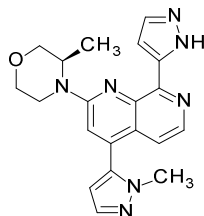


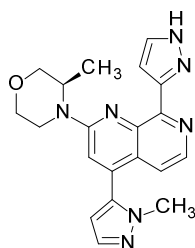
CLAIMS

1. A method for preparing the compound of formula (I)



(I),

5 or its tautomer of formula (Ia)

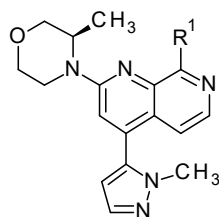


(Ia),

or a mixture thereof,

said method comprising the successive steps of:

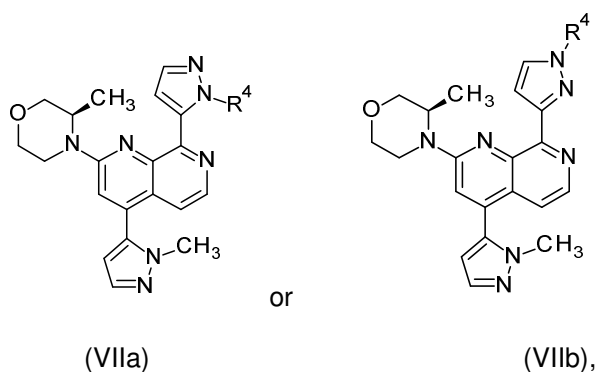
10 (a) reacting an intermediate compound of formula (IXa)



(IXa),

in which

15 R¹ represents a chlorine, bromine or iodine atom or represents a group selected from [(trifluoromethyl)sulfonyl]oxy, [(nonafluorobutyl)sulfonyl]oxy, (methylsulfonyl)oxy, (p-toluenesulfonyl)oxy, (phenylsulfonyl)oxy, [(4-bromophenyl)sulfonyl]oxy, [(4-nitrophenyl)sulfonyl]oxy, [(2-nitrophenyl)sulfonyl]oxy, [(4-isopropylphenyl)sulfonyl]oxy,



or a mixture thereof,

in which

5 R⁴ represents a group selected from tetrahydro-2H-pyran-2-yl, 1-methyl-1-methoxyethyl, 1-methyl-1-phenoxyethyl, 1-methyl-1-benzyloxyethyl; and

(b) removing the group R⁴ from the intermediate compound of formula (VIIa) or (VIIb), thus providing a compound of formula (I), or its tautomer of formula (Ia), or a mixture thereof.

10 2. The method according to claim 1,

wherein the compound of formula (IXa) is (R)-4-(8-chloro-4-(1-methyl-1H-pyrazol-5-yl)-1,7-naphthyridin-2-yl)-3-methyl-morpholine; and/or

wherein the compound of formula (IIIa) is 1-(tetrahydro-2H-pyran-2-yl)-1H-pyrazole-5-boronic acid pinacol ester; and/or

15 wherein the compound of formula (VIIa) is (3R)-3-methyl-4-(4-(1-methyl-1H-pyrazol-5-yl)-8-(1-(tetrahydro-2H-pyran-2-yl)-1H-pyrazol-5-yl)-1,7-naphthyridin-2-yl)morpholine.

3. The method according to claims 1 or 2,

wherein the reaction of the intermediate compound of formula (IXa) with a compound of formula (IIIa) or of formula (IIIb) is performed in the presence of a palladium catalyst
20 and/or a base.

4. The method according to any one of claims 1 to 3, wherein the reaction of the intermediate compound of formula (IXa) with a compound of formula (IIIa) or (IIIb) is performed in an organic solvent, wherein the solvent comprises isopropyl acetate, ethyl acetate, 1,2-dimethoxyethane, 1,4-dioxane, dimethylformamide, tetrahydrofuran, 2-methyltetrahydrofuran, methanol, ethanol, 1-propanol, isopropanol, 1-butanol or 2-butanol;
25

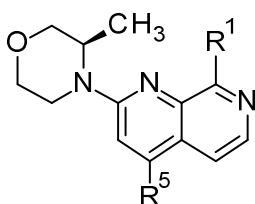
- or wherein said reaction is performed in a solvent mixture comprising one or more of said solvents and water.
5. The method according to any one of claims 1 to 4, wherein the group R⁴ is removed from the intermediate compound of formula (VIIa) or (VIIb) by reacting the intermediate compound of formula (VIIa) or (VIIb) with an acid in a solvent or in a solvent mixture.
6. The method according to any one of claims 1 to 5, wherein the intermediate compound of formula (VIIa) or (VIIb) is the compound of formula (VIId), (VIId) or (VIId/VIId).
7. The method according to any one of claims 1 to 6, wherein the intermediate compound of formula (VIIa), (VIIb), (VIId), (VIId) or (VIId/VIId) is not isolated and/or is not purified prior to the step of removing the group R⁴ from the intermediate compound of formula (VIIa), VII(b), (VIId), (VIId) or (VIId/VIId).
8. The method according to any one of claims 1 to 7, wherein the group R⁴ is removed from the intermediate compound of formula (VIIa) or (VIIb) by reacting the intermediate compound of formula (VIIa) or (VIIb) with aqueous hydrochloric acid in a solvent mixture comprising dichloromethane, methanol and water, to give the crude compound of formula (I) dissolved in an acidified aqueous phase, wherein the pH of the resulting acidified aqueous solution is less than 3 (pH <3).
9. The method according to claim 8, wherein
- (a) the acidified aqueous solution of the crude compound of formula (I) is extracted one or more times with solvent A, wherein solvent A comprises dichloromethane, ethyl acetate, isopropyl acetate, tetrahydrofuran, 2-methyl-tetrahydrofuran, toluol, or chloroform; and/or the acidified aqueous solution of the crude compound of formula (I) is treated one or more times with a Pd scavenger;
- (b) the acidified aqueous solution of the crude compound of formula (I) obtained by previous step (a) is treated with solvent A and with an aqueous solution of a base to give a two-phase system, in which the aqueous phase of said two-phase system has a pH >12;
- (c) the aqueous phase with pH >12 obtained by step (b) is separated from the two-phase system to give a solution of the crude compound of formula (I) in solvent A; and, optionally,
- (d) replacing the solvent A of the solution of the crude compound of formula (I) in solvent A by solvent B, wherein solvent B comprises ethanol, n-propanol, n-butanol, 2-butanol, or isopropanol; to give a solution of the crude compound of formula (I) in solvent B.

10. The method according to claim 9, wherein solvent A comprises dichloromethane, and wherein the aqueous solution of a base comprises an aqueous solution of potassium hydroxide, and wherein solvent B comprises n-butanol.

11. The method according to any one of claims 8 to 10, wherein the crude compound of formula (I) is crystallized in solvent B, preferably in n-butanol, to give the polymorphic form B of the compound of formula (I).

12. The method according to any one of claims 1 to 11 further comprising prior to step (a) according to claim 1 the step of

(a) reacting an intermediate compound of formula (VIIIa)



(VIIIa),

in which

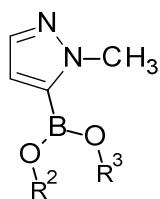
R¹ represents a chlorine, bromine or iodine atom or represents a group selected from [(trifluoromethyl)sulfonyl]oxy,

[(nonafluorobutyl)sulfonyl]oxy, (methylsulfonyl)oxy, (p-toluenesulfonyl)oxy, (phenylsulfonyl)oxy, [(4-bromophenyl)sulfonyl]oxy, [(4-nitrophenyl)sulfonyl]oxy, [(2-nitrophenyl)sulfonyl]oxy, [(4-isopropylphenyl)sulfonyl]oxy, [(2,4,6-triisopropylphenyl)sulfonyl]oxy, [(2,4,6-trimethylphenyl)sulfonyl]oxy, [(4-tert-butylphenyl)sulfonyl]oxy and [(4-methoxyphenyl)sulfonyl]oxy; and

R⁵ represents a chlorine, bromine or iodine atom or represents a group selected from [(trifluoromethyl)sulfonyl]oxy,

[(nonafluorobutyl)sulfonyl]oxy, (methylsulfonyl)oxy, (p-toluenesulfonyl)oxy, (phenylsulfonyl)oxy, [(4-bromophenyl)sulfonyl]oxy, [(4-nitrophenyl)sulfonyl]oxy, [(2-nitrophenyl)sulfonyl]oxy, [(4-isopropylphenyl)sulfonyl]oxy, [(2,4,6-triisopropylphenyl)sulfonyl]oxy, [(2,4,6-trimethylphenyl)sulfonyl]oxy, [(4-tert-butylphenyl)sulfonyl]oxy and [(4-methoxyphenyl)sulfonyl]oxy;

with a compound of formula (VIa)



(VIa),

in which

R² and R³ represent, independently from each other, a hydrogen atom or a C₁-C₆-alkyl group;

or

R² and R³ together represent a -CH₂-CH₂- group or a -CH₂-CH₂-CH₂- group, wherein said -CH₂-CH₂- group or -CH₂-CH₂-CH₂- group is optionally substituted one, two, three or four times with a group selected from methyl and ethyl;

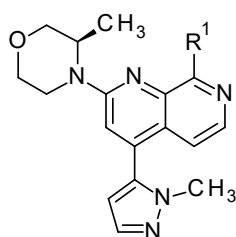
or

R² and R³ together represent a group



wherein "*" represents the point of attachment to the rest of the molecule;

to give an intermediate compound of formula (IXa)



(IXa),

in which

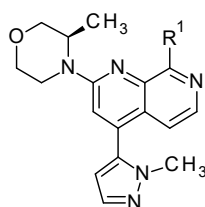
R¹ represents a chlorine, bromine or iodine atom or represents a group selected from [(trifluoromethyl)sulfonyl]oxy, [(nonafluorobutyl)sulfonyl]oxy, (methylsulfonyl)oxy, (p-toluenesulfonyl)oxy, (phenylsulfonyl)oxy, [(4-bromophenyl)sulfonyl]oxy, [(4-nitrophenyl)sulfonyl]oxy,

[(2-nitrophenyl)sulfonyl]oxy, [(4-isopropylphenyl)sulfonyl]oxy,
 [(2,4,6-triisopropylphenyl)sulfonyl]oxy, [(2,4,6-trimethylphenyl)sulfonyl]oxy,
 [(4-*tert*-butylphenyl)sulfonyl]oxy and [(4-methoxyphenyl)sulfonyl]oxy.

13. The method according to claim 12, wherein the compound of formula (VIIIa) is (R)-8-chloro-2-(3-methylmorpholino)-1,7-naphthyridin-4-yl trifluoro-methanesulfonate; and/or
 5 wherein the compound of formula (VIa) is 1-methyl-1H-pyrazole-5-boronic acid pinacol ester.

14. The method according to any one of claims 1 to 13, wherein the reaction of the intermediate compound of formula (VIIIa) with a compound of formula (VIa) is performed in the presence of a palladium catalyst and/or a base.

10 15. An intermediate compound of formula (IXa)

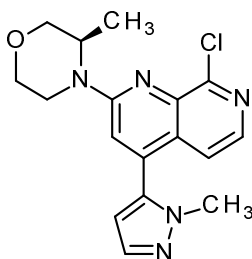


(IXa),

in which

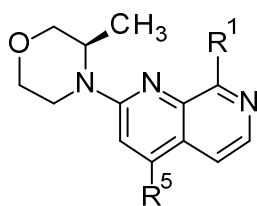
R¹ represents a chlorine, bromine or iodine atom or represents a group selected from
 15 [(trifluoromethyl)sulfonyl]oxy, [(nonafluorobutyl)sulfonyl]oxy,
 (methylsulfonyl)oxy, (p-toluenesulfonyl)oxy, (phenylsulfonyl)oxy,
 [(4-bromophenyl)sulfonyl]oxy, [(4-nitrophenyl)sulfonyl]oxy,
 [(2-nitrophenyl)sulfonyl]oxy, [(4-isopropylphenyl)sulfonyl]oxy,
 [(2,4,6-triisopropylphenyl)sulfonyl]oxy, [(2,4,6-trimethylphenyl)sulfonyl]oxy, [(4-*tert*-
 20 butylphenyl)sulfonyl]oxy and [(4-methoxyphenyl)sulfonyl]oxy.

16. The intermediate compound of claim 15, which is the compound of formula (IXb)



(IXb).

17. An intermediate compound of formula (VIIIa)

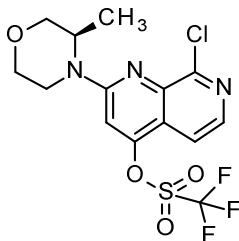


(VIIIa),

in which

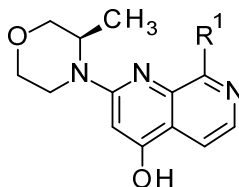
- 5 R¹ represents a chlorine or bromine atom, preferably a chlorine atom, and
R⁵ represents a group selected from [(trifluoromethyl)sulfonyl]oxy,
[(nonafluorobutyl)sulfonyl]oxy, (methylsulfonyl)oxy, (p-toluenesulfonyl)oxy,
(phenylsulfonyl)oxy, [(4-bromophenyl)sulfonyl]oxy, [(4-nitrophenyl)sulfonyl]oxy,
[(2-nitrophenyl)sulfonyl]oxy, [(4-isopropylphenyl)sulfonyl]oxy,
10 [(2,4,6-triisopropylphenyl)sulfonyl]oxy, [(2,4,6-trimethylphenyl)sulfonyl]oxy, [(4-*tert*-
butylphenyl)sulfonyl]oxy and [(4-methoxyphenyl)sulfonyl]oxy, preferably a
[(trifluoromethyl)sulfonyl]oxy group.

18. The intermediate compound of claim 17, which is the compound of formula (VIIIb)



(VIIIb).

19. The method according to any one of claims 1 to 14 further comprising - prior to step
(a) according to claim 12 - the step of reacting an intermediate compound of formula (II)



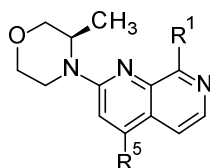
(II),

- 20 in which

R¹ represents a chlorine, bromine or iodine atom or represents a group selected from [(trifluoromethyl)sulfonyl]oxy, [(nonafluorobutyl)sulfonyl]oxy, (methylsulfonyl)oxy, (p-toluenesulfonyl)oxy, (phenylsulfonyl)oxy, [(4-bromophenyl)sulfonyl]oxy, [(4-nitrophenyl)sulfonyl]oxy, [(2-nitrophenyl)sulfonyl]oxy, [(4-isopropylphenyl)sulfonyl]oxy, [(2,4,6-triisopropylphenyl)sulfonyl]oxy, [(2,4,6-trimethylphenyl)sulfonyl]oxy, [(4-*tert*-butylphenyl)sulfonyl]oxy and [(4-methoxyphenyl)sulfonyl]oxy;

with a compound selected from N-phenyl-bis(trifluoromethanesulfonimide, trifluoromethanesulfonic anhydride, methanesulfonic acid chloride, p-toluenesulfonyl chloride, nonafluorobutanesulfonyl chloride, nonafluorobutanesulfonyl fluoride, benzenesulfonyl chloride, 4-bromobenzenesulfonyl chloride, 4-nitrobenzenesulfonyl chloride, 2-nitrobenzenesulfonyl chloride, 4-isopropylbenzenesulfonyl chloride, 2,4,6-triisopropylbenzenesulfonyl chloride, 2-mesitylenesulfonyl chloride (=2,4,6-trimethylbenzenesulfonyl chloride), 4-*tert*-butylbenzenesulfonyl chloride and 4-methoxybenzenesulfonyl chloride;

to give an intermediate compound of formula of formula (VIIIa)



(VIIIa),

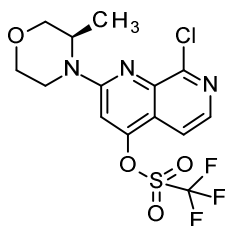
in which

R¹ represents a chlorine, bromine or iodine atom or represents a group selected from [(trifluoromethyl)sulfonyl]oxy, [(nonafluorobutyl)sulfonyl]oxy, (methylsulfonyl)oxy, (p-toluenesulfonyl)oxy, (phenylsulfonyl)oxy, [(4-bromophenyl)sulfonyl]oxy, [(4-nitrophenyl)sulfonyl]oxy, [(2-nitrophenyl)sulfonyl]oxy, [(4-isopropylphenyl)sulfonyl]oxy, [(2,4,6-triisopropylphenyl)sulfonyl]oxy, [(2,4,6-trimethylphenyl)sulfonyl]oxy, [(4-*tert*-butylphenyl)sulfonyl]oxy and [(4-methoxyphenyl)sulfonyl]oxy;

R⁵ represents a chlorine, bromine or iodine atom or represents a group selected from [(trifluoromethyl)sulfonyl]oxy, [(nonafluorobutyl)sulfonyl]oxy, (methylsulfonyl)oxy, (p-toluenesulfonyl)oxy, (phenylsulfonyl)oxy, [(4-bromophenyl)sulfonyl]oxy, [(4-nitrophenyl)sulfonyl]oxy, [(2-nitrophenyl)sulfonyl]oxy, [(4-isopropylphenyl)sulfonyl]oxy,

[(2,4,6-triisopropylphenyl)sulfonyl]oxy, [(2,4,6-trimethylphenyl)sulfonyl]oxy, [(4-*tert*-butylphenyl)sulfonyl]oxy and [(4-methoxyphenyl)sulfonyl]oxy.

20. The method according to claim 19, wherein the compound of formula (II) is (R)-8-chloro-2-(3-methylmorpholino)-1,7-naphthyridin-4-ol, which is reacted with
- 5 trifluoromethanesulfonic anhydride to give an intermediate compound of formula (VIIIb)



(VIIIb).