R¹ und R² jeweils unabhängig ausgewählt sind aus der Gruppe bestehend aus:

- (a) Wasserstoff,
- (b) Halogen,
- (c) CN,
- (d) CF₃,
- (e) -C₁₋₆-Alkyl,
- (f) -C₁₋₆-Alkyl-C(=O)OH,
- (g) -O-(R⁷),
- (h) -S(=O)₀R⁷,
- (i) -N(R⁷)(R⁸),
- (j) -N(R⁷)-C(=O)-(R⁸),
- (k) -N(R⁷)-C(=O)-O-(R⁸),
- (l) -N(R⁷)S(=O)₂(R⁸),
- (m) -C₃₋₆-Cycloalkyl,
- (n) -C(=O)(R⁷),
- (o) Aryl,
- (p) Heteroaryl,
- (q) -OC(=O)N(R⁷)(R⁸),
- (r) -S(=O)₂N(R⁷)(R⁸),
- (s) -C(=O)N(R⁷)(R⁸), und
- (t) -C(R⁷)(R⁸)OH,

wobei der Alkylteil der Auswahlmöglichkeiten (e) und (f) und der Cycloalkylteil der Auswahlmöglichkeit (m) gegebenenfalls mit Halogen substituiert sind, und

wobei das Aryl der Auswahlmöglichkeit (o) und das Heteroaryl der Auswahlmöglichkeit (p) gegebenenfalls mit Substituenten ausgewählt aus Halogen, Nitro, C₁₋₆-Alkyl, C₁₋₆-Alkoxy, Halo-C₁₋₆-Alkyl, C₃₋₆-Cycloalkyl, C₃₋₆-Cy-

EP 2 935 228 B9

cloalkoxy, -NH(C₁₋₆-Alkyl), -NH(C₃₋₆-Cycloalkyl), -N(C₁₋₆-Alkyl)₂, -N(C₃₋₆-Cycloalkyl)₂, -S(=O)₀C₁₋₆-Alkyl, -S(=O)₀C₃₋₆-Cycloalkyl und CN mono- oder disubstituiert sind;
R³ ausgewählt ist aus der Gruppe bestehend aus:

- 5 (a) Wasserstoff,
(b) Halogen,
(c) CN,
(d) CF₃,
(e) -C₁₋₆-Alkyl,
10 (f) -C₁₋₆-Alkyl-C(=O)OH,
(g) -O-(R⁷),
(h) -S(=O)₀R⁷,
(i) -N(R⁷)(R⁸),
(j) -N(R⁷)-C(=O)-(R⁸),
15 (k) -N(R⁷)-C(=O)-O-(R⁸),
(l) -N(R⁷)S(=O)₂(R⁸),
(m) -C₃₋₆-Cycloalkyl,
(n) -C(=O)(R⁷),
(o) Aryl,
20 (p) Heteroaryl,
(q) -OC(=O)N(R⁷)(R⁸),
(r) -S(=O)₂N(R⁷)(R⁸),
(s) -C(=O)N(R⁷)(R⁸),
(t) -C(R⁷)(R⁸)OH,
25 (u) -NHC(=O)-N(R⁷)(R⁸),
(v) -C₃₋₆-Cycloalkyl-COOH,
(w) Heterozyklus, und
(x) -C₁₋₆-Alkyl-C(=O)-N(R⁷)(R⁸),

30 wobei der Alkylteil der Auswahlmöglichkeiten (e), (f) und (x) und der Cycloalkylteil der Auswahlmöglichkeiten (m) und (v) gegebenenfalls mit Halogen oder Hydroxyl substituiert sind, und wobei das Aryl der Auswahlmöglichkeit (o), das Heteroaryl der Auswahlmöglichkeit (p) und der Heterozyklus der Auswahlmöglichkeit (w) gegebenenfalls mit Substituenten ausgewählt aus Halogen, Nitro, C₁₋₆-Alkyl, C₁₋₆-Alkoxy, Halo-C₁₋₆-Alkyl, C₃₋₆-Cycloalkyl, C₃₋₆-Cycloalkoxy, -NH(C₁₋₆-Alkyl), -NH(C₃₋₆-Cycloalkyl),
35 -N(C₁₋₆-Alkyl)₂, -N(C₃₋₆-Cycloalkyl)₂, -S(=O)₀C₁₋₆-Alkyl, -S(=O)₀C₃₋₆-Cycloalkyl, Hydroxyl und CN mono- oder disubstituiert sind;

R⁴ und R^{4'} jeweils unabhängig ausgewählt sind aus der Gruppe bestehend aus:

- 40 (a) Wasserstoff,
(b) -N(R⁷)(R⁸),
(c) -N(R⁷)S(=O)₂R⁸,
(d) -N(R⁷)-C(=O)R⁸,
(e) -N(R⁷)C(=O)OR⁸,
(f) -S(=O)₀R⁷,
45 (g) -S(=O)₂N(R⁷)(R⁸),
(h) -C(=O)R⁷,
(i) -C(=O)N(R⁷)(R⁸),
-OC(=O)N(R⁷)(R⁸),
(k) -O-R⁷,
50 (l) -C(R⁷)(R⁸)OH,
(m) -C₁₋₄-Alkyl-C(=O)NHS(=O)₂R⁷,
(n) -C₁₋₄-Alkyl-S(=O)₂NHC(=O)R⁷,
(o) -C₁₋₄-Alkyl-C(=O)-N(R⁷)(R⁸),
(p) -C₁₋₄-Alkyl-N(R⁷)C(=O)(R⁸),
55 (q) -C₁₋₄-Alkyl-N(R⁷)S(=O)₂(R⁸),
(r) -C₁₋₄-Alkyl-S(=O)₂N(R⁷)(R⁸),
(s) -C₁₋₄-Alkyl-N(R⁷)C(=O)O(R⁸)
(t) -C₁₋₄-Alkyl-O-C(=O)N(R⁷)(R⁸)

- (u) -C₁₋₄-Alkyl-C(=O)(R⁷),
 (v) -C₁₋₄-Alkyl-C(R⁷)(R⁸)OH,
 (w) -C₁₋₄-Alkyl-O(R⁷),
 (x) -C₁₋₆-Alkyl-C(=O)OH,
 5 (y) -C₂₋₆-Alkenyl-C(=O)OH,
 (z) -C₃₋₆-Cycloalkyl-C(=O)OH,
 (aa) -C₃₋₆-Cycloalkyl-C(=O)NHS(=O)₂R⁷,
 (bb) -C₃₋₆-Cycloalkyl-S(=O)₂NHC(=O)R⁷,
 (cc) -C₃₋₆-Cycloalkyl-C(=O)-N(R⁷)(R⁸),
 10 (dd) -C₃₋₆-Cycloalkyl-N(R⁷)C(=O)(R⁸),
 (ee) -C₃₋₆-Cycloalkyl-N(R⁷)S(=O)₂(R⁸),
 (ff) -C₃₋₆-Cycloalkyl-S(=O)₂N(R⁷)(R⁸),
 (gg) -C₃₋₆-Cycloalkyl-N(R⁷)C(=O)O(R⁸),
 (hh) -C₃₋₆-Cycloalkyl-O-C(=O)N(R⁷)(R⁸),
 15 (ii) -C₃₋₆-Cycloalkyl-C(=O)(R⁷),
 (jj) -C₃₋₆-Cycloalkyl-C(R⁷)(R⁸)OH,
 (kk) -C₃₋₆-Cycloalkyl-O(R⁷),
 (ll) -C(=O)OH,
 (mm) Aryl,
 20 (nn) Heteroaryl,
 (oo) -C(=O)N(R⁷)S(=O)₂(R⁸),
 (pp) -S(=O)₂N(R⁷)C(=O)(R⁸),
 (qq) -NHS(=O)₂N(R⁷)(R⁸),
 (rr) -NHC(=O)N(R⁷)(R⁸),
 25 (ss) -CH(OH)-C(=O)-N(R⁷)(R⁸),
 (tt) -C(=O)-C(=O)-N(R⁷)(R⁸),
 (uu) -C₃₋₆-Cycloalkyl,
 (vv) -CF₃,
 (ww) -C₁₋₆-Alkyl N(R⁷)(R⁸),
 30 (xx) -Heterozyklus,
 (yy) -C₁₋₆-Alkyl,
 (zz) Halogen, und
 (aaa) -O-C₁₋₆-Alkyl-N(R⁷)(R⁸),

35 wobei der Alkylteil der Auswahlmöglichkeiten (m), (n), (o), (p), (q), (r), (s), (t), (u), (v), (w), (x), (ww), (yy) und (aaa), der Alkenylteil der Auswahlmöglichkeit (y) und der Cycloalkylteil der Auswahlmöglichkeiten (z), (aa), (bb), (cc), (dd), (ee), (ff), (gg), (hh), (ii), (jj), (kk) und (uu) gegebenenfalls mit Halogen, CN, Aryl, C₁₋₆-Alkyl, Halo-C₁₋₆-Alkyl, C₃₋₆-Cycloalkyl, C₁₋₆-Alkoxy oder C₃₋₆-Cycloalkoxy mono- oder disubstituiert sind, und wobei das Aryl der Auswahlmöglichkeit (mm), das Heteroaryl der Auswahlmöglichkeit (nn) und der Heterozyklus der Auswahlmöglichkeit (xx) gegebenenfalls mit Substituenten ausgewählt aus Halogen, Nitro, C₁₋₆-Alkyl, C₁₋₆-Alkoxy, Halo-C₁₋₆-Alkyl, C₃₋₆-Cycloalkyl, C₃₋₆-Cycloalkoxy, -NH(C₁₋₆-Alkyl), -NH(C₃₋₆-Cycloalkyl), -N(C₁₋₆-Alkyl)₂, -N(C₃₋₆-Cycloalkyl)₂, -S(=O)_oC₁₋₆-Alkyl, -S(=O)_oC₃₋₆-Cycloalkyl, Hydroxyl und CN mono- oder disubstituiert sind, oder

40 wobei R³ und R⁴ oder R⁴ und R^{4'} miteinander verbunden sind, um einen 5- oder 6-gliedrigen heterocyclischen Ring zu bilden, wobei der Ring über ein Heteroatom verfügt, ausgewählt aus O und N, wobei der Ring gegebenenfalls mit -C(=O)OH oder -C₁₋₆-Alkyl-C(=O)OH substituiert ist, unter der Voraussetzung, dass zumindest eines von R³, R⁴ und R^{4'} nicht Wasserstoff ist; R⁵ ausgewählt ist aus der Gruppe bestehend aus:

- 50 (a) Wasserstoff,
 (b) -C₁₋₆-Alkyl,
 (c) -C₁₋₄-Alkyl-(R⁷),
 (d) Aryl,
 (e) Heteroaryl,
 55 (f) -C₃₋₆-Cycloalkyl,
 (g) -C₃₋₆-Cycloalkyl-(R⁷),
 (h) -C₃₋₆-Cycloalkyl-O(R⁷),
 (i) -C₁₋₄-Alkyl-C₃₋₆-Cycloalkyl,

- (j) C₁₋₆-Alkoxy, und
- (k) C₃₋₆-Cycloalkoxy,

wobei der Alkylteil der Auswahlmöglichkeiten (b), (c), (i) und (j) und der Cycloalkylteil der Auswahlmöglichkeiten (f), (g), (h), (i) und (k) gegebenenfalls mit Halogen oder C₁₋₄-Alkyl substituiert sind, und wobei das Aryl der Auswahlmöglichkeit (d) und das wobei das Heteroaryl der Auswahlmöglichkeit (e) gegebenenfalls mit Substituenten ausgewählt aus Halogen, Nitro, C₁₋₆-Alkyl, CF₃, C₁₋₆-Alkoxy, Halo-C₁₋₆-Alkyl, Aryl, Heteroaryl, C₃₋₆-Cycloalkyl, C₃₋₆-Cycloalkoxy und CN mono- oder disubstituiert sind; R⁶ ausgewählt ist aus der Gruppe bestehend aus:

- (a) Wasserstoff,
- (b) -C₁₋₆-Alkyl,
- (c) -C₁₋₆-Alkylaryl,
- (d) -C₁₋₆-Alkylheteroaryl,
- (e) -S(=O)₀C₁₋₆-Alkyl-(R⁷),
- (f) -C(=O)C₁₋₆-Alkyl-(R⁷),
- (g) -C₃₋₆-Cycloalkyl,
- (h) Aryl,
- (i) Heteroaryl,
- (j) -C(=O)C₃₋₆-Cycloalkyl-(R⁷),
- (k) -S(=O)₀C₃₋₆-Cycloalkyl-(R⁷), und
- (l) -C₁₋₆-Alkyl-(R⁷),

wobei der Alkylteil der Auswahlmöglichkeiten (b), (c), (d), (e), (f) und (l) und der Cycloalkylteil der Auswahlmöglichkeiten (g), (j) und (k) gegebenenfalls mit Halogen oder C₁₋₄-Alkyl substituiert sind, und wobei der Arylteil der Auswahlmöglichkeiten (c) und (h) und der Heteroarylteil der Auswahlmöglichkeiten (d) und (i) gegebenenfalls mit Substituenten ausgewählt aus Halogen, Nitro, -CF₃, C₁₋₆-Alkyl, C₁₋₆-Alkoxy, Halo-C₁₋₆-Alkyl, C₃₋₆-Cycloalkyl, C₃₋₆-Cycloalkoxy, Aryl, Heteroaryl, Heterozyklus gegebenenfalls substituiert mit Halogen, -NH(C₁₋₆-Alkyl), -NH(C₃₋₆-Cycloalkyl), -N(C₁₋₆-Alkyl)₂, -N(C₃₋₆-Cycloalkyl)₂, -S(=O)₀C₁₋₆-Alkyl, S(=O)₀C₃₋₆-Cycloalkyl und CN mono- oder disubstituiert sind; R⁷ und R⁸ jeweils unabhängig ausgewählt sind aus den Folgenden:

- (a) Wasserstoff,
- (b) -C₁₋₆-Alkyl,
- (c) -C₃₋₆-Cycloalkyl,
- (d) -Aryl,
- (e) -Heteroaryl,
- (f) -C₁₋₆-Alkylaryl,
- (g) -C₁₋₆-Alkylheteroaryl,
- (h) -C(=O)C₁₋₆-Alkyl,
- (i) -S(=O)₀-Aryl,
- (j) -C₁₋₆-Alkyl-C₃₋₆-Cycloalkyl, und
- (k) CF₃,

wobei das Alkyl der Auswahlmöglichkeiten (b), (f), (g), (h) und (j) und das Cycloalkyl der Auswahlmöglichkeiten (c) und (j) jeweils gegebenenfalls mit Halogen mono-, di- oder trisubstituiert sind, und wobei der Arylteil der Auswahlmöglichkeiten (d), (f) und (i) und der Heteroarylteil der Auswahlmöglichkeiten (e) und (g) jeweils gegebenenfalls mit Substituenten ausgewählt aus Halogen, -C(=O)OH, -CF₃, -NHC(=O)CH₃, Nitro, C₁₋₆-Alkyl, C₁₋₆-Alkoxy, Halo-C₁₋₆-Alkyl, C₃₋₆-Cycloalkyl, C₃₋₆-Cycloalkoxy, -NH(C₁₋₃-Alkyl), -NH(C₃₋₆-Cycloalkyl), -N(C₁₋₃-Alkyl)₂, -N(C₃₋₆-Cycloalkyl)₂, -S(=O)₀C₁₋₄-Alkyl, S(=O)₀C₃₋₆-Cycloalkyl, Aryl, Heteroaryl, Hydroxyl und CN mono- oder disubstituiert sind; R⁹ und R¹⁰ jeweils unabhängig ausgewählt sind aus den Folgenden:

- (a) Wasserstoff,
- (b) -C₁₋₆-Alkyl,
- (c) -C₃₋₆-Cycloalkyl,
- (d) Halogen,
- (e) -OC₃₋₆-Cycloalkyl,

- (f) CF₃, und
 (g) C₁₋₆-Alkoxy,

5 wobei der Alkylteil der Auswahlmöglichkeit (b) und der Cycloalkylteil der Auswahlmöglichkeiten (c) und (e) jeweils gegebenenfalls mit Halogen mono-, di- oder trisubstituiert sind; und wobei jedes o unabhängig 0, 1 oder 2 ist.

2. Verbindung nach Anspruch 1, oder ein pharmazeutisch unbedenkliches Salz davon, wobei:

10 X ausgewählt ist aus -CH₂CH₂CH₂- oder -CF₂CH₂CH₂-.

3. Verbindung nach Anspruch 1, oder ein pharmazeutisch unbedenkliches Salz davon, wobei:

15 A₂ A_{2a} ist und A_{2a} substituiertes Phenyl, substituiertes Pyrimidin, substituiertes Pyrazin oder substituiertes Pyridin ist.

4. Verbindung nach Anspruch 1, oder ein pharmazeutisch unbedenkliches Salz davon, wobei:

20 R¹ und R² jeweils unabhängig ausgewählt sind aus der Gruppe bestehend aus:

- (a) Wasserstoff,
 (b) Halogen,
 (c) CN,
 (d) CF₃,
 25 (e) -C₁₋₆-Alkyl,
 (f) -O-(R⁷),
 (g) -C₃₋₆-Cycloalkyl, und
 (h) -N(R⁷)(R⁸),

30 wobei der Alkylteil der Auswahlmöglichkeit (e) und der Cycloalkylteil der Auswahlmöglichkeit (g) gegebenenfalls mit Halogen substituiert sind.

5. Verbindung nach Anspruch 1, oder ein pharmazeutisch unbedenkliches Salz davon, wobei:

35 R¹ und R² jeweils Wasserstoff sind.

6. Verbindung nach Anspruch 1, oder ein pharmazeutisch unbedenkliches Salz davon, wobei:

40 R³ ausgewählt ist aus der Gruppe bestehend aus:

- (a) Wasserstoff,
 (b) -O-(R⁷),
 (c) -N(R⁷)S(=O)₂(R⁸), und
 45 (d) -C₁₋₆-Alkyl,

wobei der Alkylteil der Auswahlmöglichkeit (d) gegebenenfalls mit Halogen oder Hydroxyl substituiert ist.

7. Verbindung nach Anspruch 1, oder ein pharmazeutisch unbedenkliches Salz davon, wobei:

50 R⁴ und R^{4'} jeweils unabhängig ausgewählt sind aus der Gruppe bestehend aus:

- (a) Wasserstoff,
 (b) -N(R⁷) S(=O)₂R⁸,
 (c) -N(R⁷)-C(=O)R⁸,
 55 (d) -S(=O)_oR⁷,
 (e) -S(=O)₂N(R⁷)(R⁸),
 (f) -C(=O)N(R⁷)(R⁸),
 (g) -O-(R⁷),

- (h) $-C(R^7)(R^8)OH$,
 (i) $-C_{1-4}\text{-Alkyl-C}(=O)NHS(=O)_2R^7$,
 (j) $-C_{1-4}\text{-Alkyl-S}(=O)_2NHC(=O)R^7$,
 (k) $-C_{1-4}\text{-Alkyl-C}(=O)-N(R^7)(R^8)$,
 5 (l) $-C_{1-4}\text{-Alkyl-N}(R^7)C(=O)(R^8)$,
 (m) $-C_{1-4}\text{-Alkyl-N}(R^7)S(=O)_2(R^8)$,
 (n) $-C_{1-4}\text{-Alkyl-S}(=O)_2N(R^7)(R^8)$,
 (o) $-C_{1-4}\text{-Alkyl-C}(R^7)(R^8)OH$,
 (p) $-C_{1-4}\text{-Alkyl-O}(R^7)$,
 10 (q) $-C_{1-6}\text{-Alkyl-C}(=O)OH$,
 (r) $-C_{2-6}\text{-Alkenyl-C}(=O)OH$,
 (s) $-C_{3-6}\text{-Cycloalkyl-C}(=O)OH$,
 (t) $-C_{3-6}\text{-Cycloalkyl-C}(=O)NHS(=O)_2R^7$,
 (u) $-C_{3-6}\text{-Cycloalkyl-S}(=O)_2NHC(=O)R^7$,
 15 (v) $-C_{3-6}\text{-Cycloalkyl-C}(=O)-N(R^7)(R^8)$,
 (w) $-C_{3-6}\text{-Cycloalkyl-N}(R^7)S(=O)_2(R^8)$,
 (x) $-C_{3-6}\text{-Cycloalkyl-S}(=O)_2N(R^7)(R^8)$,
 (y) $-C_{3-6}\text{-Cycloalkyl-N}(R^7)C(=O)O(R^8)$,
 (z) $-C_{3-6}\text{-Cycloalkyl-C}(R^7)(R^8)OH$,
 20 (aa) $-C_{3-6}\text{-Cycloalkyl-O}(R^7)$,
 (bb) $-C(=O)OH$,
 (cc) Aryl,
 (dd) Heteroaryl,
 (ee) $-C(=O)N(R^7)S(=O)_2(R^8)$,
 25 (ff) $-S(=O)_2N(R^7)C(=O)(R^8)$,
 (gg) $-NHS(=O)_2N(R^7)(R^8)$,
 (hh) $-NHC(=O)N(R^7)(R^8)$,
 (ii) $C_{3-6}\text{-Cycloalkyl}$,
 (jj) CF_3 ,
 30 (kk) Heterozyklus,
 (ll) $-C_{1-6}\text{-Alkyl}$, und
 (mm) Halogen,

35 wobei der Alkylteil der Auswahlmöglichkeiten (i), (j), (k), (l), (m), (n), (o), (p), (q) und (11), der Alkenylteil der Auswahlmöglichkeit (r) und der Cycloalkylteil der Auswahlmöglichkeiten (s), (t), (u), (v), (w), (x), (y), (z) und (aa) gegebenenfalls mit Halogen, CN, Aryl, $C_{1-6}\text{-Alkyl}$, Halo- $C_{1-6}\text{-Alkyl}$, $C_{3-6}\text{-Cycloalkyl}$, $C_{1-6}\text{-Alkoxy}$ oder $C_{3-6}\text{-Cycloalkoxy}$ mono- oder disubstituiert sind, und

40 wobei das Aryl der Auswahlmöglichkeit (cc), das Heteroaryl der Auswahlmöglichkeit (dd) und der Heterozyklus der Auswahlmöglichkeit (kk) gegebenenfalls mit Substituenten ausgewählt aus Halogen, Hydroxyl, Nitro, $C_{1-6}\text{-Alkyl}$, $C_{1-6}\text{-Alkoxy}$, Halo- $C_{1-6}\text{-Alkyl}$, $C_{3-6}\text{-Cycloalkyl}$, $C_{3-6}\text{-Cycloalkoxy}$, $-NH(C_{1-6}\text{-Alkyl})$, $-NH(C_{3-6}\text{-Cycloalkyl})$, $-N(C_{1-6}\text{-Alkyl})_2$, $-N(C_{3-6}\text{-Cycloalkyl})_2$, $-S(=O)_oC_{1-6}\text{-Alkyl}$, $-S(=O)_oC_{3-6}\text{-Cycloalkyl}$ und CN mono- oder disubstituiert sind.

8. Verbindung nach Anspruch 1, oder ein pharmazeutisch unbedenkliches Salz davon, wobei:

45 R^4 und R^4 jeweils unabhängig ausgewählt sind aus der Gruppe bestehend aus:

- (a) $-C(R^7)(R^8)OH$,
 (b) $-N(R^7)S(=O)_2R^8$,
 (c) $-O-(R^7)$,
 50 (d) $-C_{1-6}\text{-Alkyl-C}(=O)OH$,
 (e) $-C(=O)OH$,
 (f) $-NHS(=O)_2N(R^7)(R^8)$,
 (g) $-C_{3-6}\text{-Cycloalkyl}$,
 (h) CF_3 ,
 55 (i) Heterozyklus,
 (j) $-C_{1-6}\text{-Alkyl}$, und
 (k) Halogen,

wobei der Alkylteil der Auswahlmöglichkeiten (d) und (j) und der Cycloalkylteil der Auswahlmöglichkeit (g) gegebenenfalls mit Halogen, CN, Aryl, C₁₋₆-Alkyl, Halo-C₁₋₆-Alkyl, C₃₋₆-Cycloalkyl, C₁₋₆-Alkoxy oder C₃₋₆-Cycloalkoxy mono- oder disubstituiert sind, und

5 wobei das Heterozyklus der Auswahlmöglichkeit (i) gegebenenfalls mit Substituenten ausgewählt aus Halogen, Hydroxyl, Nitro, C₁₋₆-Alkyl, C₁₋₆-Alkoxy, Halo-C₁₋₆-Alkyl, C₃₋₆-Cycloalkyl, C₃₋₆-Cycloalkoxy, -NH(C₁₋₆-Alkyl), -NH(C₃₋₆-Cycloalkyl), -N(C₁₋₆-Alkyl)₂, -N(C₃₋₆-Cycloalkyl)₂, -S(=O)₀C₁₋₆-Alkyl, -S(=O)₀C₃₋₆-Cycloalkyl und CN mono- oder disubstituiert ist.

9. Verbindung nach Anspruch 1, oder ein pharmazeutisch unbedenkliches Salz davon, wobei:

10

R⁵ ausgewählt ist aus der Gruppe bestehend aus:

- 15 (a) Wasserstoff,
(b) -C₁₋₆-Alkyl, und
(c) -C₁₋₄-Alkyl-(R⁷),

wobei der Alkylteil der Auswahlmöglichkeiten (b) und (c) gegebenenfalls mit Halogen oder C₁₋₄-Alkyl substituiert ist.

20 10. Verbindung nach Anspruch 1, oder ein pharmazeutisch unbedenkliches Salz davon, wobei:

R⁶ ausgewählt ist aus der Gruppe bestehend aus:

- 25 (a) -C₁₋₆-Alkylaryl,
(b) -C₁₋₆-Alkylheteroaryl, und
(c) -C₁₋₆-Alkyl-(R⁷),

wobei der Alkylteil der Auswahlmöglichkeiten (a), (b) und (c) gegebenenfalls mit Halogen oder C₁₋₄-Alkyl substituiert ist, und

30 wobei der Arylteil der Auswahlmöglichkeit (a) und der Heteroarylteil der Auswahlmöglichkeit (b) gegebenenfalls mit Substituenten ausgewählt aus Halogen, Nitro, -CF₃, C₁₋₆-Alkyl, C₁₋₆-Alkoxy, Halo-C₁₋₆-Alkyl, C₃₋₆-Cycloalkyl, C₃₋₆-Cycloalkoxy, Aryl, Heteroaryl, Heterozyklus gegebenenfalls substituiert mit Halogen, -NH(C₁₋₆-Alkyl), -NH(C₃₋₆-Cycloalkyl), -N(C₁₋₆-Alkyl)₂, -N(C₃₋₆-Cycloalkyl)₂, -S(=O)₀C₁₋₆-Alkyl, S(=O)₀C₃₋₆-Cycloalkyl und CN mono- oder disubstituiert sind.

35

11. Verbindung nach Anspruch 1, oder ein pharmazeutisch unbedenkliches Salz davon, wobei:

R⁹ und R¹⁰ jeweils unabhängig Folgendes sind:

- 40 (a) Wasserstoff,
(b) -C₁₋₆-Alkyl,
(c) Halogen,
(d) CF₃, und
45 (e) C₁₋₆-Alkoxy,

wobei das Alkyl der Auswahlmöglichkeit (b) gegebenenfalls mit Halogen mono-, di- oder trisubstituiert ist.

12. Verbindung nach Anspruch 11, oder ein pharmazeutisch unbedenkliches Salz davon, wobei:

50 A2 A2a ist und A2a substituiertes Phenyl, substituiertes Pyrimidin, substituiertes Pyrazin oder substituiertes Pyridin ist;

R¹ und R² jeweils unabhängig ausgewählt sind aus:

- 55 (a) Wasserstoff,
(b) Halogen,
(c) CF₃,
(d) C₁₋₆-Alkyl, und
(e) -O-(R⁷),

wobei der Alkylteil der Auswahlmöglichkeit (d) gegebenenfalls mit Halogen substituiert ist;
 R^3 ausgewählt ist aus der Gruppe bestehend aus:

- 5 (a) Wasserstoff,
 (b) $-O-(R^7)$,
 (c) $-N(R^7)S(=O)_2(R^8)$, und
 (d) $-C_{1-6}$ -Alkyl,

10 wobei der Alkylteil der Auswahlmöglichkeit (d) gegebenenfalls mit Halogen oder Hydroxyl substituiert ist;
 R^4 und R^4' jeweils unabhängig ausgewählt sind aus der Gruppe bestehend aus:

- 15 (a) $-C(R^7)(R^8)OH$,
 (b) $-N(R^7)S(=O)_2R^8$,
 (c) $-O-(R^7)$,
 (d) $-C_{1-6}$ -Alkyl- $C(=O)OH$,
 (e) $-C(=O)OH$,
 (f) $-NHS(=O)_2N(R^7)(R^8)$,
 (g) C_{3-6} -Cycloalkyl,
 (h) CF_3 ,
 20 (i) Heterozyklus,
 (j) $-C_{1-6}$ -Alkyl, und
 (k) Halogen,

25 wobei der Alkylteil der Auswahlmöglichkeiten (d) und (j) und der Cycloalkylteil der Auswahlmöglichkeit (g)
 gegebenenfalls mit Halo, CN, Aryl, C_{1-6} -Alkyl, Halo- C_{1-6} -Alkyl, C_{3-6} -Cycloalkyl, C_{1-6} -Alkoxy oder C_{3-6} -Cyclo-
 alkoxy mono- oder disubstituiert sind, und

wobei das Heterozyklus der Auswahlmöglichkeit (i) gegebenenfalls mit Substituenten ausgewählt aus Halogen,
 Hydroxyl, Nitro, C_{1-6} -Alkyl, C_{1-6} -Alkoxy, Halo- C_{1-6} -Alkyl, C_{3-6} -Cycloalkyl, C_{3-6} -Cycloalkoxy, $-NH(C_{1-6}$ -Alkyl),
 $-NH(C_{3-6}$ -Cycloalkyl), $-N(C_{1-6}$ -Alkyl) $_2$, $-N(C_{3-6}$ -Cycloalkyl) $_2$, $-S(=O)_oC_{1-6}$ -Alkyl, $-S(=O)_oC_{3-6}$ -Cycloalkyl und CN
 30 mono- oder disubstituiert ist;

R^5 ausgewählt ist aus der Gruppe bestehend aus:

- 35 (a) Wasserstoff,
 (b) $-C_{1-6}$ -Alkyl, und
 (c) $-C_{1-4}$ -Alkyl- (R^7) ,

wobei der Alkylteil der Auswahlmöglichkeiten (b) und (c) gegebenenfalls mit Halogen oder C_{1-4} -Alkyl substituiert
 ist;

40 R^6 ausgewählt ist aus der Gruppe bestehend aus:

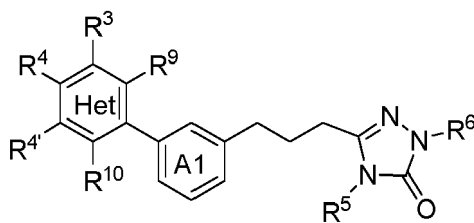
- (a) $-C_{1-6}$ -Alkylaryl,
 (b) $-C_{1-6}$ -Alkylheteroaryl, und
 (c) $-C_{1-6}$ -Alkyl- (R^7) ,

45 wobei der Alkylteil der Auswahlmöglichkeiten (a), (b) und (c) gegebenenfalls mit Halogen oder C_{1-4} -Alkyl sub-
 stituiert ist, und

wobei der Arylteil der Auswahlmöglichkeit (a) und der Heteroarylteil der Auswahlmöglichkeit (b) gegebenenfalls
 mit Substituenten ausgewählt aus Halogen, Nitro, $-CF_3$, C_{1-6} -Alkyl, C_{1-6} -Alkoxy, Halo- C_{1-6} -Alkyl, C_{3-6} -Cycloalkyl,
 C_{3-6} -Cycloalkoxy, Aryl, Heteroaryl, Heterozyklus gegebenenfalls substituiert mit Halogen, $-NH(C_{1-6}$ -Alkyl),
 50 $-NH(C_{3-6}$ -Cycloalkyl), $-N(C_{1-6}$ -Alkyl) $_2$, $-N(C_{3-6}$ -Cycloalkyl) $_2$, $-S(=O)_oC_{1-6}$ -Alkyl, $S(=O)_oC_{3-6}$ -Cycloalkyl und CN
 mono- oder disubstituiert sind.

13. Verbindung nach Anspruch 12 der Formel 1a

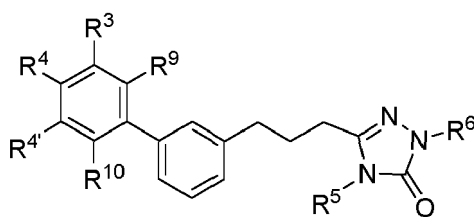
55



1a

oder ein pharmazeutisch unbedenkliches Salz davon.

14. Verbindung nach Anspruch 13 der Formel 1b



1b

oder ein pharmazeutisch unbedenkliches Salz davon.

15. Verbindung nach Anspruch 1, ausgewählt aus der Gruppe bestehend aus:

2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)essigsäure,

2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)essigsäure,

3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-carboxylsäure,

3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-carboxylsäure,

1-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)cyclopropanocarboxylsäure,

2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-yl)essigsäure,

1-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)cyclopropanocarboxylsäure,

1-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-yl)cyclopropanocarboxylsäure,

3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-carboxylsäure,

3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphenyl]-3-carboxylsäure,

2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-propoxy-[1,1'-biphenyl]-3-yl)essigsäure,

N-(6-(3-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)phenyl)pyridin-3-yl)benzolsulfonamid,

2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphenyl]-3-yl)essigsäure,

1-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methyl-[1,1'-biphenyl]-3-yl)cyclopropanocarboxylsäure,

2-(4-(Benzyloxy)-3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)essigsäure,

2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-(cyclopropylmethoxy-

xy)-[1,1'-biphenyl]-3-yl)essigsäure,
 2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-fluor-[1,1'-biphenyl]-
 3-yl)essigsäure,
 2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-6-ethoxy-[1,1'-biphe-
 5 nyl]-3-yl)essigsäure,
 3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-propoxy-[1,1'-biphe-
 nyl]-3-carboxylsäure,
 N-((3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-
 yl)methyl)benzolsulfonamid,
 10 3-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-methoxy-[1,1'-biphe-
 nyl]-3-yl)propansäure,
 2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)-1,1-difluorpropyl)-4-etho-
 xy-[1,1'-biphenyl]-3-yl)essigsäure,
 N-(6-(3-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)-1,1-difluorpropyl)phe-
 15 nyl)pyridin-3-yl)benzolsulfonamid,
 2-(5-(6-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)pyridin-2-yl)-2-me-
 thoxyphenyl)essigsäure,
 3-(3-(3'-(1*H*-Tetrazol-5-yl)-[1,1'-biphenyl]-3-yl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-ethyl-1*H*-1,2,4-triazol-
 5(4*H*)-on,
 20 2-(5-(4-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)pyrimidin-2-yl)-2-
 ethoxyphenyl)essigsäure,
 2-(5-(6-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)pyrimidin-4-yl)-2-
 ethoxyphenyl)essigsäure,
 (3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-methoxy-[1,1'-biphe-
 25 nyl]-4-yl)essigsäure,
 (3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-ethoxy-[1,1'-biphenyl]-
 4-yl)essigsäure,
 (3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-propoxy-[1,1'-biphe-
 nyl]-4-yl)essigsäure,
 30 2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-hydroxy-[1,1'-biphe-
 nyl]-4-yl)essigsäure,
 2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-isopropoxy-[1,1'-bi-
 phenyl]-3-yl)essigsäure, und
 2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-(2-(dimethylami-
 35 no)ethoxy)-[1,1'-biphenyl]-3-yl)essigsäure,

oder ein pharmazeutisch unbedenkliches Salz davon.

16. Verbindung nach Anspruch 1, ausgewählt aus der Gruppe bestehend aus:

40 3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-4-carbo-
 xylsäure;
 2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-ethoxy-[1,1'-biphe-
 nyl]-3-yl)essigsäure;
 45 1-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphenyl]-3-yl)cy-
 clopropanocarboxylsäure;
 2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-propoxy-[1,1'-biphe-
 nyl]-3-yl)essigsäure;
 2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-fluor-[1,1'-biphenyl]-
 50 3-yl)essigsäure,
 2-(3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)-1,1-difluorpropyl)-4-etho-
 xy-[1,1'-biphenyl]-3-yl)essigsäure;
 (3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-ethoxy-[1,1'-biphenyl]-
 4-yl)essigsäure;
 55 (3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-ethyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-propoxy-[1,1'-biphe-
 nyl]-4-yl)essigsäure,

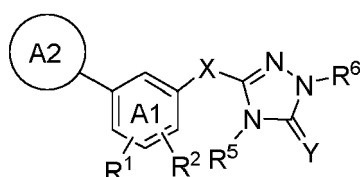
oder ein pharmazeutisch unbedenkliches Salz davon.

17. Pharmazeutische Zusammensetzung, umfassend eine Verbindung nach Anspruch 1, oder ein pharmazeutisch unbedenkliches Salz davon, und einen pharmazeutisch unbedenklichen Träger.

18. Verbindung nach Anspruch 1 zur Verwendung beim Behandeln eines Krebses bei einem Säuger, der durch Verminderung in seinem Stoffwechsel von Fettsäure negativ beeinflusst ist, durch die Verabreichung einer therapeutisch wirksamen Menge einer Verbindung von Anspruch 1, oder einem pharmazeutisch unbedenklichen Salz davon, an den Säuger, der dessen bedarf, wobei der Krebs ausgewählt ist aus Prostata-, Brust-, Eierstock-, Leber-, Nieren-, Darm-, Pankreaskrebs, chronischer lymphozytischer Leukämie beim Menschen und Melanom.

Revendications

1. Composé de la formule I

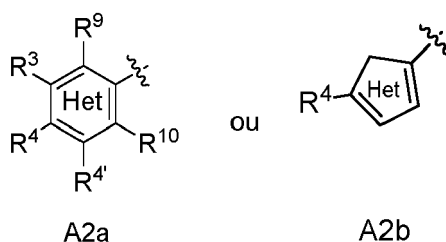


Formule I

ou un sel pharmaceutiquement acceptable de celui-ci, dans lequel :

A1 est phényle ou un cycle hétéroaromatique de 6 chaînons comportant 1, 2 ou 3 N dans le cycle hétéroaromatique ;

A2 est sélectionné entre A2a ou A2b



A2a étant phényle ou un cycle hétéroaromatique de 6 chaînons comportant 1, 2 ou 3 N dans le cycle hétéroaromatique, et

A2b étant un cycle hétéroaromatique de 5 chaînons comportant 1, 2 ou 3 hétéroatomes indépendamment sélectionnés parmi O, S et N ;

X est sélectionné dans le groupe constitué par $-(CH_2)_2-$, $-(CH_2)_3-$, $-(CH_2)_4-$, et $-(CH_2)_m-O-(CH_2)_n-$, éventuellement mono- ou disubstitué par halogène, m et n étant indépendamment 0, 1, 2, 3 ou 4, à condition que m+n soit égal à 2, 3 ou 4 ;

Y est O ;

R¹ et R² sont chacun indépendamment choisis dans le groupe constitué par :

- (a) hydrogène,
- (b) halogène,
- (c) CN,
- (d) CF₃,
- (e) -C₁₋₆alkyle,
- (f) -C₁₋₆alkyl-C(=O)OH,
- (g) -O-(R⁷),
- (h) -S(=O)₀R⁷,
- (i) -N(R⁷)(R⁸),
- (j) -N(R⁷)-C(=O)-(R⁸),

- (k) $-N(R^7)-C(=O)-O-(R^8)$,
 (l) $-N(R^7)S(=O)_2(R^8)$,
 (m) $-C_{3-6}$ cycloalkyle,
 (n) $-C(=O)(R^7)$,
 5 (o) aryle,
 (p) hétéroaryle,
 (q) $-OC(=O)N(R^7)(R^8)$,
 (r) $-S(=O)_2N(R^7)(R^8)$,
 (s) $-C(=O)N(R^7)(R^8)$, et
 10 (t) $-C(R^7)(R^8)OH$,

la partie alkyle des choix (e) et (f), et la partie cycloalkyle du choix (m) étant éventuellement substituées par halogène, et

- l'aryle du choix (o) et l'hétéroaryle du choix (p) étant éventuellement mono- ou disubstitués par des substituants
 15 sélectionnés parmi halogène, nitro, C_{1-6} alkyle, C_{1-6} alcoxy, halo C_{1-6} alkyle, C_{3-6} cycloalkyle, C_{3-6} cycloalcoxy,
 $-NH(C_{1-6}alkyl)$, $-NH(C_{3-6}cycloalkyl)$, $-N(C_{1-6}alkyl)_2$, $-N(C_{3-6}cycloalkyl)_2$, $-S(=O)_oC_{1-6}alkyle$,
 $-S(=O)_oC_{3-6}cycloalkyle$, et CN ;

R^3 est sélectionné dans le groupe constitué de :

- 20 (a) hydrogène,
 (b) halogène,
 (c) CN,
 (d) CF_3 ,
 (e) $-C_{1-6}alkyle$,
 25 (f) $-C_{1-6}alkyl-C(=O)OH$,
 (g) $-O-(R^7)$,
 (h) $-S(=O)_oR^7$,
 (i) $-N(R^7)(R^8)$,
 (j) $-N(R^7)-C(=O)-(R^8)$,
 30 (k) $-N(R^7)-C(=O)-O-(R^8)$,
 (l) $-N(R^7)S(=O)_2(R^8)$,
 (m) $-C_{3-6}cycloalkyle$,
 (n) $-C(=O)(R^7)$,
 (o) aryle,
 35 (p) hétéroaryle,
 (q) $-OC(=O)N(R^7)(R^8)$,
 (r) $-S(=O)_2N(R^7)(R^8)$,
 (s) $-C(=O)N(R^7)(R^8)$,
 (t) $-C(R^7)(R^8)OH$,
 40 (u) $-NHC(=O)-N(R^7)(R^8)$,
 (v) $-C_{3-6}cycloalkyl-COOH$,
 (w) hétérocycle, et
 (x) $-C_{1-6}alkylC(=O)-N(R^7)(R^8)$,

45 la partie alkyle des choix (e), (f) et (x), et la partie cycloalkyle des choix (m) et (v) étant éventuellement substituées par halogène ou hydroxyle, et

- l'aryle du choix (o) et l'hétéroaryle du choix (p) et l'hétérocycle du choix (w) étant éventuellement mono- ou
 disubstitués par des substituants sélectionnés parmi halogène, nitro, $C_{1-6}alkyle$, $C_{1-6}alcoxy$, halo $C_{1-6}alkyle$,
 $C_{3-6}cycloalkyle$, $C_{3-6}cycloalcoxy$, $-NH(C_{1-6}alkyl)$, $-NH(C_{3-6}cycloalkyl)$, $-N(C_{1-6}alkyl)_2$, $-N(C_{3-6}cycloalkyl)_2$,
 50 $-S(=O)_oC_{1-6}alkyle$, $-S(=O)_oC_{3-6}cycloalkyle$, hydroxyle et CN ;

R^4 et R^4' sont chacun indépendamment choisis dans le groupe constitué par :

- (a) hydrogène,
 (b) $-N(R^7)(R^8)$,
 55 (c) $-N(R^7)S(=O)_2R^8$,
 (d) $-N(R^7)-C(=O)R^8$,
 (e) $-N(R^7)C(=O)OR^8$,
 (f) $-S(=O)_oR^7$,

- (g) $-\text{S}(=\text{O})_2\text{N}(\text{R}^7)(\text{R}^8)$,
 (h) $-\text{C}(=\text{O})\text{R}^7$,
 (i) $-\text{C}(=\text{O})\text{N}(\text{R}^7)(\text{R}^8)$,
 - $\text{OC}(=\text{O})\text{N}(\text{R}^7)(\text{R}^8)$,
 5 (k) $-\text{O}-\text{R}^7$,
 (l) $-\text{C}(\text{R}^7)(\text{R}^8)\text{OH}$,
 (m) $-\text{C}_{1-4}\text{alkyl}-\text{C}(=\text{O})\text{NHS}(=\text{O})_2\text{R}^7$,
 (n) $-\text{C}_{1-4}\text{alkyl}-\text{S}(=\text{O})_2\text{NHC}(=\text{O})\text{R}^7$,
 (o) $-\text{C}_{1-4}\text{alkyl}-\text{C}(=\text{O})-\text{N}(\text{R}^7)(\text{R}^8)$,
 10 (p) $-\text{C}_{1-4}\text{alkyl}-\text{N}(\text{R}^7)\text{C}(=\text{O})(\text{R}^8)$,
 (q) $-\text{C}_{1-4}\text{alkyl}-\text{N}(\text{R}^7)\text{S}(=\text{O})_2(\text{R}^8)$,
 (r) $-\text{C}_{1-4}\text{alkyl}-\text{S}(=\text{O})_2\text{N}(\text{R}^7)(\text{R}^8)$,
 (s) $-\text{C}_{1-4}\text{alkyl}-\text{N}(\text{R}^7)\text{C}(=\text{O})\text{O}(\text{R}^8)$,
 (t) $-\text{C}_{1-4}\text{alkyl}-\text{O}-\text{C}(=\text{O})\text{N}(\text{R}^7)(\text{R}^8)$,
 15 (u) $-\text{C}_{1-4}\text{alkyl}-\text{C}(=\text{O})(\text{R}^7)$,
 (v) $-\text{C}_{1-4}\text{alkyl}-\text{C}(\text{R}^7)(\text{R}^8)\text{OH}$,
 (w) $-\text{C}_{1-4}\text{alkyl}-\text{O}(\text{R}^7)$,
 (x) $-\text{C}_{1-6}\text{alkyl}-\text{C}(=\text{O})\text{OH}$,
 (y) $-\text{C}_{2-6}\text{alcényl}-\text{C}(=\text{O})\text{OH}$,
 20 (z) $-\text{C}_{3-6}\text{cycloalkyl}-\text{C}(=\text{O})\text{OH}$,
 (aa) $-\text{C}_{3-6}\text{cycloalkyl}-\text{C}(=\text{O})\text{NHS}(=\text{O})_2\text{R}^7$,
 (bb) $-\text{C}_{3-6}\text{cycloalkyl}-\text{S}(=\text{O})_2\text{NHC}(=\text{O})\text{R}^7$,
 (cc) $-\text{C}_{3-6}\text{cycloalkyl}-\text{C}(=\text{O})-\text{N}(\text{R}^7)(\text{R}^8)$,
 (dd) $-\text{C}_{3-6}\text{cycloalkyl}-\text{N}(\text{R}^7)\text{C}(=\text{O})(\text{R}^8)$,
 25 (ee) $-\text{C}_{3-6}\text{cycloalkyl}-\text{N}(\text{R}^7)\text{S}(=\text{O})_2(\text{R}^8)$,
 (ff) $-\text{C}_{3-6}\text{cycloalkyl}-\text{S}(=\text{O})_2\text{N}(\text{R}^7)(\text{R}^8)$,
 (gg) $-\text{C}_{3-6}\text{cycloalkyl}-\text{N}(\text{R}^7)\text{C}(=\text{O})\text{O}(\text{R}^8)$,
 (hh) $-\text{C}_{3-6}\text{cycloalkyl}-\text{O}-\text{C}(=\text{O})\text{N}(\text{R}^7)(\text{R}^8)$,
 (ii) $-\text{C}_{3-6}\text{cycloalkyl}-\text{C}(=\text{O})(\text{R}^7)$,
 30 (jj) $-\text{C}_{3-6}\text{cycloalkyl}-\text{C}(\text{R}^7)(\text{R}^8)\text{OH}$,
 (kk) $-\text{C}_{3-6}\text{cycloalkyl}-\text{O}(\text{R}^7)$,
 (ll) $-\text{C}(=\text{O})\text{OH}$,
 (mm) aryle,
 (nn) hétéroaryle,
 35 (oo) $-\text{C}(=\text{O})\text{N}(\text{R}^7)\text{S}(=\text{O})_2(\text{R}^8)$,
 (pp) $-\text{S}(=\text{O})_2\text{N}(\text{R}^7)\text{C}(=\text{O})(\text{R}^8)$,
 (qq) $-\text{NHS}(=\text{O})_2\text{N}(\text{R}^7)(\text{R}^8)$,
 (rr) $-\text{NHC}(=\text{O})\text{N}(\text{R}^7)(\text{R}^8)$,
 (ss) $-\text{CH}(\text{OH})-\text{C}(=\text{O})-\text{N}(\text{R}^7)(\text{R}^8)$,
 40 (tt) $-\text{C}(=\text{O})-\text{C}(=\text{O})-\text{N}(\text{R}^7)(\text{R}^8)$,
 (uu) $-\text{C}_{3-6}\text{cycloalkyle}$,
 (vv) $-\text{CF}_3$,
 (ww) $-\text{C}_{1-6}\text{alkyl N}(\text{R}^7)(\text{R}^8)$,
 (xx) hétérocycle,
 45 (yy) $-\text{C}_{1-6}\text{alkyle}$,
 (zz) halogène, et
 (aaa) $-\text{O}-\text{C}_{1-6}\text{alkyl}-\text{N}(\text{R}^7)(\text{R}^8)$,

la partie alkyle des choix (m), (n), (o), (p), (q), (r), (s), (t), (u), (v), (w), (x), (ww), (yy) et (aaa), la partie alcényle
 50 du choix (y), et la partie cycloalkyle des choix (z), (aa), (bb), (cc), (dd), (ee), (ff), (gg), (hh), (ii), (jj), (kk) et (uu),
 étant éventuellement mono- ou disubstitués par halogène, CN, aryle, C_{1-6} alkyle, halo C_{1-6} alkyle, C_{3-6} cycloalkyle,
 C_{1-6} alcoxy, or C_{3-6} cycloalcoxy, et
 l'aryle du choix (mm) et l'hétéroaryle du choix (nn) et l'hétérocycle du choix (xx) étant éventuellement mono-
 55 ou disubstitués par des substituants sélectionnés parmi halogène, nitro, C_{1-6} alkyle, C_{1-6} alcoxy, halo C_{1-6} alkyle,
 C_{3-6} cycloalkyle, C_{3-6} cycloalcoxy, $-\text{NH}(\text{C}_{1-6}\text{alkyl})$, $-\text{NH}(\text{C}_{3-6}\text{cycloalkyl})$, $-\text{N}(\text{C}_{1-6}\text{alkyl})_2$, $-\text{N}(\text{C}_{3-6}\text{cycloalkyl})_2$,
 $-\text{S}(=\text{O})_o\text{C}_{1-6}\text{alkyle}$, $-\text{S}(=\text{O})_o\text{C}_{3-6}\text{cycloalkyle}$, hydroxyle et CN, ou
 R^3 et R^4 ou R^4 et $\text{R}^{4'}$ étant joints pour former un cycle hétérocyclique de 5 ou 6 chaînons, ledit cycle ayant un
 hétéroatome sélectionné entre O et N, ledit cycle étant éventuellement substitué par $-\text{C}(=\text{O})\text{OH}$, ou $-\text{C}_{1-6}\text{alkyl}-$

C(=O)OH, à condition qu'au moins un de R³, R⁴ et R⁴ soit autre que l'hydrogène ;
R⁵ est sélectionné dans le groupe constitué de :

- 5 (a) hydrogène,
(b) -C₁₋₆alkyle,
(c) -C₁₋₄alkyl(R⁷),
(d) aryle,
(e) hétéroaryle,
10 (f) -C₃₋₆cycloalkyle,
(g) -C₃₋₆cycloalkyl(R⁷),
(h) -C₃₋₆cycloalkyl-O(R⁷),
(i) -C₁₋₄alkyl-C₃₋₆cycloalkyle,
(j) C₁₋₆alcoxy, et
15 (k) C₃₋₆cycloalcoxy,

la partie alkyle des choix (b), (c), (i) et (j), et la partie cycloalkyle des choix (f), (g), (h), (i) et (k) étant éventuellement substituées par halogène ou C₁₋₄alkyle, et

l'aryle du choix (d) et l'hétéroaryle du choix (e) étant éventuellement mono- ou disubstitués par des substituants sélectionnés parmi halogène, nitro, C₁₋₆alkyle, CF₃, C₁₋₆alcoxy, halo C₁₋₆ alkyle, aryle, hétéroaryle,
20 C₃₋₆cycloalkyle, C₃₋₆cycloalcoxy, et CN ;
R⁶ est sélectionné dans le groupe constitué de :

- 25 (a) hydrogène,
(b) -C₁₋₆alkyle,
(c) -C₁₋₆alkylaryle,
(d) -C₁₋₆alkylhétéroaryle,
(e) -S(=O)₀C₁₋₆alkyl(R⁷),
(f) -C(=O)C₁₋₆alkyl(R⁷),
30 (g) -C₃₋₆cycloalkyle,
(h) aryle,
(i) hétéroaryle,
(j) -C(=O)C₃₋₆cycloalkyl(R⁷),
(k) -S(=O)₀C₃₋₆cycloalkyl(R⁷), et
35 (l) -C₁₋₆alkyl(R⁷),

la partie alkyle des choix (b), (c), (d), (e), (f) et (l), et la partie cycloalkyle des choix (g), (j) et (k) étant éventuellement substituées par halogène ou C₁₋₄alkyle, et

la partie aryle des choix (c) et (h), et la partie hétéroaryle des choix (d) et (i), étant éventuellement mono- ou disubstituées par des substituants sélectionnés parmi halogène, nitro, - CF₃, C₁₋₆alkyle, C₁₋₆alcoxy, halo C₁₋₆alkyle, C₃₋₆cycloalkyle, C₃₋₆cycloalcoxy, aryle, hétéroaryle, hétérocycle éventuellement substitué par halogène, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆ alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₆alkyle, S(=O)₀C₃₋₆cycloalkyle, et CN ;
40 R⁷ et R⁸ sont chacun indépendamment choisis parmi :

- 45 (a) hydrogène,
(b) -C₁₋₆alkyle,
(c) -C₃₋₆cycloalkyle,
(d) -aryle,
(e) -hétéroaryle,
50 (f) -C₁₋₆alkylaryle,
(g) -C₁₋₆alkylhétéroaryle,
(h) -C(=O)C₁₋₆alkyle,
(i) -S(=O)₀-aryle,
(j) -C₁₋₆alkyle-C₃₋₆cycloalkyle, et
55 (k) CF₃,

l'alkyle des choix (b), (f), (g), (h) et (j), et le cycloalkyle des choix (c) et (j), étant éventuellement mono-, di- ou trisubstitués par halogène, et

EP 2 935 228 B9

la partie aryle des choix (d), (f) et (i), et la partie hétéroaryle des choix (e) et (g), étant chacune éventuellement mono- ou disubstituées par des substituants sélectionnés parmi halogène, -C(=O)OH, -CF₃, -NHC(=O)CH₃, nitro, C₁₋₆alkyle, C₁₋₆alcoxy, halo C₁₋₆alkyle, C₃₋₆cycloalkyle, C₃₋₆ cycloalcoxy, -NH(C₁₋₃alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₃alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₄alkyle, S(=O)₀C₃₋₆cycloalkyle, aryle, hétéroaryle, hydroxyle, et CN ;

R⁹ et R¹⁰ sont chacun indépendamment choisis parmi :

- (a) hydrogène,
- (b) -C₁₋₆alkyle,
- (c) -C₃₋₆cycloalkyle,
- (d) halogène,
- (e) -OC₃₋₆cycloalkyle,
- (f) CF₃, et
- (g) C₁₋₆alcoxy,

la partie alkyle du choix (b) et la partie cycloalkyle des choix (c) et (e), étant chacune éventuellement mono-, di- or trisubstituées par halogène; et chaque o étant indépendamment 0, 1 ou 2.

2. Composé selon la revendication 1, ou sel pharmaceutiquement acceptable de celui-ci, dans lequel :

X est sélectionné entre -CH₂CH₂CH₂-, ou -CF₂CH₂CH₂-.

3. Composé selon la revendication 1, ou sel pharmaceutiquement acceptable de celui-ci, dans lequel :

A₂ est A_{2a} et A_{2a} est phényle substitué, pyrimidine substituée, pyrazine substituée, ou pyridine substituée.

4. Composé selon la revendication 1, ou sel pharmaceutiquement acceptable de celui-ci, dans lequel :

R¹ et R² sont chacun indépendamment choisis dans le groupe constitué par :

- (a) hydrogène,
- (b) halogène,
- (c) CN,
- (d) CF₃,
- (e) -C₁₋₆alkyle,
- (f) -O-(R⁷),
- (g) -C₃₋₆cycloalkyle, et
- (h) -N(R⁷)(R⁸),

la partie alkyle du choix (e) et la partie cycloalkyle du choix (g) étant éventuellement substituées par halogène.

5. Composé selon la revendication 1, ou sel pharmaceutiquement acceptable de celui-ci, dans lequel :

R¹ et R² sont chacun hydrogène.

6. Composé selon la revendication 1, ou sel pharmaceutiquement acceptable de celui-ci, dans lequel :

R³ est sélectionné dans le groupe constitué de :

- (a) hydrogène,
- (b) -O-(R⁷),
- (c) -N(R⁷)S(=O)₂(R⁸), et
- (d) -C₁₋₆alkyle,

la partie alkyle du choix (d) étant éventuellement substituée par halogène ou hydroxyle.

7. Composé selon la revendication 1, ou sel pharmaceutiquement acceptable de celui-ci, dans lequel :

R⁴ et R^{4'} sont chacun indépendamment choisis dans le groupe constitué par :

- 5 (a) hydrogène,
 (b) -N(R⁷)S(=O)₂R⁸,
 (c) -N(R⁷)-C(=O)R⁸,
 (d) -S(=O)_oR⁷,
 (e) -S(=O)₂N(R⁷)(R⁸),
 (f) -C(=O)N(R⁷)(R⁸),
 (g) -O-(R⁷),
 10 (h) -C(R⁷)(R⁸)OH,
 (i) -C₁₋₄alkyl-C(=O)NHS(=O)₂R⁷,
 (j) -C₁₋₄alkyl-S(=O)₂NHC(=O)R⁷,
 (k) -C₁₋₄alkyl-C(=O)-N(R⁷)(R⁸),
 (l) -C₁₋₄alkyl-N(R⁷)C(=O)(R⁸),
 15 (m) -C₁₋₄alkyl-N(R⁷)S(=O)₂(R⁸),
 (n) -C₁₋₄alkyl-S(=O)₂N(R⁷)(R⁸),
 (o) -C₁₋₄alkyl-C(R⁷)(R⁸)OH,
 (p) -C₁₋₄alkyl-O(R⁷),
 (q) -C₁₋₆alkyl-C(=O)OH,
 20 (r) -C₂₋₆alcényl-C(=O)OH,
 (s) -C₃₋₆cycloalkyl-C(=O)OH,
 (t) -C₃₋₆cycloalkyl-C(=O)NHS(=O)₂R⁷,
 (u) -C₃₋₆cycloalkyl-S(=O)₂NHC(=O)R⁷,
 (v) -C₃₋₆cycloalkyl-C(=O)-N(R⁷)(R⁸),
 25 (w) -C₃₋₆cycloalkyl-N(R⁷)S(=O)₂(R⁸),
 (x) -C₃₋₆cycloalkyl-S(=O)₂N(R⁷)(R⁸),
 (y) -C₃₋₆cycloalkyl-N(R⁷)C(=O)O(R⁸),
 (z) -C₃₋₆cycloalkyl-C(R⁷)(R⁸)OH,
 (aa) -C₃₋₆cycloalkyl-O(R⁷),
 30 (bb) -C(=O)OH,
 (cc) aryle,
 (dd) hétéroaryle,
 (ee) -C(=O)N(R⁷)S(=O)₂(R⁸),
 (ff) -S(=O)₂N(R⁷)C(=O)(R⁸),
 35 (gg) -NHS(=O)₂N(R⁷)(R⁸),
 (hh) -NHC(=O)N(R⁷)(R⁸),
 (ii) C₃₋₆cycloalkyle,
 (jj) CF₃,
 (kk) hétérocycle,
 40 (ll) -C₁₋₆alkyle, et
 (mm) halogène,

la partie alkyle des choix (i), (j), (k), (l), (m), (n), (o), (p), (q), et (ll), la partie alcényle du choix (r), et la partie cycloalkyle des choix (s), (t), (u), (v), (w), (x), (y), (z), et (aa), étant éventuellement mono- ou disubstitués par halogène, CN, aryle, C₁₋₆alkyle, halo C₁₋₆alkyle, C₃₋₆cycloalkyle, C₁₋₆alcoxy, or C₃₋₆ cycloalcoxy, et l'aryle du choix (cc) et l'hétéroaryle du choix (dd) et l'hétérocycle du choix (kk) étant éventuellement mono- ou disubstitués par des substituants sélectionnés parmi halogène, hydroxyle, nitro, C₁₋₆alkyle, C₁₋₆alcoxy, halo C₁₋₆alkyle, C₃₋₆cycloalkyle, C₃₋₆cycloalcoxy, -NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)_oC₁₋₆alkyle, -S(=O)_oC₃₋₆cycloalkyle, et CN.

8. Composé selon la revendication 1, ou sel pharmaceutiquement acceptable de celui-ci, dans lequel :

R⁴ et R^{4'} sont chacun indépendamment choisis dans le groupe constitué par :

- 55 (a) -C(R⁷)(R⁸)OH,
 (b) -N(R⁷)S(=O)₂R⁸,
 (c) -O-(R⁷),
 (d) -C₁₋₆alkyl-C(=O)OH,

- (e) $-C(=O)OH$,
 (f) $-NHS(=O)_2N(R^7)(R^8)$,
 (g) $-C_{3-6}cycloalkyle$,
 (h) CF_3 ,
 (i) hétérocycle,
 (j) $-C_{1-6}alkyle$, et
 (k) halogène,

la partie alkyle des choix (d) et (j), et la partie cycloalkyle du choix (g) étant éventuellement mono- ou disubstituées par halogène, CN, aryle, $C_{1-6}alkyle$, halo $C_{1-6}alkyle$, $C_{3-6}cycloalkyle$, $C_{1-6}alcoxy$, ou $C_{3-6}cycloalcoxy$, et l'hétérocycle du choix (i) étant éventuellement mono- ou disubstitué par des substituants sélectionnés parmi halogène, hydroxyle, nitro, $C_{1-6}alkyle$, $C_{1-6}alcoxy$, halo $C_{1-6}alkyle$, $C_{3-6}cycloalkyle$, $C_{3-6}cycloalcoxy$, $-NH(C_{1-6}alkyl)$, $-NH(C_{3-6}cycloalkyl)$, $-N(C_{1-6}alkyl)_2$, $-N(C_{3-6}cycloalkyl)_2$, $-S(=O)_oC_{1-6}alkyle$, $-S(=O)_oC_{3-6}cycloalkyle$, et CN.

9. Composé selon la revendication 1, ou sel pharmaceutiquement acceptable de celui-ci, dans lequel :

R^5 est sélectionné dans le groupe constitué de :

- (a) hydrogène,
 (b) $-C_{1-6}alkyle$, et
 (c) $-C_{1-4}alkyl(R^7)$,

la partie alkyle des choix (b) et (c) étant éventuellement substituée par halogène ou $C_{1-4}alkyle$.

10. Composé selon la revendication 1, ou sel pharmaceutiquement acceptable de celui-ci, dans lequel :

R^6 est sélectionné dans le groupe constitué de :

- (a) $-C_{1-6}alkylaryle$,
 (b) $-C_{1-6}alkylhétéroaryle$, et
 (c) $-C_{1-6}alkyl(R^7)$,

la partie alkyle des choix (a), (b) et (c) étant éventuellement substituée par halogène ou $C_{1-4}alkyle$, et la partie aryle du choix (a), et la partie hétéroaryle du choix (b), étant éventuellement mono- ou disubstituées par des substituants sélectionnés parmi halogène, nitro, $-CF_3$, $C_{1-6}alkyle$, $C_{1-6}alcoxy$, halo $C_{1-6}alkyle$, $C_{3-6}cycloalkyle$, $C_{3-6}cycloalcoxy$, aryle, hétéroaryle, hétérocycle éventuellement substitué par halogène, $-NH(C_{1-6}alkyl)$, $-NH(C_{3-6}cycloalkyl)$, $-N(C_{1-6}alkyl)_2$, $-N(C_{3-6}cycloalkyle)_2$, $-S(=O)_oC_{1-6}alkyle$, $S(=O)_oC_{3-6}cycloalkyle$, et CN.

11. Composé selon la revendication 1, ou sel pharmaceutiquement acceptable de celui-ci, dans lequel :

R^9 et R^{10} sont chacun indépendamment

- (a) hydrogène,
 (b) $-C_{1-6}alkyle$,
 (c) halogène,
 (d) CF_3 , et
 (e) $C_{1-6}alcoxy$,

l'alkyle du choix (b) étant éventuellement mono-, di- or trisubstitué par halogène.

12. Composé selon la revendication 11, ou sel pharmaceutiquement acceptable de celui-ci, dans lequel :

A_2 est A_{2a} , et A_{2a} est phényle substitué, pyrimidine substituée, pyrazine substituée, ou pyridine substituée ; R^1 et R^2 sont chacun indépendamment choisis parmi :

- (a) hydrogène,

- (b) halogène,
- (c) CF₃,
- (d) C₁₋₆alkyle, et
- (e) -O-(R⁷),

5

la partie alkyle du choix (d) étant éventuellement substituée par halogène ;
R³ est sélectionné dans le groupe constitué de :

- (a) hydrogène,
- (b) -O-(R⁷),
- (c) -N(R⁷)S(=O)₂(R⁸), et
- (d) -C₁₋₆alkyle,

10

la partie alkyle du choix (d) étant éventuellement substituée par halogène ou hydroxyle ;
R⁴ et R^{4'} sont chacun indépendamment choisis dans le groupe constitué par :

15

- (a) -C(R⁷)(R⁸)OH,
- (b) -N(R⁷)S(=O)₂R⁸,
- (c) -O-(R⁷),
- (d) -C₁₋₆alkyl-C(=O)OH,
- (e) -C(=O)OH,
- (f) -NHS(=O)₂N(R⁷)(R⁸),
- (g) C₃₋₆cycloalkyle,
- (h) CF₃,
- (i) hétérocycle,
- (j) -C₁₋₆alkyle, et
- (k) halogène,

20

25

la partie alkyle des choix (d) et (j), et la partie cycloalkyle du choix (g) étant éventuellement mono- ou disubstituées
par halo, CN, aryle, C₁₋₆alkyle, halo C₁₋₆alkyle, C₃₋₆ cycloalkyle, C₁₋₆alcoxy, ou C₃₋₆cycloalcoxy, et
l'hétéroaryle du choix (i) étant éventuellement mono- ou disubstitué par des substituants sélectionnés parmi
halogène, hydroxyle, nitro, C₁₋₆alkyle, C₁₋₆alcoxy, halo C₁₋₆alkyle, C₃₋₆cycloalkyle, C₃₋₆cycloalcoxy,
-NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆alkyl)₂, -N(C₃₋₆ cycloalkyl)₂, -S(=O)₀C₁₋₆alkyle,
-S(=O)₀C₃₋₆cycloalkyle, et CN ;

30

35

R⁵ est sélectionné dans le groupe constitué de :

- (a) hydrogène,
- (b) -C₁₋₆alkyle, et
- (c) -C₁₋₄alkyl(R⁷),

40

la partie alkyle des choix (b) et (c) étant éventuellement substituée par halogène ou C₁₋₄alkyle ;
R⁶ est sélectionné dans le groupe constitué de :

- (a) -C₁₋₆alkylaryle,
- (b) -C₁₋₆alkylhétéroaryle, et
- (c) -C₁₋₆alkyl(R⁷),

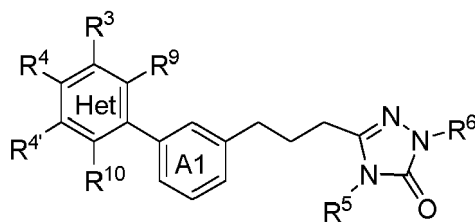
45

la partie alkyle des choix (a), (b) et (c) étant éventuellement substituée par halogène ou C₁₋₄alkyle, et
la partie aryle du choix (a), et la partie hétéroaryle du choix (b), étant éventuellement mono- ou disubstituées
par des substituants sélectionnés parmi halogène, nitro, -CF₃, C₁₋₆alkyle, C₁₋₆alcoxy, halo C₁₋₆alkyle,
C₃₋₆cycloalkyle, C₃₋₆cycloalcoxy, aryle, hétéroaryle, hétérocycle éventuellement substitué par halogène,
-NH(C₁₋₆alkyl), -NH(C₃₋₆cycloalkyl), -N(C₁₋₆ alkyl)₂, -N(C₃₋₆cycloalkyl)₂, -S(=O)₀C₁₋₆alkyle,
S(=O)₀C₃₋₆cycloalkyle, et CN.

50

55

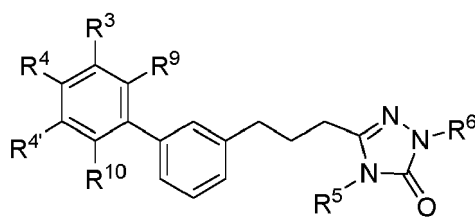
13. Composé selon la revendication 12 de la formule 1a



1a

ou un sel pharmaceutiquement acceptable de celui-ci.

14. Composé selon la revendication 13 de la formule 1b



1b

ou un sel pharmaceutiquement acceptable de celui-ci

15. Composé selon la revendication 1, sélectionné dans le groupe constitué de :

acide 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-[1,1'-biphényl]-3-yl)acétique,

acide 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-[1,1'-biphényl]-4-yl)acétique,

acide 3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-[1,1'-biphényl]-3-carboxylique,

acide 3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-[1,1'-biphényl]-4-carboxylique,

acide 1-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-éthoxy-[1,1'-biphényl]-3-yl)cyclopropanecarboxylique,

acide 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-éthoxy-[1,1'-biphényl]-3-yl)acétique,

acide 1-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-[1,1'-biphényl]-3-yl)cyclopropanecarboxylique,

acide 1-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-[1,1'-biphényl]-4-yl)cyclopropanecarboxylique,

acide 3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-méthoxy-[1,1'-biphényl]-3-carboxylique,

acide 3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-éthoxy-[1,1'-biphényl]-3-carboxylique,

acide 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-propoxy-[1,1'-biphényl]-3-yl)acétique,

N-(6-(3-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)phényl)pyridin-3-yl)benzènesulfonamide,

acide 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-méthoxy-[1,1'-biphényl]-3-yl)acétique

acide 1-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-méthyl-[1,1'-biphényl]-3-yl)cyclopropanecarboxylique,

acide 2-(4-(benzyloxy)-3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-[1,1'-biphényl]-3-yl)acétique.

acide 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1H-1,2,4-triazol-3-yl)propyl)-4-(cyclopropyl-

méthoxy)-[1,1'-biphényl]-3-yl)acétique,
 acide 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-fluoro-[1,1'-biphényl]-3-yl)acétique,
 acide 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-6-éthoxy-[1,1'-biphényl]-3-yl)acétique,
 5 acide 3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-propoxy-[1,1'-biphényl]-3-carboxylique,
 N-((3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphényl]-3-yl)méthyl)benzènesulfonamide,
 10 acide 3-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-méthoxy-[1,1'-biphényl]-3-yl)propanoïque,
 acide 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)-1,1-difluoropropyl)-4-éthoxy-[1,1'-biphényl]-3-yl)acétique,
 N-(6-(3-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)-1,1-difluoropropyl)phényl)pyridin-3-yl)benzènesulfonamide,
 15 acide 2-(5-(6-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)pyridin-2-yl)-2-méthoxyphényl)acétique,
 3-(3-(3'-(1*H*-tétrazol-5-yl)-[1,1'-biphényl]-3-yl)propyl)-1-(4-(*tert*-butyl)benzyl)-4-éthyl-1*H*-1,2,4-triazol-5(4*H*)-one,
 20 acide 2-(5-(4-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)pyrimidin-2-yl)-2-éthoxyphényl)acétique,
 acide 2-(5-(6-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)pyrimidin-4-yl)-2-éthoxyphényl)acétique,
 acide (3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-méthoxy-[1,1'-biphényl]-4-yl)acétique,
 25 acide (3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-éthoxy-[1,1'-biphényl]-4-yl)acétique,
 acide (3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-propoxy-[1,1'-biphényl]-4-yl)acétique,
 30 acide 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-hydroxy-[1,1'-biphényl]-4-yl)acétique,
 acide 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-isopropoxy-[1,1'-biphényl]-3-yl)acétique, et
 acide 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-(2-(diméthylamino)éthoxy)-[1,1'-biphényl]-3-yl)acétique,
 35

ou un sel pharmaceutiquement acceptable de celui-ci.

16. Composé selon la revendication 1, sélectionné dans le groupe constitué de :

40 acide 3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphényl]-4-carboxylique ;
 acide 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-éthoxy-[1,1'-biphényl]-3-yl)acétique ;
 45 acide 1-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-[1,1'-biphényl]-3-yl)cyclopropanecarboxylique ;
 acide 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-propoxy-[1,1'-biphényl]-3-yl)acétique ;
 acide 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-4-fluoro-[1,1'-biphényl]-3-yl)acétique ;
 50 acide 2-(3'-(3-(1-(4-(*tert*-butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)-1,1-difluoropropyl)-4-éthoxy-[1,1'-biphényl]-3-yl)acétique ;
 acide (3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-éthoxy-[1,1'-biphényl]-4-yl)acétique ;
 55 acide (3'-(3-(1-(4-(*tert*-Butyl)benzyl)-4-éthyl-5-oxo-4,5-dihydro-1*H*-1,2,4-triazol-3-yl)propyl)-3-propoxy-[1,1'-biphényl]-4-yl)acétique,

ou un sel pharmaceutiquement acceptable de celui-ci.

17. Composition pharmaceutique comprenant un composé selon la revendication 1, ou un sel pharmaceutiquement acceptable de celui-ci, et un support pharmaceutiquement acceptable.

5

18. Composé selon la revendication 1 pour utilisation dans le traitement d'un cancer chez un mammifère négativement affecté par une diminution dans son métabolisme des acides gras, par l'administration d'une quantité thérapeutiquement efficace d'un composé selon la revendication 1, ou d'un sel pharmaceutiquement acceptable de celui-ci, au mammifère qui en a besoin, ledit cancer étant sélectionné parmi le cancer de la prostate, du sein, de l'ovaire, du foie, du rein, du colon, du pancréas, la leucémie lymphoïde chronique chez les humains et le mélanome.

10

15

20

25

30

35

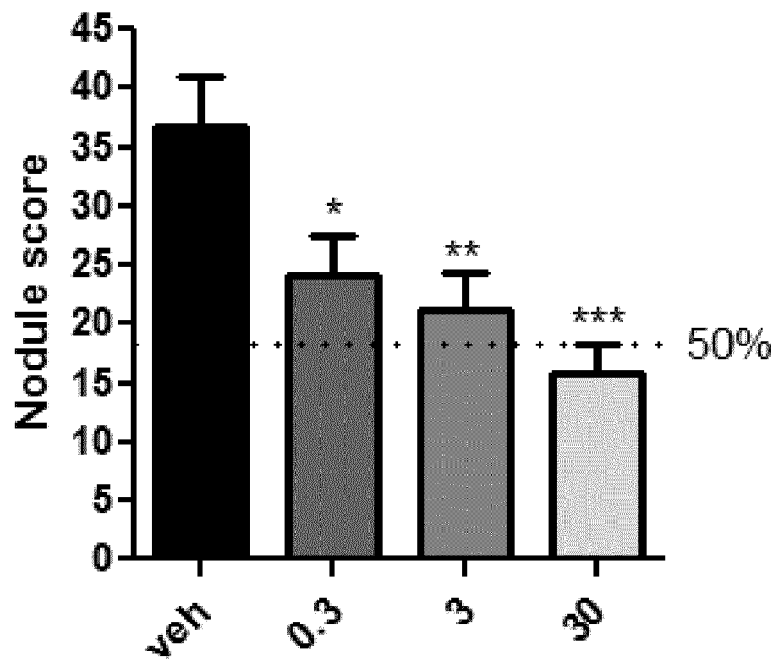
40

45

50

55

Figure 1



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.

Patent documents cited in the description

- WO 2012027482 A2 [0008]

Non-patent literature cited in the description

- **WANG et al.** Small mitochondrial-targeting molecules as anti-cancer agents. *Mol. Aspects Med.*, February 2010, vol. 31 (1), 75-92 [0002]
- **SAMUDIO et al.** *J. Clin. Invest.*, 2010, vol. 120, 142-156 [0003] [0004]
- **PYPER et al.** *Nucl. Recept. Signal.*, 2010, vol. 8, e002 [0004]
- **LINHER-MELVILLE et al.** *BMC*, 2011, vol. 4 (11), 56 [0004]
- **NIEMAN et al.** *Nat Med.*, 30 October 2011, vol. 17 (11), 1498-503 [0004]
- **LIU.** *Prostate Cancer Prostatic Dis.*, 2006, vol. 9 (3), 230-4 [0004]
- **HOLLA et al.** *JCB*, 2011, vol. 286 (34), 30003-30009 [0004]
- **KHASAWNEH et al.** *PNAS*, 2009, vol. 106 (9), 3354-3359 [0004]
- **ZAUGG et al.** *Genes and Development*, 2011, vol. 25, 1041-1051 [0004]
- **XU et al.** *Nature*, 2002, vol. 415, 813-817 [0005]
- **KEHRER et al.** *Biochem. J.*, 2001, vol. 356, 899-906 [0005]
- *Nature*, 19 June 2008, vol. 453 (7198), 1072-1078 [0007]
- *J. Clin. Invest.*, 2012, vol. 122 (9), 3088-3100 [0007]
- **RAKIC et al.** *Chem. & Biol.*, January 2006, vol. 13, 23-30 [0008]
- **CAPEAU et al.** *PPAR Research*, vol. 2009, 2 [0008]
- Remington's Pharmaceutical Sciences. Mack Publishing Company, 1985, 1418 [0063]
- *Journal of Pharmaceutical Science*, 1977, vol. 66, 2 [0063]
- Pharmaceutical Salts: Properties, Selection, and Use A Handbook. Verlag Helvetica Chimica Acta [0063]
- **FREIREICH et al.** *Cancer Chemother. Rep.*, 1966, vol. 50, 219 [0072]
- Scientific Tables. Geigy Pharmaceuticals. Ardsley, 1970, 537 [0072]
- **BRADEN, T. M. et al.** *Org. Process Res. Dev.*, 2007, vol. 11, 431-440 [0131]