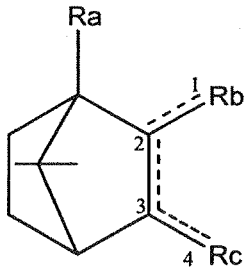
CLAIMS:

1. A compound of general formula (I):



(I)

wherein

1 ------ 2, 2 ------ 3, 3 ------ 4 are each independently a single or double bond;

R_a is selected from an straight or branched C_1-C_5 alkyl, straight or branched C_2-C_5 alkenyl, straight or branched C_2-C_5 alkynyl and -C(=O)R_d, each optionally substituted by at least one group selected from –OH, -COOH, -NH_2, C_1-C_5 amine, halogen, phenyl, heteroaryl; wherein

R_d is selected from the group consisting of -H, –OH, straight or branched C_1-C_5 alkyl, straight or branched C_2-C_5 alkenyl, straight or branched C_2-C_5 alkynyl, straight or branched C_1-C_5 alkoxy, -NR_eR_f;

R_e and R_f are each independently selected from H and straight or branched C_1-C_5 alkyl; and

R_b and R_c are each independently selected from -H, -OH, =O, =CR_gR_h, =NR_i, =S, -C_5-C_{15} aryl ring substituted by at least one group selected from a straight or branched C_1-C_{12} alkyl, C_2-C_{12} alkenyl, C_2-C_{12} alkynyl, C_1-C_{12} alkoxy, amine, C_1-C_{12} alkoxycarboxylic acid, -OH, –OC(=O)R_p and –C(=O)R_q; wherein

R_g, R_h, R_i, R_p and R_q are each independently selected from H, straight or branched C_1-C_5 alkyl, straight or branched C_1-C_5 alkoxy and –NH_2; and

provided that at least one of R_b and R_c is said substituted -C_5-C_{15} aryl ring.

2. A compound according to claim 1, wherein 2 ------ 3 is a double bond.

3. A compound according to claim 1, wherein 2 ------ 3 is a single bond.

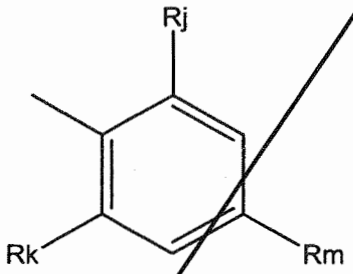
4. A compound according to claim 3, wherein 1 ------ 2 is a double bond.

5. A compound according to claim 3, wherein 3 ------ 4 is a double bond.

6. A compound according to claim 3, wherein ^{1}======^{2} is a single bond and ^{3}======^{4} is a single bond.

7. A compound according to claims 2 or 3, wherein at least one of R_b and R_c is a phenyl ring substituted by at least two substituent selected from a straight or branched C_1-C_{12} alkyl, C_2-C_{12} alkenyl, C_2-C_{12} alkynyl, C_1-C_{12} alkoxy, -C(=O)OH, -C(=O)NH_2, -C(=O)(C_1-C_5alkyl), -C(=O)(C_1-C_5alkoxy), -OC(=O)H, -OC(=O)NH_2, -OC(=O)(C_1-C_5alkyl).

8. A compound according to claim 7, wherein at least one of R_b and R_c is a group of formula (II):



(II)

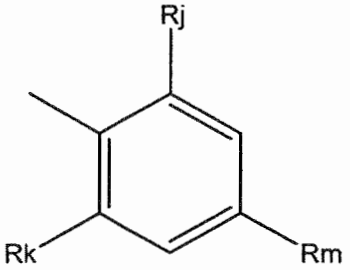
wherein

R_j and R_k are each independently selected from H, and –OR_n wherein R_n is selected from H, -$COOR_t$, a straight or branched C_1-C_5 alkyl optionally substituted by at least one group selected from –COOH, -NH_2 provided that at least one of R_j and R_k is different than H;

R_m is selected from a straight or branched C_6-C_{12} alkyl, a straight or branched C_5-C_9 alkoxy, a straight or branched C_1-C_7 ether; each optionally substituted by at least one group selected from –COOH, -NH_2; and

R_t is selected from H, C_1-C_5 alkyl and -NH_2.

9. A compound according to claim 2, wherein at least one of R_b and R_c is a group of formula (II):



(II)

wherein R_j and R_k are each independently H or $-OR_n$ wherein R_n is selected from H, $-COOR_t$, a straight or branched C_1-C_5 alkyl optionally substituted by at least one group selected from –COOH, $-NH_2$, provided that at least one of R_j and R_k is different than H; and R_m is a straight or branched C_6-C_{12} alkyl and R_t is selected from H, C_1-C_5 alkyl and $-NH_2$.

10. A compound according to any one of the preceding claims, wherein R_a is selected from a straight or branched C_1-C_5 alkyl and $-C(=O)R_d$, each optionally substituted by at least one group selected from –OH, -COOH, $-NH_2$, C_1-C_5 amine, halogen, phenyl, heteroaryl; and R_d is as defined herein above.

11. A compound according to claim 3, wherein R_b and R_c are each independently selected from -H, -OH, =O, $=CR_gR_h$, $=NR_i$, =S, $-C_5$-C_{15} aryl ring substituted by at least two substituent selected from a straight or branched C_1-C_{12} alkyl, C_2-C_{12} alkenyl, C_2-C_{12} alkynyl, C_1-C_{12} alkoxy, amine, $-OC(=O)R_p$ and $-C(=O)R_q$; wherein R_g, R_h, R_i, R_p and R_q are each independently selected from H, straight or branched C_1-C_5 alkyl, straight or branched C_1-C_5 alkoxy and $-NH_2$; and provided that at least one of R_b and R_c is said substituted $-C_5$-C_{15} aryl ring.

12. A compound according to claim 11, wherein R_b is =O.

13. A compound according o claim 11, wherein R_c is =O.

14. A compound according to claim 1, being selected from the following list:

- methyl-2-(2,6-dimethoxy-4-(2-methyloctan-2-yl)phenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-ene-1-carboxylate;
- methyl-2-(2,6-dimethoxy-4-pentylphenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-ene-1-carboxylate;
- 2-(2,6-dimethoxy-4-(2-methyloctan-2-yl)phenyl)-1,7,7-trimethylbicyclo[2.2.1]hept-2-ene;
- (2-(2,6-dimethoxy-4-(2-methyloctan-2-yl)phenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-en-1-yl)methanol;
- (2-(2,6-dimethoxy-4-pentylphenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-en-1-yl)methanol;
- 2-(2,6-dimethoxy-4-(2-methyloctan-2-yl)phenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-ene-1-carboxylic acid;

- 2-(2,6-dimethoxy-4-pentylphenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-ene-1-carboxylic acid;
- 3-(2,6-dimethoxy-4-(2-methyloctan-2-yl)phenyl)-1,7,7-trimethylbicyclo[2.2.1]hept-2-ene;
- 3-(2,6-dimethoxy-4-pentylphenyl)-1,7,7-trimethylbicyclo[2.2.1]heptan-2-one;
- 3-(2,6-dimethoxy-4-(2-methyloctan-2-yl)phenyl)-1,7,7-trimethylbicyclo[2.2.1]heptan-2-one;
- 3-(2,6-dimethoxy-4-pentylphenyl)-1,7,7-trimethylbicyclo[2.2.1]heptan-2-ol;
- 3-(2,6-dimethoxy-4-(2-methyloctan-2-yl)phenyl)-1,7,7-trimethylbicyclo[2.2.1]heptan-2-ol;
- (3-(2,6-dimethoxy-4-(2-methyloctan-2-yl)phenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-en-1-yl)methanol;
- 3-(2,6-dimethoxy-4-(2-methyloctan-2-yl)phenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-ene-1-carboxylic acid;
- methyl 3-(2,6-dimethoxy-4-(2-methyloctan-2-yl)phenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-ene-1-carboxylate;
- (3-(2,6-dimethoxy-4-pentylphenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-en-1-yl)methanol;
- 3-(2,6-dimethoxy-4-pentylphenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-ene-1-carboxylic acid;
- 5-(2-methyloctan-2-yl)-2-(4,7,7-trimethylbicyclo[2.2.1]hept-2-en-2-yl)benzene-1,3-diol;
- 2-(4-(hydroxymethyl)-7,7-dimethylbicyclo[2.2.1]hept-2-en-2-yl)-5-(2-methyloctan-2-yl)benzene-1,3-diol;
- 3-(2,6-dihydroxy-4-(2-methyloctan-2-yl)phenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-ene-1-carboxylic acid;
- 2-(4-(hydroxymethyl)-7,7-dimethylbicyclo[2.2.1]heptan-2-yl)-5-(2-methyloctan-2-yl)benzene-1,3-diol;
- 5-(2-methyloctan-2-yl)-2-(4,7,7-trimethylbicyclo[2.2.1]heptan-2-yl)benzene-1,3-diol; and

- 3-(2,6-dihydroxy-4-(2-methyloctan-2-yl)phenyl)-7,7-dimethylbicyclo[2.2.1]heptane-1-carboxylic acid.

15. A compound according to any one of the preceding claims capable of stimulating a CB receptor.

16. A compound according to claim 15, wherein said receptor is a CB2 receptor.

17. A compound according to claims 15 or 16, wherein said stimulation is associated with the treatment of a disease, disorder or condition.

18. A compound according to claim 17, wherein said disease, disorder or condition is selected from inflammation, pain, allergies, neurological and neurodegenerative diseases, liver diseases, cerebral injury, cancer, retinal vascularization, endometritis, appetite related disorders, metabolic syndrome, diabetes, atherosclerosis; disorders related to anti-fibrinogenic effects, inflammatory bowel disease, arthritis and emesis, or any combination thereof.

19. A compound according to claim 18 wherein said disease, disorder or condition is cerebral injury.

20. A compound according to claim 19, wherein said cerebral injury is selected from closed head injury, penetrating head injury, blast injury, cerebral ischemic-reperfusion injury, post-operable brain injury, brain hemorrhaging.

21. A compound according to any one of claims 1 to 14, capable of lowering secondary damage produced by brain trauma.

22. A compound according to any one of claims 1 to 14 for use as a medicament.

23. A compound according to any one of claims 1 to 14 for use in the treatment of disease, disorder or condition is selected from inflammation, pain, allergies, neurological and neurodegenerative diseases, liver diseases, cerebral injury, cancer, retinal vascularization, endometritis, appetite related disorders, metabolic syndrome, diabetes, atherosclerosis; disorders related to anti-fibrinogenic effects, inflammatory bowel disease, arthritis and emesis, or any combination thereof.

24. A compound according to claims 1 to 14, for use in the treatment of cerebral injury.

25. A compound according to claim 24, wherein said cerebral injury is selected from close head injury, open head injury, cerebral ischemic-reperfusion injury, post-operable brain injury, brain hemorrhaging.

26. A compound according to any one of claims 1 to 14, for use in lowering secondary damage produced by brain trauma.

27. A compound according to any one of claims 1 to 14, for use in the stimulation of bone growth, bone mass, bone repair or prevention of bone loss.

28. A compound according to claim 27, for use in the treatment of at least one disease or a disorder selected from osteopenia, osteoporosis, bone fracture or deficiency, primary or secondary hyperparathyroidism, osteoarthritis, periodontal disease or defect, an osteolytic bone loss disease, post-plastic surgery, post-orthopedic surgery, post oral surgery, post-orthopedic implantation, and post-dental implantation, primary and metastatic bone cancer, osteomyelitis, or any combinations thereof.

29. A compound according to claim 28, wherein said at least one disease or disorder is selected from osteopenia and osteoporosis.

30. A pharmaceutical composition comprising a compound according to any one of claims 1 to 14.

31. A pharmaceutical composition according to claim 30, for use in the treatment of disease, disorder or condition is selected from inflammation, pain, allergies, neurological and neurodegenerative diseases, liver diseases, cerebral injury, cancer, retinal vascularization, endometritis, appetite related disorders, metabolic syndrome, diabetes, atherosclerosis; disorders related to anti-fibrinogenic effects, inflammatory bowel disease, arthritis and emesis, or any combination thereof.

32. A pharmaceutical composition according to claim 31, wherein said disease, disorder or condition is cerebral injury.

33. A pharmaceutical composition according to claim 32, wherein said cerebral injury is selected from close head injury, open head injury, cerebral ischemic-reperfusion injury, post-operable brain injury, brain hemorrhaging.

34. A pharmaceutical composition according to claim 30, for use in lowering secondary damage produced by brain trauma.

35. A pharmaceutical composition according to claim 30, for use in the stimulation of bone growth, bone mass, bone repair or prevention of bone loss.

36. A pharmaceutical composition according to claim 35, for use in the treatment of at least one disease or a disorder selected from osteopenia, osteoporosis, bone fracture or deficiency, primary or secondary hyperparathyroidism, osteoarthritis, periodontal

disease or defect, an osteolytic bone loss disease, post-plastic surgery, post-orthopedic surgery, post oral surgery, post-orthopedic implantation, and post-dental implantation, primary and metastatic bone cancer, osteomyelitis, or any combinations thereof.

37. A pharmaceutical composition according to claim 36, wherein said at least one disease or disorder is selected from osteopenia and osteoporosis.

38. Use of a compound of claims 1 to 14, for the manufacture of a pharmaceutical composition.

39. Use of a compound according to claims 1 to 14, for the manufacture of a medicament capable of stimulating a CB receptor.

40. Use according to claim 39, wherein said receptor is a CB2 receptor.

41. Use according to claims 38 or 39, wherein said stimulation is associated with the treatment of at least one disease, disorder or condition.

42. Use according to claim 41, wherein said at least one disease, disorder or condition is selected from inflammation, pain, allergies, neurological and neurodegenerative diseases, liver diseases, cerebral injury, cancer, retinal vascularization, endometritis, appetite related disorders, metabolic syndrome, diabetes, atherosclerosis; disorders related to anti-fibrinogenic effects, inflammatory bowel disease, arthritis and emesis, or any combination thereof.

43. Use of a compound according to claims 1 to 14, for the manufacture of a medicament for the treatment of cerebral injury.

44. Use according to claim 43, wherein said cerebral injury is selected from closed head injury, penetrating head injury, blast injury, cerebral ischemic-reperfusion injury, post-operable brain injury, brain hemorrhaging.

45. Use of a compound according to any one of claims 1 to 14, for the manufacture of a medicament for lowering secondary damage produced by brain trauma.

46. Use of a compound according to any one of claims 1 to 14, for the preparation of a pharmaceutical composition for stimulation of bone growth, bone mass, bone repair or prevention of bone loss.

47. Use according to claim 46, wherein said stimulation of bone growth, bone mass, bone repair or prevention of bone loss are associated with the treatment of at least one disease or a disorder selected from osteopenia, osteoporosis, bone fracture or deficiency, primary or secondary hyperparathyroidism, osteoarthritis, periodontal

disease or defect, an osteolytic bone loss disease, post-plastic surgery, post-orthopedic surgery, post oral surgery, post-orthopedic implantation, and post-dental implantation, primary and metastatic bone cancer, osteomyelitis, or any combinations thereof.

48. Use according to claim 47, wherein said at least one disease or disorder is selected from osteopenia and osteoporosis.

49. A method for stimulating a CB receptor in a subject in need thereof, said method comprising administering to said subject a therapeutically effective amount of a compound according to any one of claims 1 to 14.

50. A method according to claim 49, wherein said CB receptor is a CB2 receptor.

51. A method according to claims 49 or 50, wherein said stimulation is associated with the treatment of at least one disease, disorder or condition.

52. A method according to claim 51, wherein said at least one disease, disorder or condition is selected from inflammation, pain, allergies, neurological and neurodegenerative diseases, liver diseases, cerebral injury, cancer, retinal vascularization, endometritis, appetite related disorders, metabolic syndrome, diabetes, atherosclerosis; disorders related to anti-fibrinogenic effects, inflammatory bowel disease, arthritis and emesis, or any combination thereof.

53. A method of treating a disease, disorder or condition is selected from inflammation, pain, allergies, neurological and neurodegenerative diseases, liver diseases, cerebral injury, cancer, retinal vascularization, endometritis, appetite related disorders, metabolic syndrome, diabetes, atherosclerosis; disorders related to anti-fibrinogenic effects, inflammatory bowel disease, arthritis and emesis, or any combination thereof, said method comprising administering to in a subject in need thereof an effective amount of a compound of any one of claims 1 to 14.

54. A method of treating cerebral injury in a subject in need thereof, said method comprising administering to said subject an effective amount of a compound of any one of claims 1 to 14.

55. A method according to claim 54, wherein said cerebral injury is selected from closed head injury, penetrating head injury, blast injury, cerebral ischemic-reperfusion injury, post-operable brain injury, brain hemorrhaging.

56. A method of lowering secondary damage produced by brain trauma in a subject in need thereof, said method comprising administering to said subject an effective amount of a compound of any one of claims 1 to 14.

57. A method of affecting the c-AMP formation in a subject in need thereof, said method comprising administering to said subject an effective amount of a compound of any one of claims 1 to 14.

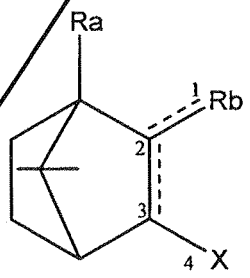
58. A method of stimulation of bone growth, bone mass, bone repair or prevention of bone loss, said method comprising administering to a subject in need thereof a therapeutically effective amount of at least one compound according to claims 1 to 14.

59. The method according to claim 58, for the treatment of at least one disease or a disorder selected from osteopenia, osteoporosis, bone fracture or deficiency, primary or secondary hyperparathyroidism, osteoarthritis, periodontal disease or defect, an osteolytic bone loss disease, post-plastic surgery, post-orthopedic surgery, post oral surgery, post-orthopedic implantation, and post-dental implantation, primary and metastatic bone cancer, osteomyelitis, or any combinations thereof.

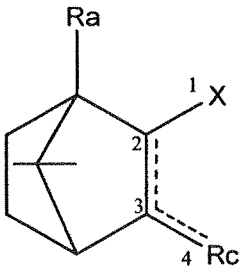
60. The method according to claim 59, wherein said at least one disease or disorder is selected from osteopenia and osteoporosis.

61. A process for the preparation of a compound of general formula (I), according to any one of claims 1 to 14, said process comprising:

(a) providing a compound having the general formula (X) or (X'):



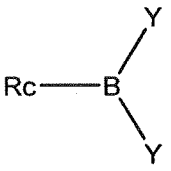
(X)



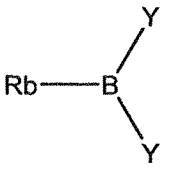
(X')

wherein R_a, R_b and R_c have the same meaning as defined herein above; X is a halide, pseudohalide, functional leaving group; and 1=======2, 2=======3, 3=======4 are each independently a single or double bond;

(b) reacting compound (X) or (X') with a compound having the general formula (XI) or (XI') respectively:



(XI')



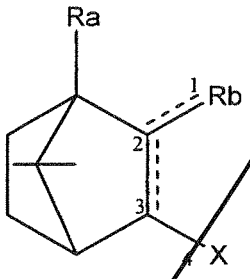
(XI)

wherein each of Y is selected from OH, C_1-C_5 alkoxy or both may form a cyclic dialkoxy ring together with the boron atom they are attached to,

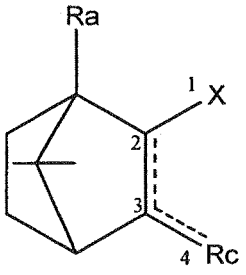
in the presence of a catalyst; thereby obtaining a compound of formula (I)..

62. A process for the preparation of a compound of general formula (I), according to any one of claims 1 to 14, said process comprising:

(a) providing a compound having the general formula (X) or (X'):



(X)

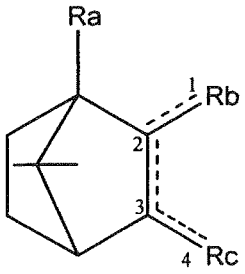


(X')

wherein R_a, R_b and R_c have the same meaning as defined herein above; X is a halide, pseudohalide, functional leaving group; and 1=2, 2=3, 3=4 are each independently a single or double bond;

(b) coupling compound (X) or (X') with R_c-H or R_b-H respectively; thereby obtaining a compound of formula (I).

63. A compound of general formula (I):



(I)

wherein

1=2, 2=3, 3=4 are each independently a single or double bond;

R_a is selected from an straight or branched C_1-C_5 alkyl, straight or branched C_2-C_5 alkenyl, straight or branched C_2-C_5 alkynyl and -C(=O)R_d, each optionally substituted by at least one group selected from –OH, -COOH, -NH_2, C_1-C_5 amine, halogen, phenyl, heteroaryl; wherein

R_d is selected from the group consisting of -H, –OH, straight or branched C_1-C_5 alkyl, straight or branched C_2-C_5 alkenyl, straight or branched C_2-C_5 alkynyl, straight or branched C_1-C_5 alkoxy, -NR_eR_f;

R_e and R_f are each independently selected from H and straight or branched C_1-C_5 alkyl; and

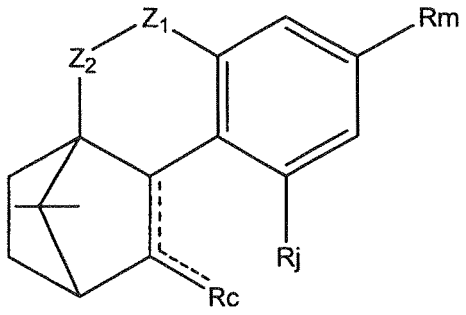
R_b and R_c are each independently selected from -H, -OH, =O, =CR_gR_h, =NR_i, =S, -C_5-C_{15} aryl ring substituted by at least one group selected from a straight or branched C_1-C_{12} alkyl, C_2-C_{12} alkenyl, C_2-C_{12} alkynyl, C_1-C_{12} alkoxy, amine, C_1-C_{12} alkoxycarboxylic acid, -OH, –OC(=O)R_p and –C(=O)R_q; wherein

R_g, R_h, R_i, R_p and R_q are each independently selected from H, straight or branched C_1-C_5 alkyl, straight or branched C_1-C_5 alkoxy and –NH_2;

or R_a and R_b may form a ring together with the carbon atoms they are each attached to; said ring may be a cycloalkyl, cycloheteroalkyl, cycloheteroalkenyl, cycloalkenyl, cycloalkynyl, cycloheteroalkynyl ring;

provided that at least one of R_b and R_c is said substituted -C_5-C_{15} aryl ring.

64. A compound of claim 63, having the formula (XII):



(XII)

wherein ------ is a single or double bond;

R_c is selected from -H, -OH, =O, =CR_gR_h, =NR_i, =S, -C_5-C_{15} aryl ring substituted by at least one group selected from a straight or branched C_1-C_{12} alkyl, C_2-C_{12} alkenyl, C_2-C_{12} alkynyl, C_1-C_{12} alkoxy, amine, C_1-C_{12} alkoxycarboxylic acid, –

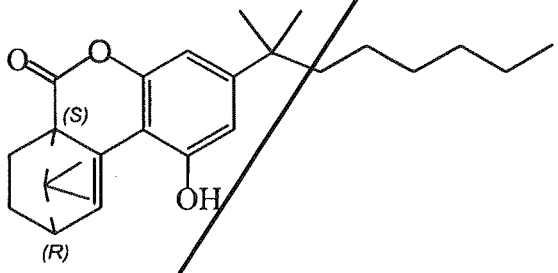
$OC(=O)R_p$ and $-C(=O)R_q$; wherein R_g, R_h, R_i, R_p and R_q are each independently selected from H, straight or branched C_1-C_5 alkyl, straight or branched C_1-C_5 alkoxy and $-NH_2$;

R_j is selected from H, and $-OR_n$ wherein R_n is selected form H, $-COOR_t$, a straight or branched C_1-C_5 alkyl optionally substituted by at least one group selected from –COOH, $-NH_2$; and R_t is selected from H, C_1-C_5 alkyl and $-NH_2$;

R_m is selected from a straight or branched C_6-C_{12} alkyl, a straight or branched C_5-C_9 alkoxy, a straight or branched C_1-C_7 ether; each optionally substituted by at least one group selected from –COOH, $-NH_2$;

Z_1 and Z_2 are each independently selected from –O-, straight or branched C_1-C_5-alkylene, -S-, -C(=O)- and -C(=S)-.

65. The compounds according to claims 63 or 64, being selected from the group consisting of:



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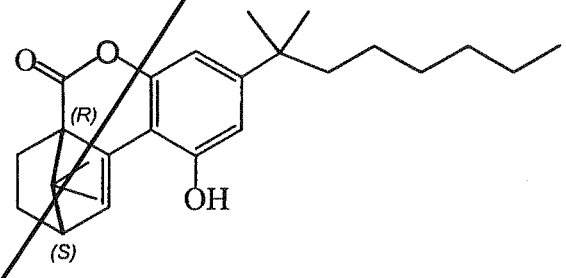

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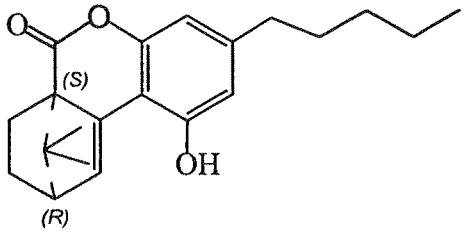

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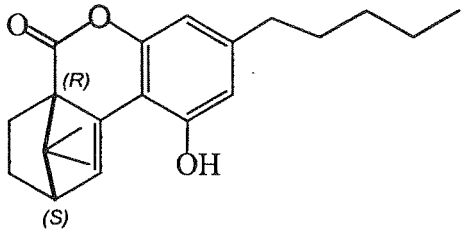


(29).

66. A compound according to claims 63 to 65, capable of stimulating a CB receptor.

67. A compound according to claim 66, wherein said receptor is a CB2 receptor.

68. A compound according to claims 66 or 67, wherein said stimulation is associated with the treatment of a disease, disorder or condition.

69. A compound according to claim 68, wherein said disease, disorder or condition is selected from inflammation, pain, allergies, neurological and neurodegenerative diseases, liver diseases, cerebral injury, cancer, retinal vascularization, endometritis, appetite related disorders, metabolic syndrome, diabetes, atherosclerosis; disorders related to anti-fibrinogenic effects, inflammatory bowel disease, arthritis and emesis, or any combination thereof.

70. A compound according to claim 69 wherein said disease, disorder or condition is cerebral injury.

71. A compound according to claim 70, wherein said cerebral injury is selected from closed head injury, penetrating head injury, blast injury, cerebral ischemic-reperfusion injury, post-operable brain injury, brain hemorrhaging.

72. A compound according to any one of claims 63 to 65, capable of lowering secondary damage produced by brain trauma.

73. A compound according to any one of claims 63 to 65 for use as a medicament.

74. A compound according to any one of claims 63 to 65 for use in the treatment of disease, disorder or condition is selected from inflammation, pain, allergies, neurological and neurodegenerative diseases, liver diseases, cerebral injury, cancer, retinal vascularization, endometritis, appetite related disorders, metabolic syndrome, diabetes, atherosclerosis; disorders related to anti-fibrinogenic effects, inflammatory bowel disease, arthritis and emesis, or any combination thereof.

75. A compound according to claims 63 to 65, for use in the treatment of cerebral injury.

76. A compound according to claim 75, wherein said cerebral injury is selected from close head injury, open head injury, cerebral ischemic-reperfusion injury, post-operable brain injury, brain hemorrhaging.

77. A compound according to any one of claims 63 to 65, for use in lowering secondary damage produced by brain trauma.

78. A compound according to any one of claims 63 to 65, for use in the stimulation of bone growth, bone mass, bone repair or prevention of bone loss.

79. A compound according to claim 78, for use in the treatment of at least one disease or a disorder selected from osteopenia, osteoporosis, bone fracture or deficiency, primary or secondary hyperparathyroidism, osteoarthritis, periodontal disease or defect, an osteolytic bone loss disease, post-plastic surgery, post-orthopedic surgery, post oral surgery, post-orthopedic implantation, and post-dental implantation, primary and metastatic bone cancer, osteomyelitis, or any combinations thereof.

80. A compound according to claim 79, wherein said at least one disease or disorder is selected from osteopenia and osteoporosis.

81. A pharmaceutical composition comprising a compound according to any one of claims 63 to 65.

82. A pharmaceutical composition according to claim 81, for use in the treatment of disease, disorder or condition is selected from inflammation, pain, allergies, neurological and neurodegenerative diseases, liver diseases, cerebral injury, cancer, retinal vascularization, endometritis, appetite related disorders, metabolic syndrome, diabetes, atherosclerosis; disorders related to anti-fibrinogenic effects, inflammatory bowel disease, arthritis and emesis, or any combination thereof.

83. A pharmaceutical composition according to claim 82, wherein said disease, disorder or condition is cerebral injury.

84. A pharmaceutical composition according to claim 83, wherein said cerebral injury is selected from close head injury, open head injury, cerebral ischemic-reperfusion injury, post-operable brain injury, brain hemorrhaging.

85. A pharmaceutical composition according to claim 81, for use in lowering secondary damage produced by brain trauma.

86. A pharmaceutical composition according to claim 81, for use in the stimulation of bone growth, bone mass, bone repair or prevention of bone loss.

87. A pharmaceutical composition according to claim 86, for use in the treatment of at least one disease or a disorder selected from osteopenia, osteoporosis, bone fracture or deficiency, primary or secondary hyperparathyroidism, osteoarthritis, periodontal disease or defect, an osteolytic bone loss disease, post-plastic surgery, post-orthopedic

surgery, post oral surgery, post-orthopedic implantation, and post-dental implantation, primary and metastatic bone cancer, osteomyelitis, or any combinations thereof.

88. A pharmaceutical composition according to claim 87, wherein said at least one disease or disorder is selected from osteopenia and osteoporosis.

89. Use of a compound of claims 63 to 65, for the manufacture of a pharmaceutical composition.

90. Use of a compound according to claims 63 to 65, for the manufacture of a medicament capable of stimulating a CB receptor.

91. Use according to claim 90, wherein said receptor is a CB2 receptor.

92. Use according to claims 90 or 91, wherein said stimulation is associated with the treatment of at least one disease, disorder or condition.

93. Use according to claim 92, wherein said at least one disease, disorder or condition is selected from inflammation, pain, allergies, neurological and neurodegenerative diseases, liver diseases, cerebral injury, cancer, retinal vascularization, endometritis, appetite related disorders, metabolic syndrome, diabetes, atherosclerosis; disorders related to anti-fibrinogenic effects, inflammatory bowel disease, arthritis and emesis, or any combination thereof.

94. Use of a compound according to claims 63 to 65, for the manufacture of a medicament for the treatment of cerebral injury.

95. Use according to claim 94, wherein said cerebral injury is selected from closed head injury, penetrating head injury, blast injury, cerebral ischemic-reperfusion injury, post-operable brain injury, brain hemorrhaging.

96. Use of a compound according to any one of claims 63 to 65, for the manufacture of a medicament for lowering secondary damage produced by brain trauma.

97. Use of a compound according to any one of claims 63 to 65, for the preparation of a pharmaceutical composition for stimulation of bone growth, bone mass, bone repair or prevention of bone loss.

98. Use according to claim 97, wherein said stimulation of bone growth, bone mass, bone repair or prevention of bone loss are associated with the treatment of at least one disease or a disorder selected from osteopenia, osteoporosis, bone fracture or deficiency, primary or secondary hyperparathyroidism, osteoarthritis, periodontal disease or defect, an osteolytic bone loss disease, post-plastic surgery, post-orthopedic

surgery, post oral surgery, post-orthopedic implantation, and post-dental implantation, primary and metastatic bone cancer, osteomyelitis, or any combinations thereof.

99. Use according to claim 98, wherein said at least one disease or disorder is selected from osteopenia and osteoporosis.

100. A method for stimulating a CB receptor in a subject in need thereof, said method comprising administering to said subject a therapeutically effective amount of a compound according to any one of claims 63 to 65.

101. A method according to claim 100, wherein said CB receptor is a CB2 receptor.

102. A method according to claims 100 or 101, wherein said stimulation is associated with the treatment of at least one disease, disorder or condition.

103. A method according to claim 102, wherein said at least one disease, disorder or condition is selected from inflammation, pain, allergies, neurological and neurodegenerative diseases, liver diseases, cerebral injury, cancer, retinal vascularization, endometritis, appetite related disorders, metabolic syndrome, diabetes, atherosclerosis; disorders related to anti-fibrinogenic effects, inflammatory bowel disease, arthritis and emesis, or any combination thereof.

104. A method of treating a disease, disorder or condition is selected from inflammation, pain, allergies, neurological and neurodegenerative diseases, liver diseases, cerebral injury, cancer, retinal vascularization, endometritis, appetite related disorders, metabolic syndrome, diabetes, atherosclerosis; disorders related to anti-fibrinogenic effects, inflammatory bowel disease, arthritis and emesis, or any combination thereof, said method comprising administering to in a subject in need thereof an effective amount of a compound of any one of claims 63 to 65.

105. A method of treating cerebral injury in a subject in need thereof, said method comprising administering to said subject an effective amount of a compound of any one of claims 63 to 65.

106. A method according to claim 105, wherein said cerebral injury is selected from closed head injury, penetrating head injury, blast injury, cerebral ischemic-reperfusion injury, post-operable brain injury, brain hemorrhaging.

107. A method of lowering secondary damage produced by brain trauma in a subject in need thereof, said method comprising administering to said subject an effective amount of a compound of any one of claims 63 to 65.

108. A method of affecting the c-AMP formation in a subject in need thereof, said method comprising administering to said subject an effective amount of a compound of any one of claims 63 to 65.

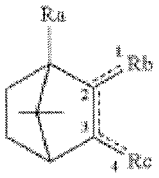
109. A method of stimulation of bone growth, bone mass, bone repair or prevention of bone loss, said method comprising administering to a subject in need thereof a therapeutically effective amount of at least one compound according to claims 63 to 65.

110. The method according to claim 109, for the treatment of at least one disease or a disorder selected from osteopenia, osteoporosis, bone fracture or deficiency, primary or secondary hyperparathyroidism, osteoarthritis, periodontal disease or defect, an osteolytic bone loss disease, post-plastic surgery, post-orthopedic surgery, post oral surgery, post-orthopedic implantation, and post-dental implantation, primary and metastatic bone cancer, osteomyelitis, or any combinations thereof.

111. The method according to claim 110, wherein said at least one disease or disorder is selected from osteopenia and osteoporosis.

Claims:

1. A compound of general formula (I):



(I)

wherein 1—2, 2═3, 3—4 are each independently a single or double bond;

R_a is selected from an straight or branched C_1-C_5 alkyl, straight or branched C_2-C_5 alkenyl, straight or branched C_2-C_5 alkynyl and —C(=O)R_d, each optionally substituted by at least one group selected from —OH, COOH, —NH_2, C_1-C_5 amine, halogen, phenyl, heteroaryl; wherein

R_d is selected from the group consisting of —H, —OH, straight or branched C_1-C_5 alkyl, straight or branched C_2-C_5 alkenyl, straight or branched C_2-C_5 alkynyl, straight or branched C_1-C_5 alkoxy, —NR_eR_f;

R_e and R_f are each independently selected from H and straight or branched C_1-C_5 alkyl; and

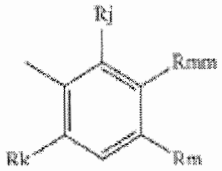
R_b and R_c are each independently selected from —H, —OH, =O, =CR_gR_h, =NR_i, =S, —C_5-C_{15} aryl ring substituted by at least one group selected from a straight or branched C_1-C_{12} alkyl, C_2-C_{12} alkenyl, C_2-C_{12} alkynyl, C_1-C_{12} alkoxy, amine, C_1-C_{12} alkoxycarboxylic acid, —OH, —OC(=O)R_p and —C(=O)R_q; wherein

R_g, R_h, R_i, R_p and R_q are each independently selected from H, straight or branched C_1-C_5 alkyl, straight or branched C_1-C_5 alkoxy and —NH_2; and

provided that at least one of R_b and R_c is said substituted —C_5-C_{15} aryl ring;

wherein at least one of R_b and R_c is a group of formula (II′):

(II')



wherein R_j and R_k are each independently selected from H, and —OR_n, wherein R_n is selected from H, a straight or branched C_1-C_5 alkyl, provided that at least one of R_j and R_k is different than H; R_m is selected from a straight or branched C_3-C_{12} alkyl, and R_{mm} is H.

2. A compound according to claim 1, wherein 2═══3 is a double bond.

3. A compound according to claim 1, wherein 2═══3 is a single bond.

4. A compound according to claim 3, wherein 1═══2 is a double bond.

5. A compound according to claim 3, wherein 3═══4 is a double bond.

6. A compound according to claim 3, wherein 1═══2 is a single bond and 3═══4 is a single bond.

7. A compound according to claim 1, wherein R_a is selected from a straight or branched C_1-C_5 alkyl and —C(=O)R_d, each optionally substituted by at least one group selected from —OH, COOH, —NH_2, C_1-C_5 amine, halogen, phenyl, heteroaryl; and
R_d is as defined herein above.

8. A compound according to claim 3, wherein R_b is =O.

9. A compound according to claim 3, wherein R_c is =O.

10. A compound according to claim 1, being selected from the following list:
methyl-2-(2,6-dimethoxy-4-(2-methyloctan-2-yl)phenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-ene-1-carboxylate;
methyl-2-(2,6-dimethoxy-4-pentylphenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-ene-1-carboxylate;
2-(2,6-dimethoxy-4-(2-methyloctan-2-yl)phenyl)-1,7,7-trimethylbicyclo[2.2.1]hept-2-ene;
(2-(2,6-dimethoxy-4-(2-methyloctan-2-yl)phenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-en-

1-yl)methanol;
(2-(2,6-dimethoxy-4-pentylphenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-en-1-yl)methanol;
2-(2,6-dimethoxy-4-(2-methyloctan-2-yl)phenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-ene-1-carboxylic acid;
2-(2,6-dimethoxy-4-pentylphenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-ene-1-carboxylic acid;
3-(2,6-dimethoxy-4-(2-methyloctan-2-yl)phenyl)-1,7,7-trimethylbicyclo[2.2.1]hept-2-ene;
3-(2,6-dimethoxy-4-pentylphenyl)-1,7,7-trimethylbicyclo[2.2.1]heptan-2-one;
3-(2,6-dimethoxy-4-(2-methyloctan-2-yl)phenyl)-1,7,7-trimethylbicyclo[2.2.1]heptan-2-one;
3-(2,6-dimethoxy-4-pentylphenyl)-1,7,7-trimethylbicyclo[2.2.1]heptan-2-ol;
3-(2,6-dimethoxy-4-(2-methyloctan-2-yl)phenyl)-1,7,7-trimethylbicyclo[2.2.1]heptan-2-ol;
(3-(2,6-dimethoxy-4-(2-methyloctan-2-yl)phenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-en-1-yl)methanol;
3-(2,6-dimethoxy-4-(2-methyloctan-2-yl)phenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-ene-1-carboxylic acid;
methyl 3-(2,6-dimethoxy-4-(2-methyloctan-2-yl)phenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-ene-1-carboxylate;
(3-(2,6-dimethoxy-4-pentylphenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-en-1-yl)methanol;
3-(2,6-dimethoxy-4-pentylphenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-ene-1-carboxylic acid;
5-(2-methyloctan-2-yl)-2-(4,7,7-trimethylbicyclo[2.2.1]hept-2-en-2-yl)benzene-1,3-diol;
2-(4-(hydroxymethyl)-7,7-dimethylbicyclo[2.2.1]hept-2-en-2-yl)-5-(2-methyloctan-2-yl)benzene-1,3-diol;
3-(2,6-dihydroxy-4-(2-methyloctan-2-yl)phenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-ene-1-carboxylic acid;
2-(4-(hydroxymethyl)-7,7-dimethylbicyclo[2.2.1]heptan-2-yl)-5-(2-methyloctan-2-yl)benzene-1,3-diol;

5-(2-methyloctan-2-yl)-2-(4,7,7-trimethylbicyclo[2.2.1]heptan-2-yl)benzene-1,3-diol;

and

3-(2,6-dihydroxy-4-(2-methyloctan-2-yl)phenyl)-7,7-dimethylbicyclo[2.2.1]heptane-1-carboxylic acid.

11. A compound according to any one of the preceding claims capable of stimulating a CB receptor.

12. A compound according to claim 11, wherein said receptor is a CB2 receptor.

13. A compound according to claims 11 or 12, wherein said stimulation is associated with the treatment of a disease, disorder or condition.

14. A compound according to claim 13, wherein said disease, disorder or condition is selected from inflammation, pain, allergies, neurological and neurodegenerative diseases, liver diseases, cerebral injury, cancer, retinal vascularization, endometritis, appetite related disorders, metabolic syndrome, diabetes, atherosclerosis; disorders related to anti-fibrinogenic effects, inflammatory bowel disease, arthritis and emesis, or any combination thereof.

15. A compound according to claim 14 wherein said disease, disorder or condition is cerebral injury.

16. A compound according to claim 15, wherein said cerebral injury is selected from closed head injury, penetrating head injury, blast injury, cerebral ischemic-reperfusion injury, post-operable brain injury, brain hemorrhaging.

17. A compound according to any one of claims 1 to 10, capable of lowering secondary damage produced by brain trauma.

18. A compound according to any one of claims 1 to 10 for use as a medicament.

19. A compound according to any one of claims 1 to 10 for use in the treatment of disease, disorder or condition is selected from inflammation, pain, allergies, neurological and neurodegenerative diseases, liver diseases, cerebral injury, cancer, retinal vascularization, endometritis, appetite related disorders, metabolic syndrome, diabetes, atherosclerosis; disorders related to anti-fibrinogenic effects, inflammatory bowel disease, arthritis and emesis, or any combination thereof.

20. A compound according to claims 1 to 10, for use in the treatment of cerebral injury.

21. A compound according to claim 20, wherein said cerebral injury is selected from close head injury, open head injury, cerebral ischemic-reperfusion injury, post-operable

brain injury, brain hemorrhaging.

22. A compound according to any one of claims 1 to 10, for use in lowering secondary damage produced by brain trauma.

23. A compound according to any one of claims 1 to 10, for use in the stimulation of bone growth, bone mass, bone repair or prevention of bone loss.

24. A compound according to claim 23, for use in the treatment of at least one disease or a disorder selected from osteopenia, osteoporosis, bone fracture or deficiency, primary or secondary hyperparathyroidism, osteoarthritis, periodontal disease or defect, an osteolytic bone loss disease, post-plastic surgery, post-orthopedic surgery, post oral surgery, post-orthopedic implantation, and post-dental implantation, primary and metastatic bone cancer, osteomyelitis, or any combinations thereof.

25. A compound according to claim 24, wherein said at least one disease or disorder is selected from osteopenia and osteoporosis.

26. A pharmaceutical composition comprising a compound according to claim 1.

27. A pharmaceutical composition according to claim 26, for use in the treatment of disease, disorder or condition is selected from inflammation, pain, allergies, neurological and neurodegenerative diseases, liver diseases, cerebral injury, cancer, retinal vascularization, endometritis, appetite related disorders, metabolic syndrome, diabetes, atherosclerosis; disorders related to anti-fibrinogenic effects, inflammatory bowel disease, arthritis and emesis, or any combination thereof.

28. A pharmaceutical composition according to claim 27, wherein said disease, disorder or condition is cerebral injury.

29. A pharmaceutical composition according to claim 28, wherein said cerebral injury is selected from close head injury, open head injury, cerebral ischemic-reperfusion injury, post-operable brain injury, brain hemorrhaging.

30. A pharmaceutical composition according to claim 26, for use in lowering secondary damage produced by brain trauma.

31. A pharmaceutical composition according to claim 26, for use in the stimulation of bone growth, bone mass, bone repair or prevention of bone loss.

32. A pharmaceutical composition according to claim 31, for use in the treatment of at least one disease or a disorder selected from osteopenia, osteoporosis, bone fracture or deficiency, primary or secondary hyperparathyroidism, osteoarthritis, periodontal disease or defect, an osteolytic bone loss disease, post-plastic surgery, post-orthopedic surgery, post oral surgery, post-orthopedic implantation, and post-dental implantation,

primary and metastatic bone cancer, osteomyelitis, or any combinations thereof.

33. A pharmaceutical composition according to claim 32, wherein said at least one disease or disorder is selected from osteopenia and osteoporosis.

34. Use of a compound of claims 1 to 10, for the manufacture of a pharmaceutical composition.

35. Use of a compound according to claims 1 to 10, for the manufacture of a medicament capable of stimulating a CB receptor.

36. Use of a compound according to claim 35, wherein said receptor is a CB2 receptor.

37. Use of a compound according to claims 34 or 35, wherein said stimulation is associated with the treatment of at least one disease, disorder or condition.

38. Use of a compound according to claim 37, wherein said at least one disease, disorder or condition is selected from inflammation, pain, allergies, neurological and neurodegenerative diseases, liver diseases, cerebral injury, cancer, retinal vascularization, endometritis, appetite related disorders, metabolic syndrome, diabetes, atherosclerosis; disorders related to anti-fibrinogenic effects, inflammatory bowel disease, arthritis and emesis, or any combination thereof.

39. Use of a compound according to claims 1 to 10, for the manufacture of a medicament for the treatment of cerebral injury.

40. Use of a compound according to claim 39, wherein said cerebral injury is selected from closed head injury, penetrating head injury, blast injury, cerebral ischemic-reperfusion injury, post-operable brain injury, brain hemorrhaging.

41. Use of a compound according to any one of claims 1 to 10, for the manufacture of a medicament for lowering secondary damage produced by brain trauma.

42. Use of a compound according to any one of claims 1 to 10, for the preparation of a pharmaceutical composition for stimulation of bone growth, bone mass, bone repair or prevention of bone loss.

43. Use of a compound according to claim 42, wherein said stimulation of bone growth, bone mass, bone repair or prevention of bone loss are associated with the treatment of at least one disease or a disorder selected from osteopenia, osteoporosis, bone fracture or deficiency, primary or secondary hyperparathyroidism, osteoarthritis, periodontal disease or defect, an osteolytic bone loss disease, post-plastic surgery, post-orthopedic surgery, post oral surgery, post-orthopedic implantation, and post-dental implantation, primary and metastatic bone cancer, osteomyelitis, or any combinations thereof.

44. Use of a compound according to claim 43, wherein said at least one disease or disorder is selected from osteopenia and osteoporosis.

45. The compound (1S, 4R)-(2-(2,6-dimethoxy-4-(2-methyloctan-2-yl)phenyl)-7,7-dimethylbicyclo[2.2.1]hept-2-en-1-yl)methanol.