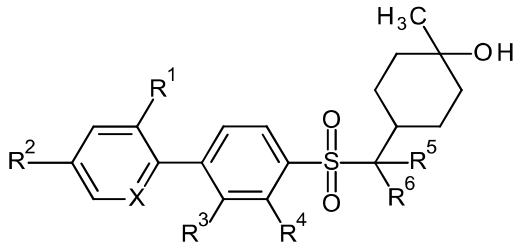
## SUMMARY

In one aspect, the present disclosure refers to a compound of the following formula:



or a pharmaceutically acceptable salt or solvate thereof;
wherein:

=X- is independently -CH= or -N=;

-$R^1$ is independently -H or -$R^{1X}$;
-$R^{1X}$ is independently -F, -Cl, -$R^{1C}$, -$R^{1F}$, or -CN;
-$R^{1C}$ is independently saturated linear or branched $C_{1-3}$alkyl;
-$R^{1F}$ is independently saturated linear or branched $C_{1-3}$fluoroalkyl;

-$R^2$ is independently -H or -$R^{2X}$;
-$R^{2X}$ is independently -F, -Cl, -$R^{2C}$, -$R^{2F}$, or -CN;
-$R^{2C}$ is independently saturated linear or branched $C_{1-3}$alkyl;
-$R^{2F}$ is independently saturated linear or branched $C_{1-3}$fluoroalkyl;

-$R^3$ is independently -H or -$R^{3X}$;
-$R^{3X}$ is independently -F, -Cl, -$R^{3C}$, -$R^{3F}$, or -CN;
-$R^{3C}$ is independently saturated linear or branched $C_{1-3}$alkyl;
-$R^{3F}$ is independently saturated linear or branched $C_{1-3}$fluoroalkyl;

-$R^4$ is independently -H or -$R^{4X}$;
-$R^{4X}$ is independently -F, -Cl, -$R^{4C}$, -$R^{4F}$, or -CN;
-$R^{4C}$ is independently saturated linear or branched $C_{1-3}$alkyl;
-$R^{4F}$ is independently saturated linear or branched $C_{1-3}$fluoroalkyl;

-$R^5$ is independently -H or -$R^{5X}$;
-$R^{5X}$ is independently -F, -$R^{5C}$, or -$R^{5F}$;
-$R^{5C}$ is independently saturated linear or branched $C_{1-3}$alkyl;
-$R^{5F}$ is independently saturated linear or branched $C_{1-3}$fluoroalkyl;

-$R^6$ is independently -H or -$R^{6X}$;
-$R^{6X}$ is independently -F, -$R^{6C}$, or -$R^{6F}$;
-$R^{6C}$ is independently saturated linear or branched $C_{1-3}$alkyl; and
-$R^{6F}$ is independently saturated linear or branched $C_{1-3}$fluoroalkyl;

or -$R^5$ and -$R^6$, taken together with the carbon atom to which they are attached, form saturated $C_{3-6}$cycloalkyl.

In another aspect, the present disclosure refers to a composition comprising a compound as described herein, and a carrier, diluent, or excipient. In another aspect, the present disclosure refers to a method of preparing a composition comprising the step of mixing a compound as described herein and a carrier or diluent. In another aspect, the present disclosure refers to a compound as described herein for use in therapy.

In yet another aspect, the present disclosure refers to use of a compound as described herein in the manufacture of a medicament for treatment of: inflammatory arthritis.

In a futher aspect, the present disclosure provides use of a compound as described herein in the manufacture of a medicament for treatment of: rheumatoid arthritis; psoriatic arthritis; ankylosing spondylitis; spondyloarthritis; reactive arthritis; infectious arthritis; systemic lupus erythematosus; scleroderma; gout; adult-onset Still's disease; or juvenile idiopathic arthritis.

In yet another aspect, the present disclosure refers to use of a compound as described herein in the manufacture of a medicament for treatment of: rheumatoid arthritis.

One example of the disclosure pertains to certain substituted 1-methyl-4-[(4-phenylphenyl) sulfonylmethyl]cyclohexanol and 1-methyl-4-[[4-(2-pyridyl)phenyl]sulfonylmethyl] cyclohexanol compounds (collectively referred to herein as CHMSA compounds), as described herein.

Another example of the disclosure pertains to a composition (*e.g.*, a pharmaceutical composition) comprising a CHMSA compound, as described herein, and a carrier, diluent, or excipient (*e.g.*, a pharmaceutically acceptable carrier, diluent, or excipient).

Another example of the disclosure pertains to a method of preparing a composition (*e.g.*, a pharmaceutical composition) comprising the step of mixing a CHMSA compound, as described herein, and a carrier, diluent, or excipient (*e.g.*, a pharmaceutically acceptable carrier, diluent, or excipient).

Another example of the present disclosure pertains to a CHMSA compound, as described herein, for use in a method of treatment of the human or animal body by therapy, for example, for use a method of treatment of a disorder (*e.g.*, a disease) as described herein.

Another example of the present disclosure pertains to use of a CHMSA compound, as described herein, in the manufacture of a medicament for treatment, for example, treatment of a disorder (*e.g.*, a disease) as described herein.

Another example of the present disclosure pertains to a method of treatment, for example, of a disorder (*e.g.*, a disease) as described herein, comprising administering to a patient in need of treatment a therapeutically effective amount of a CHMSA compound, as described herein, preferably in the form of a pharmaceutical composition.

Another example of the present disclosure pertains to a kit comprising (a) a CHMSA compound, as described herein, preferably provided as a pharmaceutical composition and in a suitable container and/or with suitable packaging; and (b) instructions for use, for example, written instructions on how to administer the compound.

Another example of the present disclosure pertains to a CHMSA compound *obtainable* by a method of synthesis as described herein, or a method comprising a method of synthesis as described herein.

Another example of the present disclosure pertains to a CHMSA compound *obtained* by a method of synthesis as described herein, or a method comprising a method of synthesis as described herein.

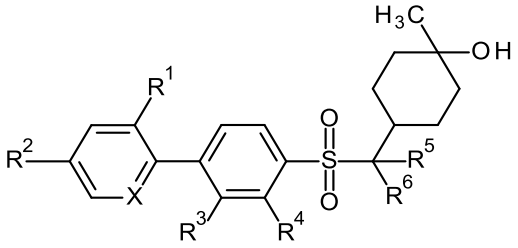
Another example of the present disclosure pertains to novel intermediates, as described herein, which are suitable for use in the methods of synthesis described herein.

Another example of the present disclosure pertains to the use of such novel intermediates, as described herein, in the methods of synthesis described herein.

As will be appreciated by one of skill in the art, features and preferred examples of one example of the disclosure will also pertain to other examples of the disclosure.

CLAIMS

1. A compound of the following formula:



or a pharmaceutically acceptable salt or solvate thereof;
wherein:

=X- is independently -CH= or -N=;

-$R^1$ is independently -H or -$R^{1X}$;
-$R^{1X}$ is independently -F, -Cl, -$R^{1C}$, -$R^{1F}$, or -CN;
-$R^{1C}$ is independently saturated linear or branched $C_{1-3}$alkyl;
-$R^{1F}$ is independently saturated linear or branched $C_{1-3}$fluoroalkyl;

-$R^2$ is independently -H or -$R^{2X}$;
-$R^{2X}$ is independently -F, -Cl, -$R^{2C}$, -$R^{2F}$, or -CN;
-$R^{2C}$ is independently saturated linear or branched $C_{1-3}$alkyl;
-$R^{2F}$ is independently saturated linear or branched $C_{1-3}$fluoroalkyl;

-$R^3$ is independently -H or -$R^{3X}$;
-$R^{3X}$ is independently -F, -Cl, -$R^{3C}$, -$R^{3F}$, or -CN;
-$R^{3C}$ is independently saturated linear or branched $C_{1-3}$alkyl;
-$R^{3F}$ is independently saturated linear or branched $C_{1-3}$fluoroalkyl;

-$R^4$ is independently -H or -$R^{4X}$;
-$R^{4X}$ is independently -F, -Cl, -$R^{4C}$, -$R^{4F}$, or -CN;
-$R^{4C}$ is independently saturated linear or branched $C_{1-3}$alkyl;
-$R^{4F}$ is independently saturated linear or branched $C_{1-3}$fluoroalkyl;

-$R^5$ is independently -H or -$R^{5X}$;
-$R^{5X}$ is independently -F, -$R^{5C}$, or -$R^{5F}$;
-$R^{5C}$ is independently saturated linear or branched $C_{1-3}$alkyl;
-$R^{5F}$ is independently saturated linear or branched $C_{1-3}$fluoroalkyl;

-$R^6$ is independently -H or -$R^{6X}$;
-$R^{6X}$ is independently -F, -$R^{6C}$, or -$R^{6F}$;
-$R^{6C}$ is independently saturated linear or branched $C_{1-3}$alkyl; and
-$R^{6F}$ is independently saturated linear or branched $C_{1-3}$fluoroalkyl;

or -$R^5$ and -$R^6$, taken together with the carbon atom to which they are attached, form saturated $C_{3-6}$cycloalkyl.

2. A compound compound according to claim 1, wherein =X- is -CH=.

3. A compound according to claim 1, wherein =X- is -N=.

4. A compound according to any one of claims 1 to 3, wherein $-R^1$ is $-R^{1X}$.

5. A compound according to any one of claims 1 to 3, wherein $-R^1$ is -H.

6. A compound according to any one of claims 1 to 5, wherein $-R^{1X}$, if present, is independently -F, -Cl, or -CN.

7. A compound according to any one of claims 1 to 5, wherein $-R^{1X}$, if present, is -F.

8. A compound according to any one of claims 1 to 5, wherein $-R^{1X}$, if present, is -Cl.

9. A compound according to any one of claims 1 to 5, wherein $-R^{1X}$, if present, is -CN.

10. A compound according to any one of claims 1 to 5, wherein $-R^{1X}$, if present, is $-R^{1C}$.

11. A compound according to any one of claims 1 to 5, wherein $-R^{1X}$, if present, is $-R^{1F}$.

12. A compound according to any one of claims 1 to 11, wherein $-R^{1C}$, if present, is $-CH_3$.

13. A compound according to any one of claims 1 to 12, wherein $-R^{1F}$, if present, is $-CF_3$.

14. A compound according to any one of claims 1 to 13, wherein $-R^2$ is $-R^{2X}$.

15. A compound according to any one of claims 1 to 13, wherein $-R^2$ is -H.

16. A compound according to any one of claims 1 to 15, wherein $-R^{2X}$, if present, is independently -F, -Cl, or -CN.

17. A compound according to any one of claims 1 to 15, wherein $-R^{2X}$, if present, is -F.

18. A compound according to any one of claims 1 to 15, wherein $-R^{2X}$, if present, is -Cl.

19. A compound according to any one of claims 1 to 15, wherein $-R^{2X}$, if present, is -CN.

20. A compound according to any one of claims 1 to 15, wherein $-R^{2X}$, if present, is $-R^{2C}$.

21. A compound according to any one of claims 1 to 15, wherein $-R^{2X}$, if present, is $-R^{2F}$.

22. A compound according to any one of claims 1 to 21, wherein $-R^{2C}$, if present, is $-CH_3$.

23. A compound according to any one of claims 1 to 22, wherein $-R^{2F}$, if present, is $-CF_3$.

24. A compound according to any one of claims 1 to 23, wherein $-R^3$ is $-R^{3X}$.

25. A compound according to any one of claims 1 to 23, wherein $-R^3$ is -H.

26. A compound according to any one of claims 1 to 25, wherein $-R^{3X}$, if present, is independently -F, -Cl, or -CN.

27. A compound according to any one of claims 1 to 25, wherein $-R^{3X}$, if present, is -F.

28. A compound according to any one of claims 1 to 25, wherein -$R^{3X}$, if present, is -Cl.

29. A compound according to any one of claims 1 to 25, wherein -$R^{3X}$, if present, is -CN.

30. A compound according to any one of claims 1 to 25, wherein -$R^{3X}$, if present, is -$R^{3C}$.

31. A compound according to any one of claims 1 to 25, wherein -$R^{3X}$, if present, is -$R^{3F}$.

32. A compound according to any one of claims 1 to 31, wherein -$R^{3C}$, if present, is -$CH_3$.

33. A compound according to any one of claims 1 to 32, wherein -$R^{3F}$, if present, is -$CF_3$.

34. A compound according to any one of claims 1 to 33, wherein -$R^4$ is -$R^{4X}$.

35. A compound according to any one of claims 1 to 33, wherein -$R^4$ is -H.

36. A compound according to any one of claims 1 to 35, wherein -$R^{4X}$, if present, is independently -F, -Cl, or -CN.

37. A compound according to any one of claims 1 to 35, wherein -$R^{4X}$, if present, is -F.

38. A compound according to any one of claims 1 to 35, wherein -$R^{4X}$, if present, is -Cl.

39. A compound according to any one of claims 1 to 35, wherein -$R^{4X}$, if present, is -CN.

40. A compound according to any one of claims 1 to 35, wherein -$R^{4X}$, if present, is -$R^{4C}$.

41. A compound according to any one of claims 1 to 35, wherein -$R^{4X}$, if present, is -$R^{4F}$.

42. A compound according to any one of claims 1 to 41, wherein -$R^{4C}$, if present, is -$CH_3$.

43. A compound according to any one of claims 1 to 42, wherein -$R^{4F}$, if present, is -$CF_3$.

44. A compound according to any one of claims 1 to 43, wherein -$R^5$ is -$R^{5X}$.

45. A compound according to any one of claims 1 to 43, wherein -$R^5$ is -H.

46. A compound according to any one of claims 1 to 45, wherein -$R^{5X}$ is independently -F, -$R^{5C}$, or -$R^{5F}$.

47. A compound according to any one of claims 1 to 45, wherein -$R^{5X}$, if present, is -F.

48. A compound according to any one of claims 1 to 45, wherein -$R^{5X}$, if present, is -$R^{5C}$.

49. A compound according to any one of claims 1 to 45, wherein -$R^{5X}$, if present, is -$R^{5F}$.

50. A compound according to any one of claims 1 to 49, wherein -$R^{5C}$, if present, is -$CH_3$.

51. A compound according to any one of claims 1 to 50, wherein -$R^{5F}$, if present, is -$CF_3$.

52. A compound according to any one of claims 1 to 51, wherein -$R^6$ is -$R^{6X}$.

53. A compound according to any one of claims 1 to 51, wherein -$R^6$ is -H.

54. A compound according to any one of claims 1 to 53, wherein -$R^{6X}$ is independently -F, -$R^{6C}$, or -$R^{6F}$.

55. A compound according to any one of claims 1 to 53, wherein -$R^{6X}$, if present, is -F.

56. A compound according to any one of claims 1 to 53, wherein -$R^{6X}$, if present, is -$R^{6C}$.

57. A compound according to any one of claims 1 to 53, wherein -$R^{6X}$, if present, is -$R^{6F}$.

58. A compound according to any one of claims 1 to 57, wherein -$R^{6C}$, if present, is -$CH_3$.

59. A compound according to any one of claims 1 to 58, wherein -$R^{6F}$, if present, is -$CF_3$.

60. A compound according to any one of claims 1 to 43, wherein -$R^5$ and -$R^6$, taken together with the carbon atom to which they are attached, form saturated $C_{3-6}$cycloalkyl.

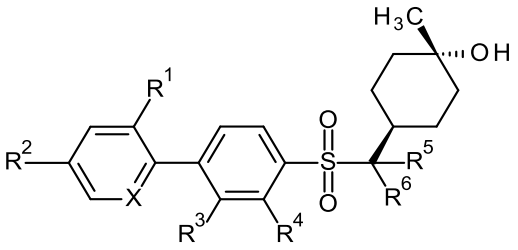
61. A compound according to any one of claims 1 to 43, wherein -$R^5$ and -$R^6$, taken together with the carbon atom to which they are attached, form cyclopropyl.

62. A compound according to any one of claims 1 to 43, wherein -$R^5$ and -$R^6$, taken together with the carbon atom to which they are attached, form cyclobutyl.

63. A compound according to any one of claims 1 to 43, wherein -$R^5$ and -$R^6$, taken together with the carbon atom to which they are attached, form cyclopentyl.

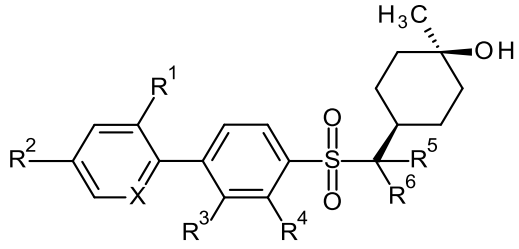
64. A compound according to any one of claims 1 to 43, wherein -$R^5$ and -$R^6$, taken together with the carbon atom to which they are attached, form cyclohexyl.

65. A compound according to any one of claims 1 to 64, wherein the compound is a compound of the following formula, or a pharmaceutically acceptable salt or solvate thereof:

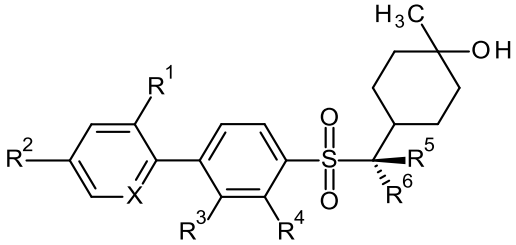



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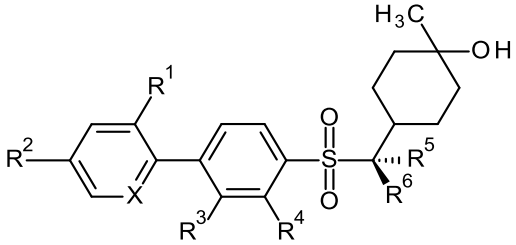
66. A compound according to any one of claims 1 to 64, wherein the compound is a compound of the following formula, or a pharmaceutically acceptable salt or solvate thereof:



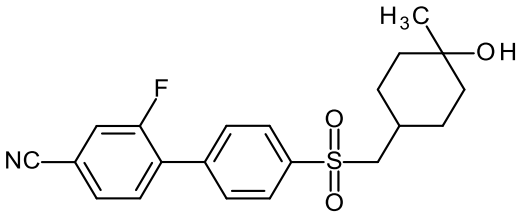
67. A compound according to any one of claims 1 to 66, wherein -$R^5$ and -$R^6$ are different, and the compound is a compound of the following formula, or a pharmaceutically acceptable salt or solvate thereof:



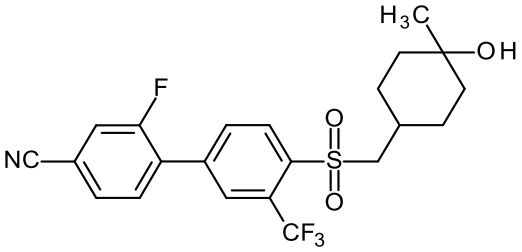
68. A compound according to any one of claims 1 to 66, wherein -$R^5$ and -$R^6$ are different, and the compound is a compound of the following formula, or a pharmaceutically acceptable salt or solvate thereof:



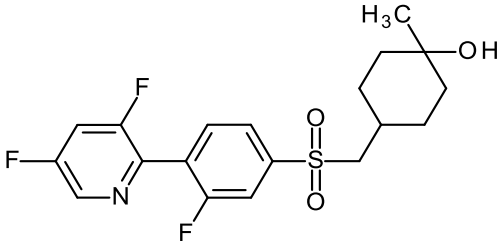
69. A compound according to claim 1, which is a compound of one of following formulae, or a pharmaceutically acceptable salt or solvate thereof:



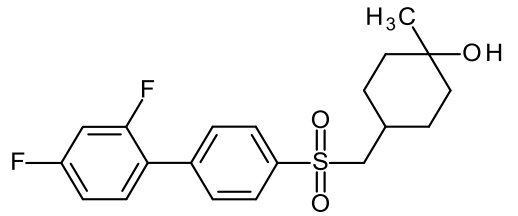
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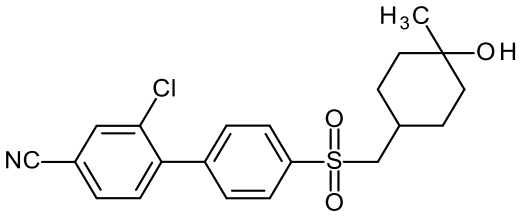
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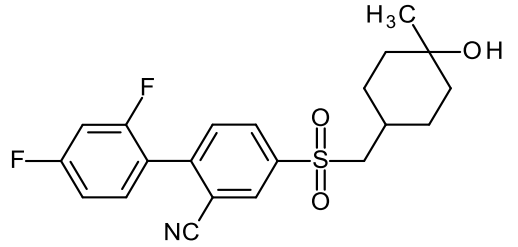
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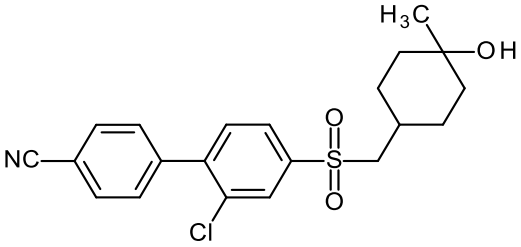
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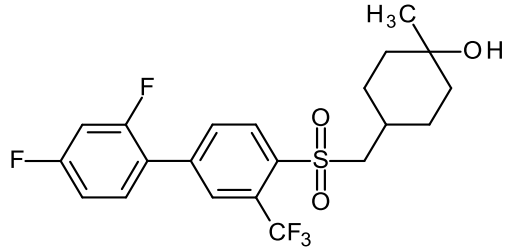
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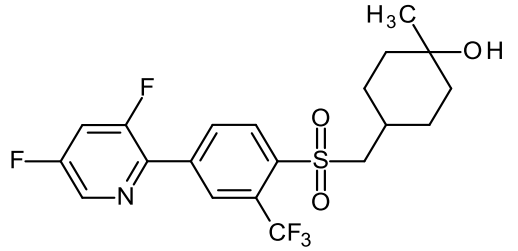
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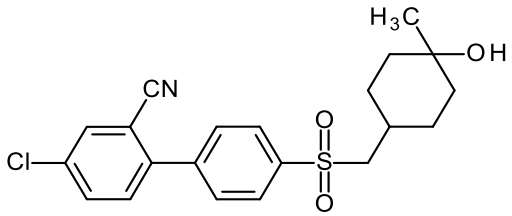
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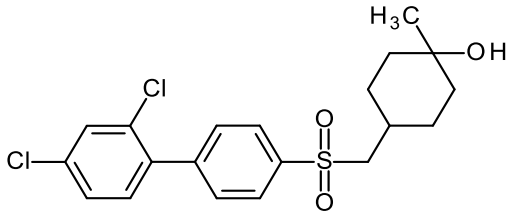
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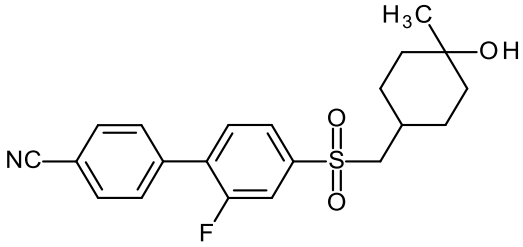
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(CHMSA-10),

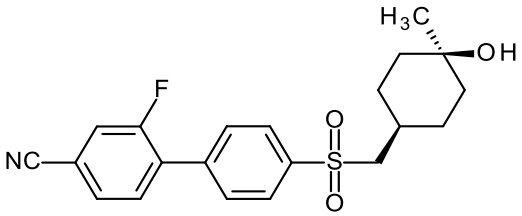


(CHMSA-11), and

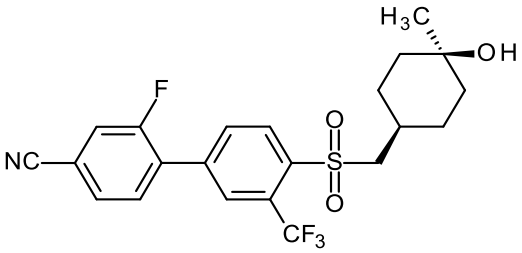


(CHMSA-12).

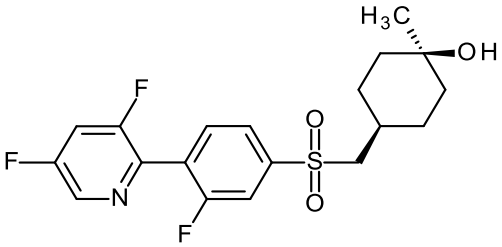
70. A compound according to claim 1, which is a compound of one of following formulae, or a pharmaceutically acceptable salt or solvate thereof:



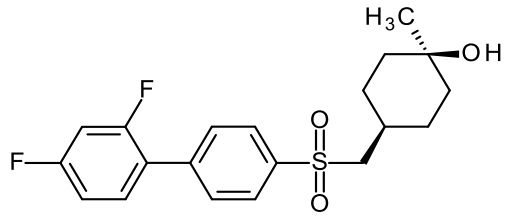
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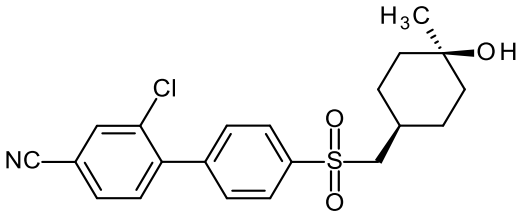
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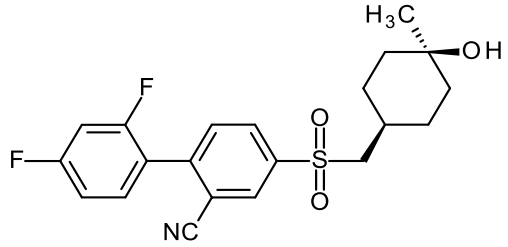
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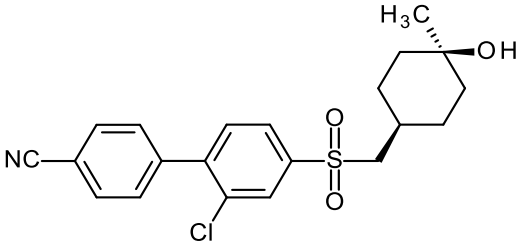
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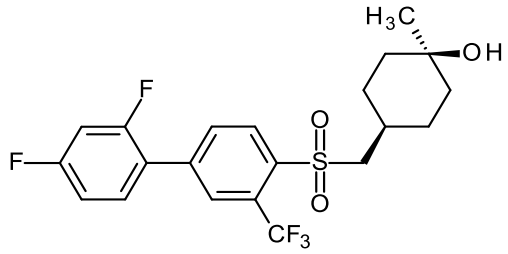
(CHMSA-05-A),



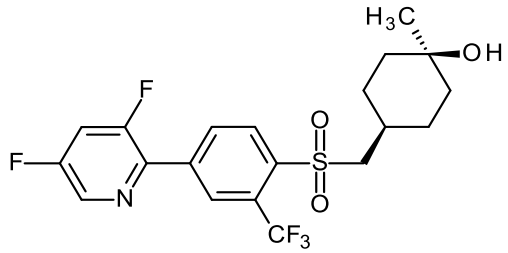
(CHMSA-06-A),



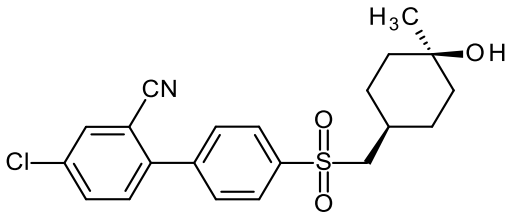
(CHMSA-07-A),



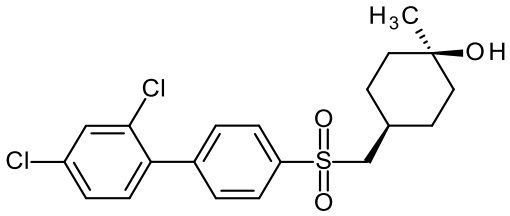
(CHMSA-08-A),



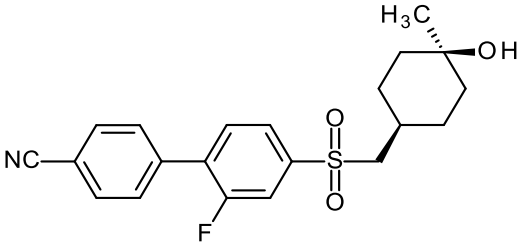
(CHMSA-09-A),



(CHMSA-10-A),

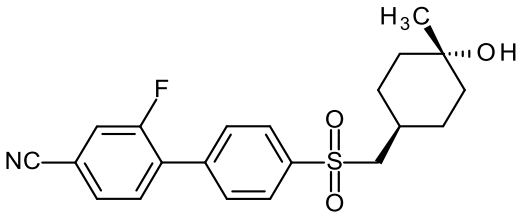


(CHMSA-11-A), and

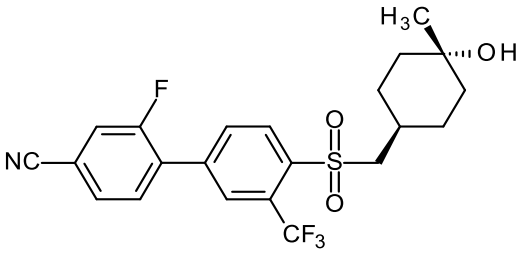


(CHMSA-12-A).

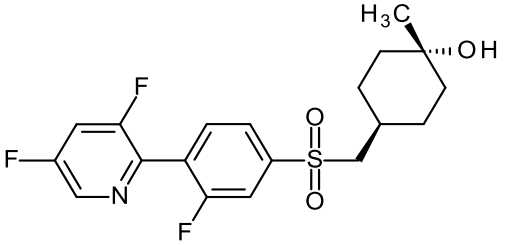
71. A compound according to claim 1, which is a compound of one of following formulae, or a pharmaceutically acceptable salt or solvate thereof:



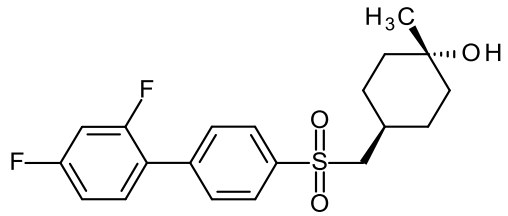
(CHMSA-01-B),



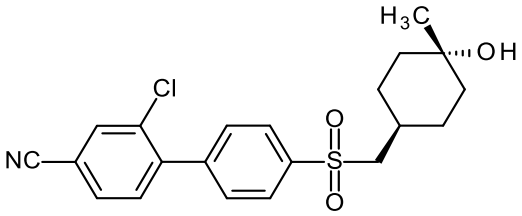
(CHMSA-02-B),



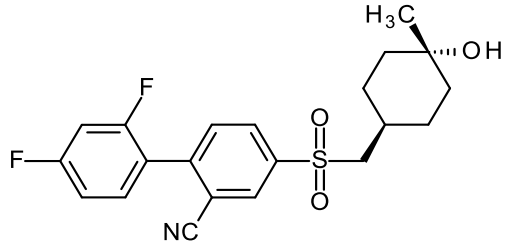
(CHMSA-03-B),



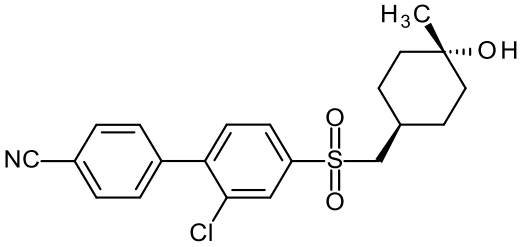
(CHMSA-04-B),



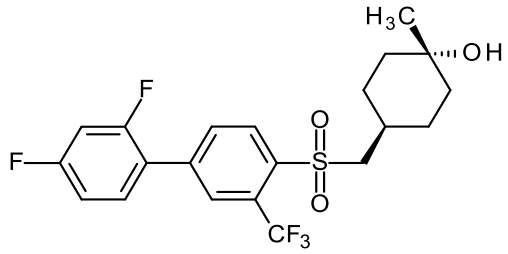
(CHMSA-05-B),



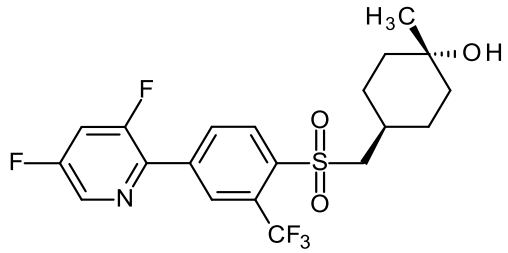
(CHMSA-06-B),



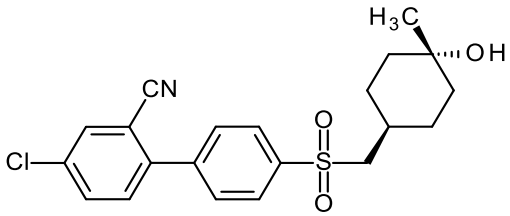
(CHMSA-07-B),



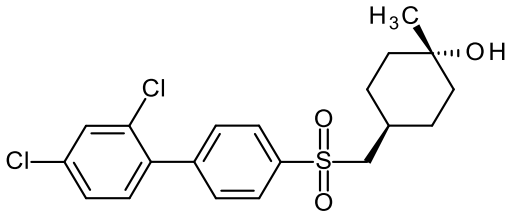
(CHMSA-08-B),



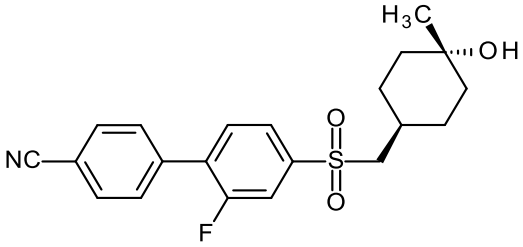
(CHMSA-09-B),




(CHMSA-10-B),




(CHMSA-11-B), and




(CHMSA-12-B).

72. A composition comprising a compound according to any one of claims 1 to 71, and a carrier, diluent, or excipient.

73. A method of preparing a composition comprising the step of mixing a compound according to any one of claims 1 to 71 and a carrier or diluent.

74. A compound according to any one of claims 1 to 71 for use in therapy.

75. Use of a compound according to any one of claims 1 to 71 in the manufacture of a medicament for treatment of:
inflammatory arthritis.

76. Use of a compound according to any one of claims 1 to 71 in the manufacture of a medicament for treatment of:
rheumatoid arthritis; psoriatic arthritis; ankylosing spondylitis; spondyloarthritis; reactive arthritis; infectious arthritis; systemic lupus erythematosus; scleroderma; gout; adult-onset Still's disease; or juvenile idiopathic arthritis.

77. Use of a compound according to any one of claims 1 to 71 in the manufacture of a medicament for treatment of:
rheumatoid arthritis.