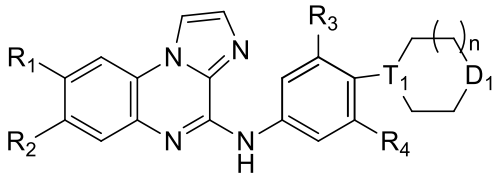
WHAT IS CLAIMED:

1. A compound represented by formula (I) or a pharmaceutically acceptable salt thereof,



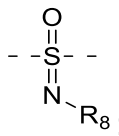
(I)

wherein,

R_1 and R_2 are each independently selected from H and pyrazolyl, and R_1 and R_2 are not both pyrazolyl or H;

R_3 and R_4 are each independently selected from H, F, Cl, Br, I, OH, NH_2, CN, C_{1-3} alkyl and C_{1-3} alkoxy, wherein C_{1-3} alkyl and C_{1-3} alkoxy are optionally substituted with 1, 2 or 3 halogens;

T_1 is selected from CH and N;

D_1 is selected from -O-, $-C(R_5)(R_6)-$, $-N(R_7)-$ and ;

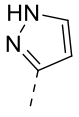
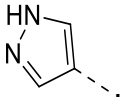
R_5 and R_6 are each independently selected from H, F, Cl, Br, I, OH and C_{1-3} alkyl, wherein C_{1-3} alkyl is optionally substituted with 1, 2 or 3 halogens;

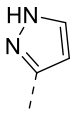
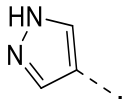
alternatively, R_5 and R_6 together with a carbon atom to which they are both connected form an oxetanyl group;

R_7 is selected from H,  and C_{1-3} alkyl, wherein C_{1-3} alkyl is optionally substituted with 1, 2 or 3 halogens;

R_8 is selected from H and $-C(=O)-C_{1-3}$ alkyl; and

n is selected from 1 and 2.

2. The compound or the pharmaceutically acceptable salt thereof according to claim 1, wherein R_1 is selected from H,  and .

3. The compound or the pharmaceutically acceptable salt thereof according to claim 1, wherein R_2 is selected from H,  and .

4. The compound or the pharmaceutically acceptable salt thereof according to claim 1, wherein R_3 is selected from H, F, Cl, Br, I, OH, NH_2, CN, CH_3 and CH_3O.

5. The compound or the pharmaceutically acceptable salt thereof according to claim 1, wherein R_4 is selected from H, F, Cl, Br, I, OH, NH_2, CN, CH_3 and CH_3O.

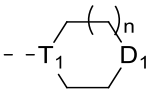
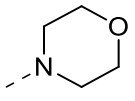
6. The compound or the pharmaceutically acceptable salt thereof according to claim 1, wherein R_5 is selected from H, F, Cl, Br, I, OH, NH_2 and CH_3.

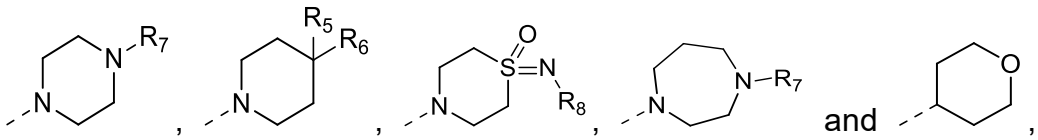
7. The compound or the pharmaceutically acceptable salt thereof according to claim 1, wherein R_6 is selected from H, F, Cl, Br, I, OH, NH_2 and CH_3.

8. The compound or the pharmaceutically acceptable salt thereof according to claim 1, wherein R_5 and R_6 together with the carbon atom to which they are both connected form .

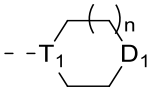
9. The compound or the pharmaceutically acceptable salt thereof according to claim 1, wherein R_7 is selected from H, CH_3 and .

10. The compound or the pharmaceutically acceptable salt thereof according to claim 1, wherein R_8 is selected from H and -C(=O)-CH_3.

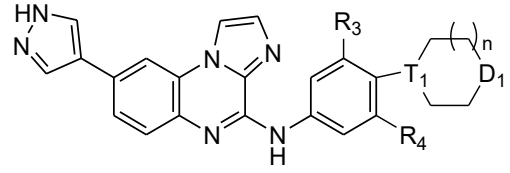
11. The compound or the pharmaceutically acceptable salt thereof according to claim 1 or any one of claims 6-10, wherein  is selected from ,



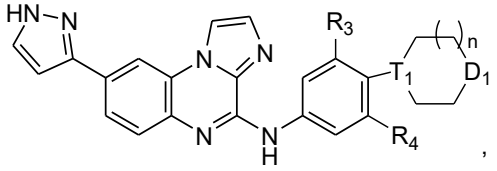
wherein R_5, R_6, R_7 and R_8 are defined according to claim 1 or any one of claims 6-10.

12. The compound or the pharmaceutically acceptable salt thereof according to claim 11, wherein  is selected from .

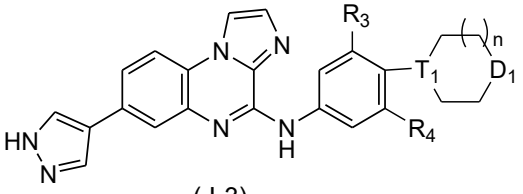
13. The compound or the pharmaceutically acceptable salt thereof according to any one of claims 1-12, wherein the compound is selected from:



(I-1)

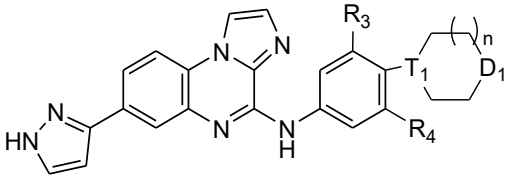


(I-2)



(I-3)

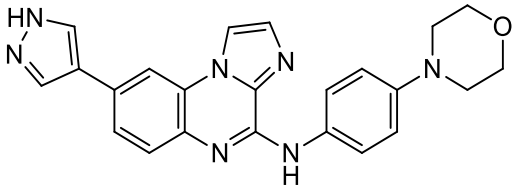
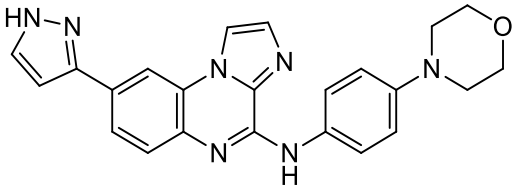
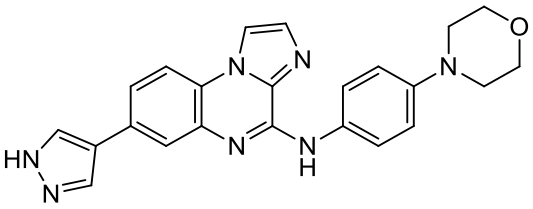
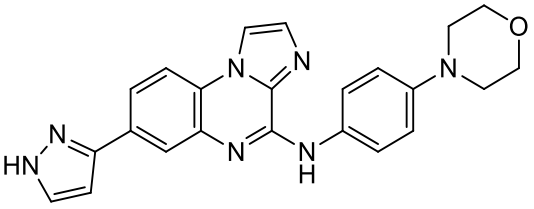
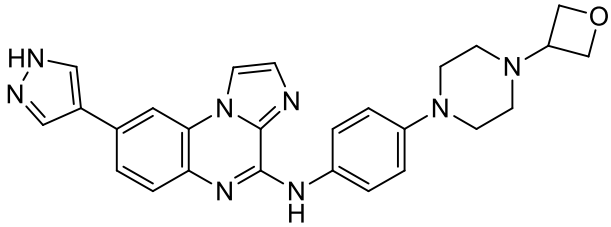
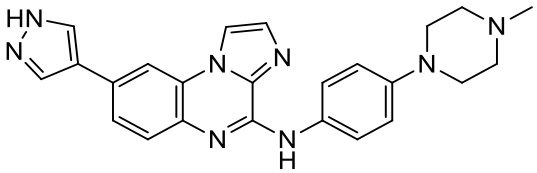
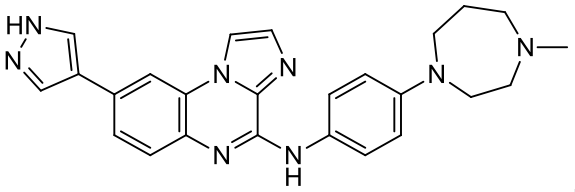
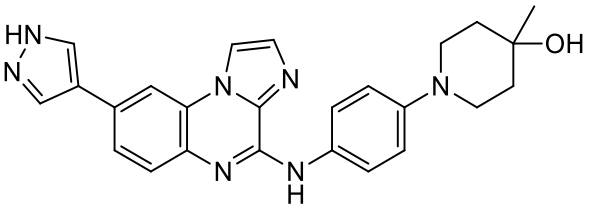
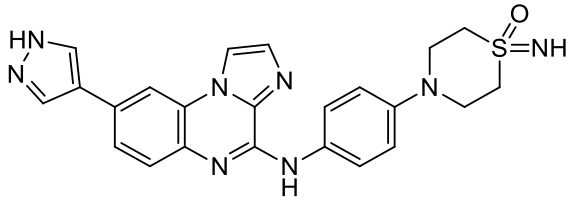
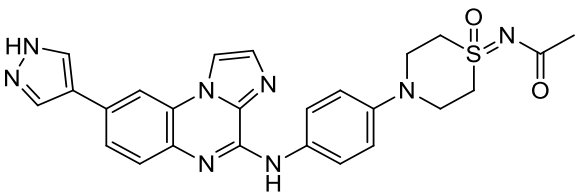
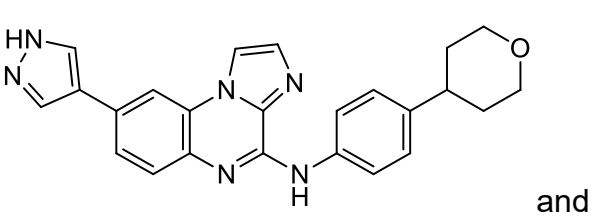
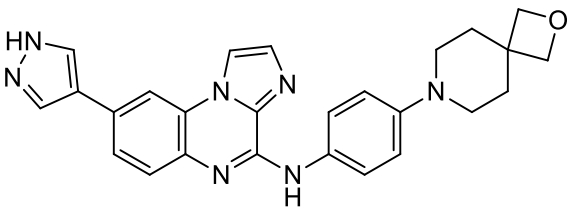
and



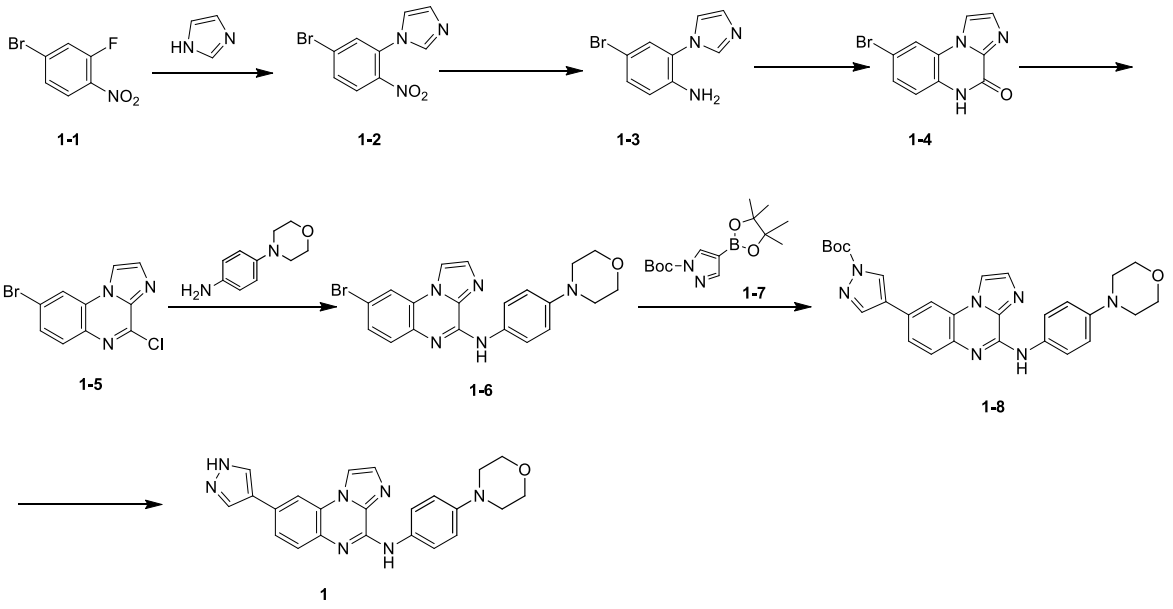
(I-4)

wherein, R_3, R_4, T_1, D_1 and n are defined according to any one of claims 1-12.

14. A compound represented by any of the following formula or a pharmaceutically acceptable salt thereof,


,

,

,

,

,

,

,

,

,

,

and

.

15. A method for preparing a compound of formula 1, comprising:



,

step 1 of synthesizing a compound of formula 1-2 by reacting a compound of formula 1-1 with imidazole;

step 2 of synthesizing a compound of formula 1-3 from the compound of formula 1-2;

step 3 of synthesizing a compound of formula 1-4 from the compound of formula 1-3;

step 4 of synthesizing a compound of formula 1-5 from the compound of formula 1-4;

step 5 of synthesizing a compound of formula 1-6 by reacting the compound of formula 1-5 with 4-morpholinoaniline;

step 6 of synthesizing a compound of formula 1-8 by reacting the compound of formula 1-6 with a compound of formula 1-7; and

step 7 of synthesizing the compound of formula 1 from the compound of formula 1-8.

16. The method according to claim 15, wherein:

step 1 comprises adding imidazole and DIEA to a solution of the compound of formula 1-1 in acetonitrile, stirring the reaction solution at 90°C for 16 hours, concentrating the reaction solution, adding water, and extracting the mixture twice with ethyl acetate, and then combining, drying, filtering and concentrating the organic phases from the extraction to obtain the compound of formula 1-2;

step 2 comprises adding stannous chloride dihydrate to a solution of the compound of formula 1-2 in ethanol, stirring the reaction solution at 90°C for 3 hours, concentrating the reaction solution under reduced pressure, adding ethyl acetate, neutralizing the solution with saturated sodium bicarbonate solution to pH=9 to

precipitate a white solid, filtering off the precipitated solid, adding to the filtrate with water, extracting the filtrate twice with ethyl acetate, and combining, washing with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain the compound of formula 1-3;

step 3 comprises adding CDI to the compound of formula 1-3 in dichlorobenzene under the protection of nitrogen, stirring the reaction solution at 190 degrees Celsius for 2 hours, cooling the reaction solution to room temperature, filtering the reaction solution, and drying the filter cake from the filtering to obtain the compound of formula 1-4;

step 4 comprises adding the compound of formula 1-4 and dimethylaniline to phosphorus oxychloride, stirring the reaction solution at 110 degrees Celsius for 1.5 hours, concentrating the reaction solution, adjusting the pH to 9 with saturated aqueous sodium bicarbonate solution to precipitate a solid, filtering the precipitated solid, and drying the filter cake from the filtering to obtain the compound of formula 1-5;

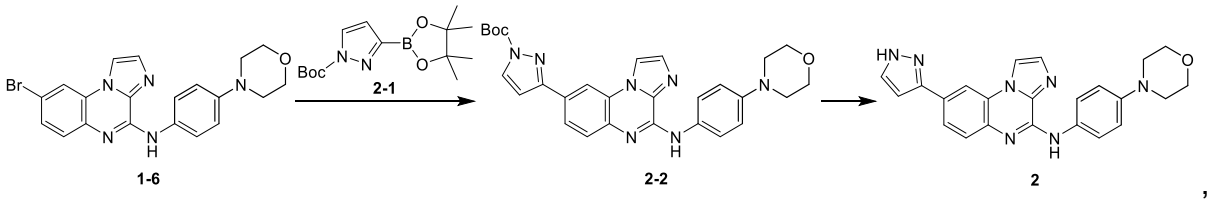
step 5 comprises adding 4-morpholinoaniline and DIEA to the compound of formula 1-5 in isopropanol, stirring the reaction solution at 100 degrees Celsius for 32 hours, filtering the reaction solution, and drying the filter cake from the filtering to obtain the compound of formula 1-6;

step 6 comprises adding the compound of formula 1-6, the compound of formula 1-7, potassium carbonate and $Pd(dppf)Cl_2$ to 1,4-dioxane and water, stirring the reaction solution at 80°C for 4 hours under the protection of nitrogen, adding the reaction solution with water, extracting the reaction solution twice with ethyl acetate, and combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain the compound of formula 1-8; and

step 7 comprises adding trifluoroacetic acid to a solution of the compound of formula 1-8 in dichloromethane, stirring the reaction solution at 25 degrees Celsius for 1 hour, adjusting the pH of the reaction solution to 8 with aqueous ammonia, adding water, and extracting the reaction solution twice with dichloromethane, then combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction, adding acetone to the crude product, and heating to 60 degrees Celsius, stirring for 0.5 hours, cooling to room

temperature, filtering, and vacuum drying the crude product to obtain the compound of formula 1.

17. A method for preparing a compound of formula 2, comprising:



,

step 1 of synthesizing a compound of formula 2-2 by reacting a compound of formula 1-6 with a compound of formula 2-1; and

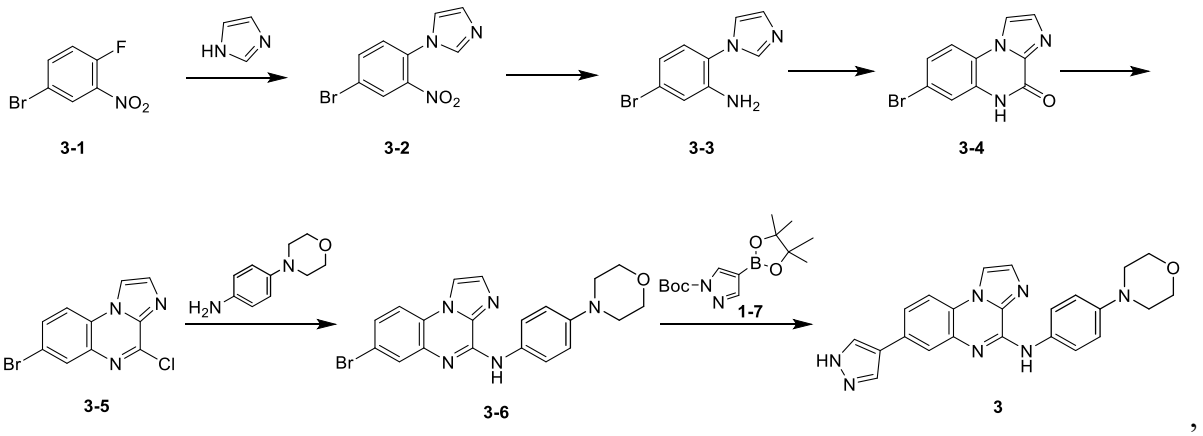
step 2 of synthesizing a compound of formula 2 from the compound of formula 2-2.

18. The method according to claim 17, wherein:

step 1 comprises adding the compound of formula 1-6, the compound of formula 2-1, potassium carbonate and Pd(dppf)Cl_2 to 1,4-dioxane and water, stirring the reaction solution at 80°C for 4 hours under the protection of nitrogen, adding water to the reaction solution, and extracting the mixture twice with ethyl acetate, and then combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain the compound of formula 2-2; and

step 2 comprises adding trifluoroacetic acid to a solution of the compound of formula 2-2 in dichloromethane; stirring the reaction solution at 25 degrees Celsius for 2 hours, adjusting the pH of the reaction solution to 8 with aqueous ammonia, adding water, extracting the solution twice with dichloromethane, then combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction, and separating and purifying the crude product by high performance liquid chromatography to obtain the compound of formula 2.

19. A method for preparing a compound of formula 3, comprising:



step 1 of synthesizing a compound of formula 3-2 by reacting a compound of formula 3-1 with imidazole;

step 2 of synthesizing a compound of formula 3-3 from the compound of formula 3-2;

step 3 of synthesizing a compound of formula 3-4 from the compound of formula 3-3;

step 4 of synthesizing a compound of formula 3-5 from the compound of formula 3-4;

step 5 of synthesizing a compound of formula 3-6 by reacting the compound of formula 3-5 with 4-morpholinoaniline; and

step 6 of synthesizing the compound of formula 3 by reacting the compound of formula 3-6 with a compound of formula 1-7.

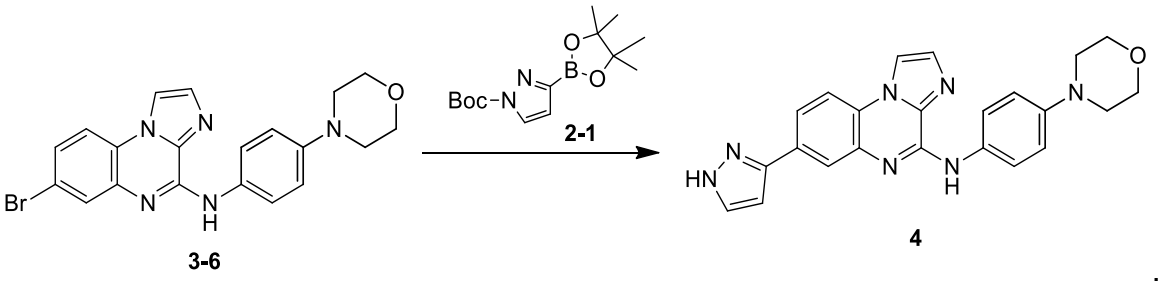
20. The method according to claim 19, wherein:

step 1 comprises adding imidazole and DIEA to a solution of the compound of formula 3-1 in acetonitrile, stirring the reaction solution at 90°C for 16 hours, concentrating the reaction solution, adding water, extracting the mixture twice with ethyl acetate, and then combining, washing once with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain the compound of formula 3-2;

step 2 comprises adding stannous chloride dihydrate to a solution of the compound of formula 3-2 in ethanol, stirring the reaction solution at 80°C for 3 hours, concentrating the reaction solution under reduced pressure, adding ethyl acetate, neutralizing the solution with saturated sodium bicarbonate solution to pH=9 to precipitate a white solid, filtering off the precipitated solid, adding water to the filtrate, extracting the filtrate twice with ethyl acetate, and combining, washing with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic

phases from the extraction to obtain the compound of formula 3-3;
step 3 comprises adding CDI to the compound of formula 3-3 in dichlorobenzene under the protection of nitrogen, stirring the reaction solution at 190 degrees Celsius for 2 hours, cooling the reaction solution to room temperature, filtering the reaction solution, and drying the filter cake from the filtering to obtain the compound of formula 3-4;
step 4 comprises adding the compound of formula 3-4 and dimethylaniline to phosphorus oxychloride, stirring the reaction solution at 110 degrees Celsius for 1.5 hours, concentrating the reaction solution, adjusting the pH to 9 with saturated aqueous sodium bicarbonate solution to precipitate a solid, filtering the precipitated solid, drying the filter cake from the filtering, and purifying the filter cake by column chromatography to obtain the compound of formula 3-5;
step 5 comprises adding 4-morpholinoaniline and DIEA to the compound of formula 3-5 in isopropanol, stirring the reaction solution at 100 degrees Celsius for 16 hours, filtering the reaction solution, and drying the filter cake from the filtering to obtain the compound of formula 3-6; and
step 6 comprises adding the compound of formula 3-6, the compound of formula 1-7, potassium carbonate and $Pd(dppf)Cl_2$ to 1,4-dioxane and water, stirring the reaction solution at 80°C under the protection of nitrogen, adding water to the reaction solution, extracting the reaction solution twice with ethyl acetate, then combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain a crude product, and separating and purifying the crude product by high performance liquid chromatography to obtain the compound of formula 3.

21. A method for preparing a compound of formula 4, comprising synthesizing the compound of formula 4 by reacting a compound of formula 3-6 with a compound of formula 2-1,

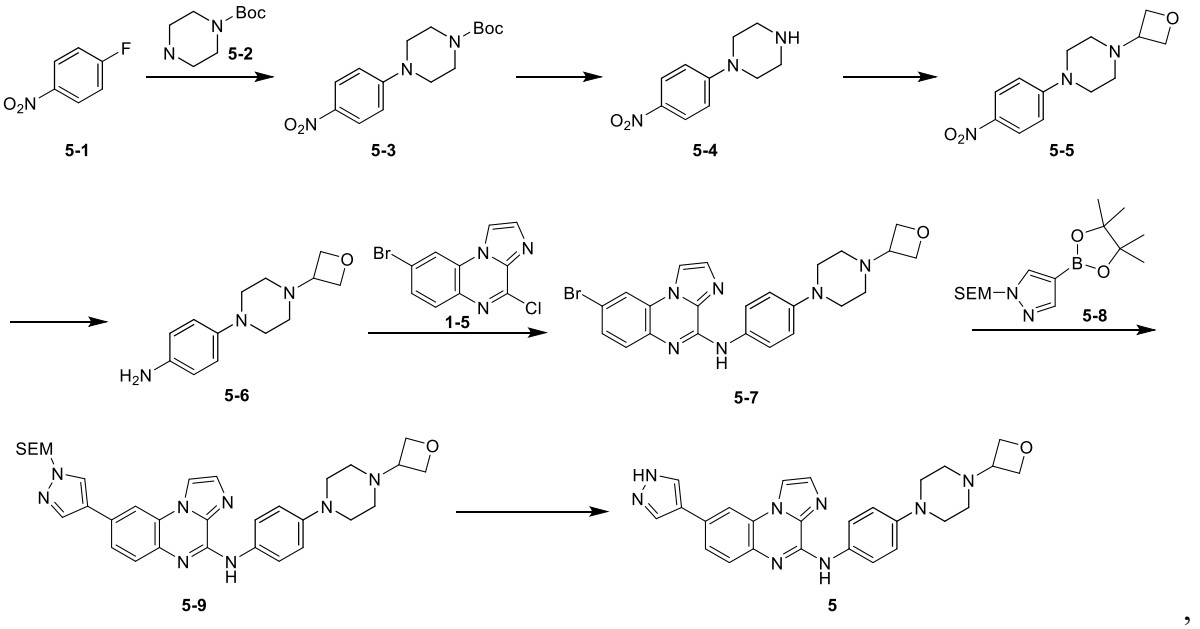


.

22. The method according to claim 21, comprising

adding the compound of formula 3-6, the compound of formula 2-1, potassium carbonate and $Pd(dppf)Cl_2$ to 1,4-dioxane and water, stirring the reaction solution at 90°C for 4 hours under the protection of nitrogen, adding water to the reaction solution, and extracting the mixture twice with ethyl acetate, then combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain a crude product, and separating and purifying the crude product by high performance liquid chromatography to obtain the compound of formula 4.

23. A method for preparing a compound of formula 5, comprising:



,

step 1 of synthesizing a compound of formula 5-3 by reacting a compound of formula 5-1 with a compound of formula 5-2;

step 2 of synthesizing a compound of formula 5-4 from the compound of formula 5-3;

step 3 of synthesizing a compound of formula 5-5 from the compound of formula 5-4;
step 4 of synthesizing a compound of formula 5-6 from the compound of formula 5-5;
step 5 of synthesizing a compound of formula 5-7 by reacting the compound of formula 5-5 with the compound of formula 5-6;
step 6 of synthesizing a compound of formula 5-9 by reacting the compound of formula 5-7 with a compound of formula 5-8; and
step 7 of synthesizing the compound of formula 5 from the compound of formula 5-9.

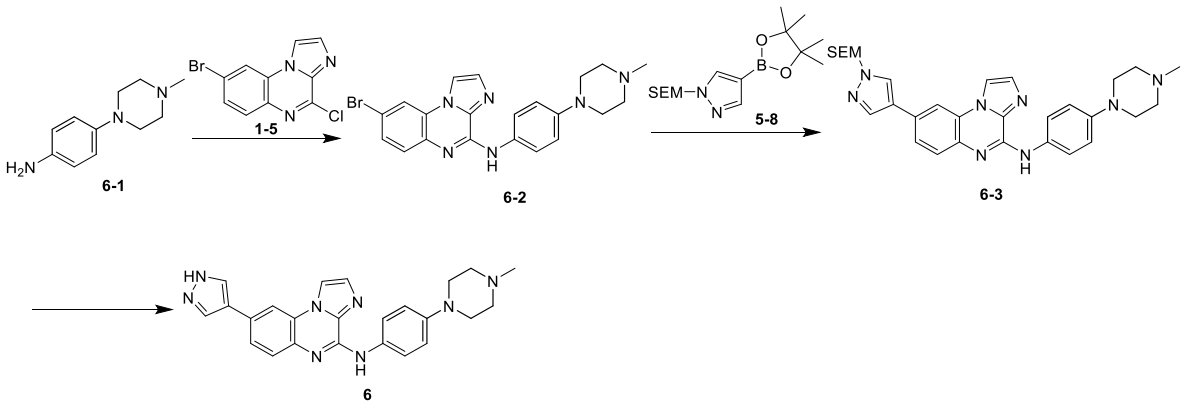
24. The method according to claim 23, wherein:
step 1 comprises adding potassium carbonate and the compound of formula 5-2 to a solution of the compound of formula 5-1 in DMSO, stirring the reaction solution at 80 degrees Celsius for 16 hours, concentrating the reaction solution, adding water, and extracting the mixture three times with ethyl acetate, and then combining, drying, filtering and concentrating the organic phases from the extraction to obtain the compound of formula 5-3;
step 2 comprises adding the compound of formula 5-3 in small batches to a dioxane hydrochloride solution, stirring the mixture at room temperature for 16 hours, and concentrating the reaction solution under reduced pressure to obtain the compound of formula 5-4;
step 3 comprises adding sodium acetate to a solution of the compound of formula 5-4 in ethanol under the protection of nitrogen, stirring the mixture at room temperature for 1 hour before adding oxetanone and zinc chloride, then stirring the mixture at room temperature for 2 hours before adding sodium cyanoborohydride, stirring the mixture at 40 degrees Celsius for 16 hours, then adding water to the reaction solution, extracting the mixture three times with ethyl acetate, and then combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain the compound of formula 5-5;
step 4 comprises adding palladium carbon to a solution of the compound of formula 5-5 in methanol under the protection of nitrogen, then replacing the nitrogen with hydrogen by a hydrogen balloon three times, stirring the reaction at room temperature for 16 hours under hydrogen, then filtering the reaction solution, and concentrating and drying the filtrate to obtain the compound of formula 5-6;

step 5 comprises adding the compound of formula 5-6 and DIEA to a solution of the compound of formula 1-5 in isopropanol, stirring the reaction solution at 100 degrees Celsius for 16 hours, cooling the reaction solution to room temperature, filtering the reaction solution, and drying the filter cake from the filtering to obtain the compound of formula 5-7;

step 6 comprises adding the compound of formula 5-7, the compound of formula 5-8, potassium carbonate and $Pd(dppf)Cl_2$ to 1,4-dioxane and water, stirring the reaction solution at 100°C for 16 hours under the protection of nitrogen, adding water to the reaction solution, extracting the mixture three times with ethyl acetate, and combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain the compound of formula 5-9; and

step 7 comprises adding tetrabutylammonium fluoride and ethylenediamine to a solution of the compound of formula 5-9 in tetrahydrofuran, stirring the reaction solution at 75 degrees Celsius for 16 hours, adjusting the pH of the reaction solution to 8 with sodium hydroxide solution, adding water, extracting the solution twice with dichloromethane, then combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain a crude product, and separating the crude product by silica gel column chromatography to obtain the compound of formula 5.

25. A method for preparing a compound of formula 6, comprising:



,

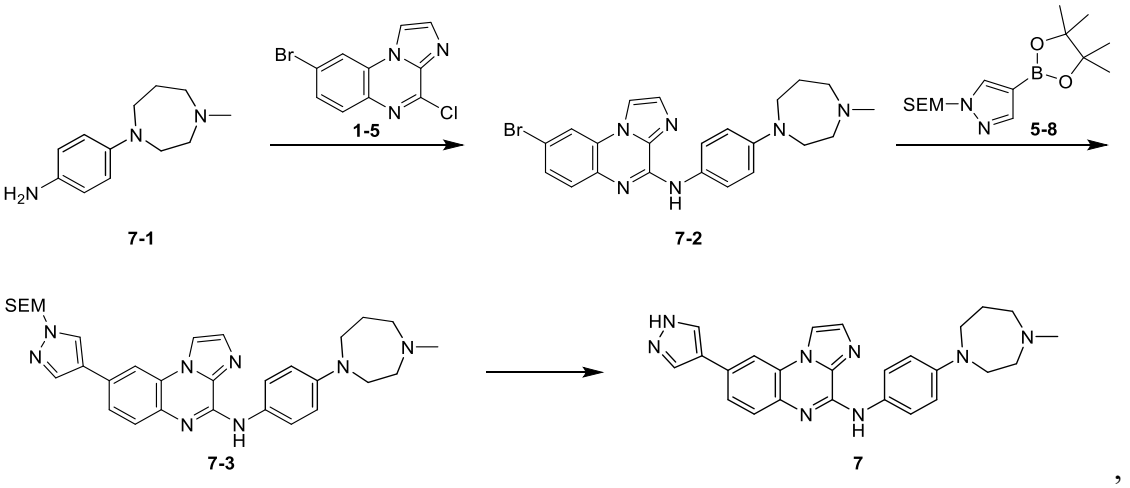
step 1 of synthesizing a compound of formula 6-2 by reacting a compound of formula 6-1 with a compound of formula 1-5;

step 2 of synthesizing a compound of formula 6-3 by reacting the compound of formula

6-2 with a compound of formula 5-8; and
step 3 of synthesizing the compound of formula 6 from the compound of formula 6-3.

26. The method according to claim 25, wherein:
step 1 comprises adding the compound of formula 6-1 and DIEA to a solution of compound of formula 1-5 in dimethyl sulfoxide, stirring the reaction solution at 120 degrees Celsius for 16 hours, cooling the reaction solution to room temperature, then adding water to precipitate a solid, filtering the mixture, slurrying the filter cake from the filtering with isopropanol, and filtering and drying the slurry to obtain the compound of formula 6-2;
step 2 comprises adding the compound of formula 6-2, the compound of formula 5-8, potassium carbonate and $Pd(dppf)Cl_2$ to 1,4-dioxane and water, then stirring the reaction solution at 100°C for 16 hours under the protection of nitrogen, adding water to the reaction solution, extracting the solution three times with ethyl acetate, combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain a crude product, and separating the crude product by silica gel column chromatography to obtain the compound of formula 6-3; and
step 3 comprises adding the compound of formula 6-3 to dioxane hydrochloride, stirring the reaction solution at 25 degrees Celsius for 16 hours, adjusting the pH of the reaction solution to 8 with aqueous sodium hydroxide solution, adding water, extracting the solution twice with dichloromethane, then combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain a crude product, adding acetone to the crude product, stirring the mixture for 0.5 hours, filtering the mixture, and drying the filter cake from the filtering to obtain the compound of formula 6.

27. A method for preparing a compound of formula 7, comprising:



,

step 1 of synthesizing a compound of formula 7-2 by reacting a compound of formula 7-1 with a compound of formula 1-5;

step 2 of synthesizing a compound of formula 7-3 by reacting the compound of formula 7-2 with a compound of formula 5-8; and

step 3 of synthesizing the compound of formula 7 from the compound of formula 7-3.

28. The method according to claim 27, wherein:

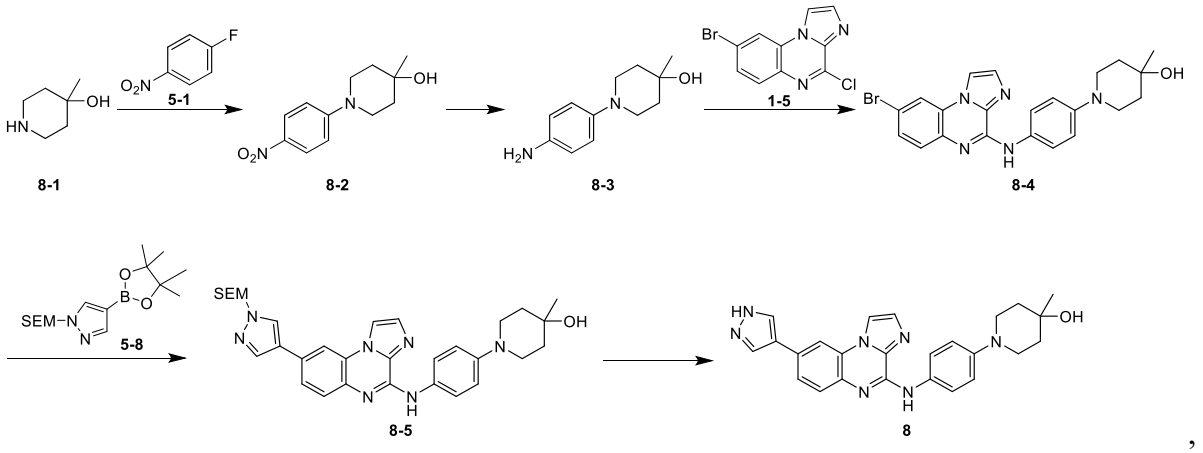
step 1 comprises adding the compound of formula 7-1 and DIEA to a solution of compound of formula 1-5 in dimethyl sulfoxide, stirring the reaction solution at 120 degrees Celsius for 16 hours, cooling the reaction solution to room temperature, then adding water to precipitate a solid, filtering the mixture, slurrying the filter cake from the filtering with isopropanol, and filtering and drying the slurry to obtain the compound of formula 7-2;

step 2 comprises adding the compound of formula 7-2, the compound of formula 5-8, potassium carbonate and Pd(dppf)Cl_2 to 1,4-dioxane and water, then stirring the reaction solution at 100°C for 16 hours under the protection of nitrogen, adding water to the reaction solution, extracting the solution three times with ethyl acetate, combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain a crude product, and separating the crude product by silica gel column chromatography to obtain the compound of formula 7-3; and

step 3 comprises adding the compound of formula 7-3 to dioxane hydrochloride, stirring the reaction solution at 25 degrees Celsius for 16 hours, adjusting the pH of the reaction solution to 8 with aqueous sodium hydroxide solution, adding water,

extracting the solution twice with dichloromethane, then combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain a crude product, and separating the crude product by silica gel column chromatography to obtain the compound of formula 7.

29. A method for preparing a compound of formula 8, comprising:



,

step 1 of synthesizing a compound of formula 8-2 by reacting a compound of formula 8-1 with a compound of formula 5-1;

step 2 of synthesizing a compound of formula 8-3 from the compound of formula 8-2;

step 3 of synthesizing a compound of formula 8-4 by reacting the compound of formula 8-3 with a compound of formula 1-5;

step 4 of synthesizing a compound of formula 8-5 by reacting the compound of formula 8-4 with a compound of formula 5-8; and

step 5 of synthesizing the compound of formula 8 from the compound of formula 8-5.

30. The method according to claim 29, wherein:

step 1 comprises adding potassium carbonate and the compound of formula 8-1 to a solution of the compound of formula 5-1 in DMSO, stirring the reaction solution at 100 degrees Celsius for 16 hours, concentrating the reaction solution, adding water, and extracting the mixture three times with ethyl acetate, and combining, drying, filtering and concentrating the organic phases from the extraction to obtain the compound of formula 8-2;

step 2 comprises adding ammonium chloride and iron powder to a solution of the

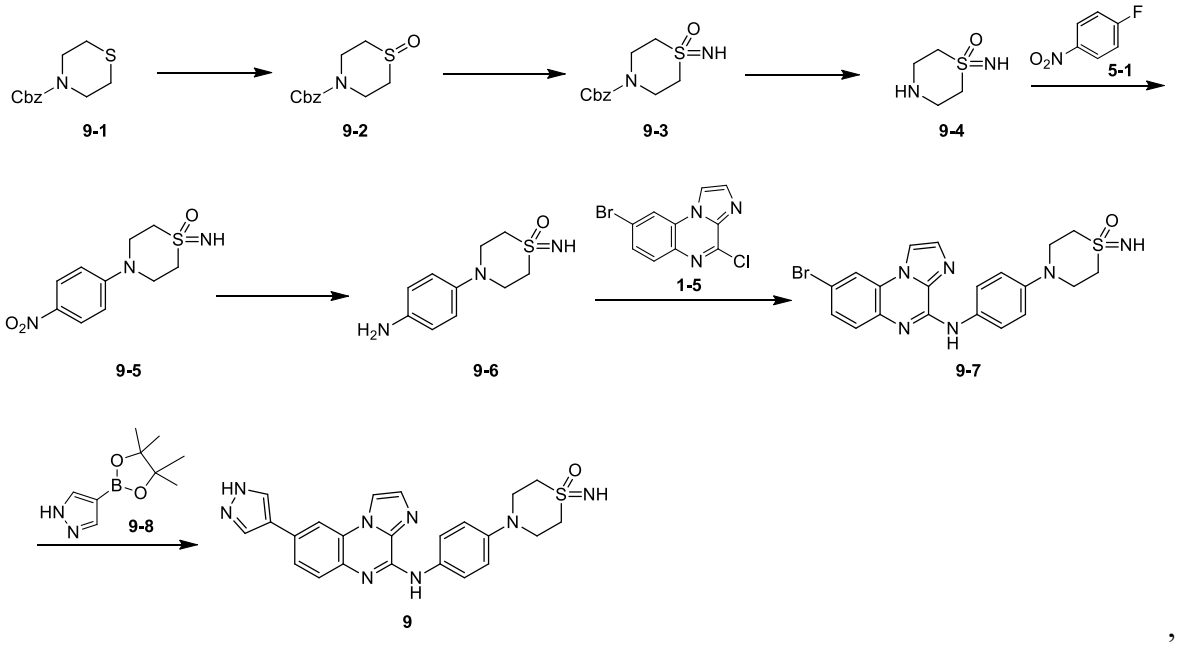
compound of formula 8-2 in ethanol and water under the protection of nitrogen, stirring the reaction solution at 100 degrees Celsius for 16 hours, then filtering the reaction solution, adding water to the filtrate, extracting the mixture three times with ethyl acetate, and combining, drying, filtering and concentrating the organic phases from the extraction to obtain the compound of formula 8-3;

step 3 comprises adding the compound of formula 8-3 and DIEA to a solution of the compound of formula 1-5 in dimethyl sulfoxide, stirring the reaction solution at 120 degrees Celsius for 16 hours, then cooling the reaction solution to room temperature, adding water to precipitate a solid, filtering the mixture, slurrying the filter cake from the filtering with isopropanol, and filtering and drying the slurry to obtain the compound of formula 8-4;

step 4 comprises adding the compound of formula 8-4, the compound of formula 5-8, potassium carbonate and $Pd(dppf)Cl_2$ to 1,4-dioxane and water, then stirring the reaction solution at 100°C for 16 hours under the protection of nitrogen, adding water to the reaction solution, extracting the solution three times with dichloromethane, combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain a crude product, and separating the crude product by silica gel column chromatography to obtain the compound of formula 8-5; and

step 5 comprises adding the compound of formula 8-5 to dioxane hydrochloride, stirring the reaction solution at 25 degrees Celsius for 16 hours, then adjusting the pH of the reaction solution to 8 with aqueous sodium hydroxide solution, adding water, extracting the solution twice with dichloromethane, then combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain a crude product, and separating the crude product by silica gel column chromatography to obtain the compound of formula 8.

31. A method for preparing a compound of formula 9, comprising:



,

step 1 of synthesizing a compound of formula 9-2 from a compound of formula 9-1;

step 2 of synthesizing a compound of formula 9-3 from the compound of formula 9-2;

step 3 of synthesizing a compound of formula 9-4 from the compound of formula 9-3;

step 4 of synthesizing a compound of formula 9-5 by reacting the compound of formula 9-4 with a compound of formula 5-1;

step 5 of synthesizing a compound of formula 9-6 from the compound of formula 9-5;

step 6 of synthesizing a compound of formula 9-7 by reacting the compound of formula 9-6 with a compound of formula 1-5; and

step 7 of synthesizing the compound of formula 9 by reacting the compound of formula 9-7 with a compound of formula 9-8.

32. The method according to claim 31, wherein:

step 1 comprises cooling a solution of the compound of formula 9-1 in methanol and water to 0 degrees Celsius, adding sodium periodate to the solution, stirring the reaction solution at 20 degrees Celsius for 16 hours, filtering the reaction solution, washing the filter cake from the filtering three times with ethyl acetate, and combining, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the washing to obtain the compound of formula 9-2;

step 2 comprises adding trifluoroacetamide, rhodium acetate, magnesium oxide diacetoxyiodobenzene and potassium carbonate to a solution of the compound of formula 9-2 in dichloromethane under the protection of nitrogen, stirring the reaction

solution at 20 degrees Celsius for 16 hours, then filtering the reaction solution, washing the filter cake from the filtering three times with dichloromethane, combining, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the washing to obtain a crude product, and separating and purifying the crude product by silica gel column chromatography to obtain the compound of formula 9-3;

step 3 comprises adding the compound of formula 9-3 to a solution of hydrobromic acid in acetic acid, stirring the reaction solution at 20 degrees Celsius for 10 hours, then adjusting the pH of the reaction solution to 8 with aqueous sodium hydroxide solution, adding water, extracting the solution three times with dichloromethane, and combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain the compound of formula 9-4;

step 4 comprises adding potassium carbonate and the compound of formula 9-4 to a solution of the compound of formula 5-1 in DMSO, stirring the reaction solution at 100 degrees Celsius for 16 hours, concentrating the reaction solution, adding water, and extracting the mixture three times with ethyl acetate, and combining, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain the compound of formula 9-5,

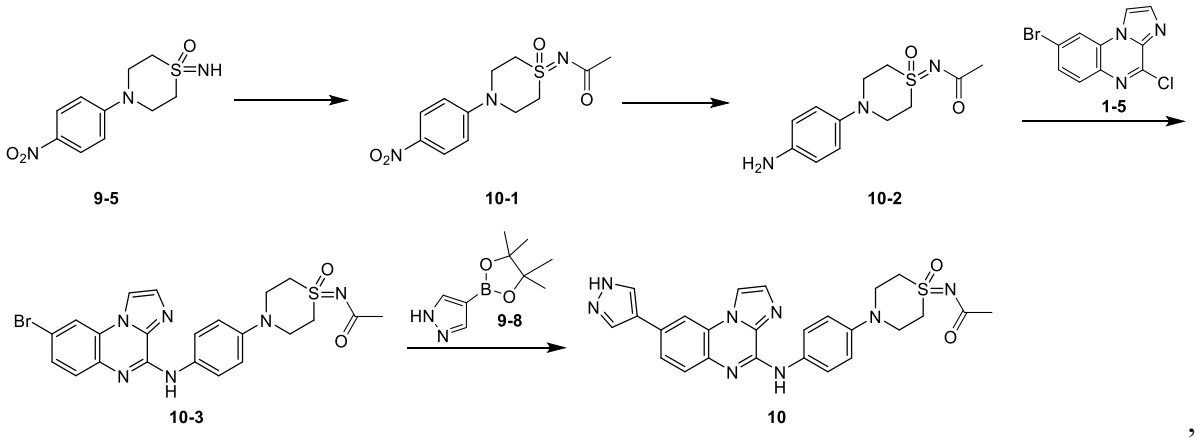
step 5 comprises adding ammonium chloride and iron powder to a solution of the compound of formula 9-5 in ethanol and water under the protection of nitrogen, stirring the reaction solution at 90 degrees Celsius 1 hour, then filtering the reaction solution, adding water to the filtrate, extracting the mixture three times with ethyl acetate, and combining, drying, filtering and concentrating the organic phases from the extraction to obtain the compound of formula 9-6;

step 6 comprises adding the compound of formula 9-6 and DIEA to a solution of the compound of formula 1-5 in dimethyl sulfoxide, stirring the reaction solution at 120 degrees Celsius for 16 hours, then cooling the reaction solution to room temperature, adding water to precipitate a solid, filtering the mixture, slurrying the filter cake from the filtering with isopropanol, and filtering and drying the slurry to obtain the compound of formula 9-7; and

step 7 comprises adding the compound of formula 9-7, the compound of formula 9-8 potassium carbonate and $Pd(dppf)Cl_2$ to 1,4-dioxane and water, then stirring the reaction solution at 100°C for 16 hours under the protection of nitrogen, adding water

to the reaction solution, extracting the solution three times with dichloromethane, combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain a crude product, and separating and purifying the crude product by silica gel column chromatography to obtain the compound of formula 9.

33. A method for preparing a compound of formula 10, comprising:



,

step 1 of synthesizing a compound of formula 10-1 from a compound of formula 9-5;
step 2 of synthesizing a compound of formula 10-2 from the compound of formula 10-1;
step 3 of synthesizing a compound of formula 10-3 by reacting the compound of formula 10-2 with a compound of formula 1-5; and
step 4 of synthesizing the compound of formula 10 by reacting the compound of formula 10-3 with a compound of formula 9-8.

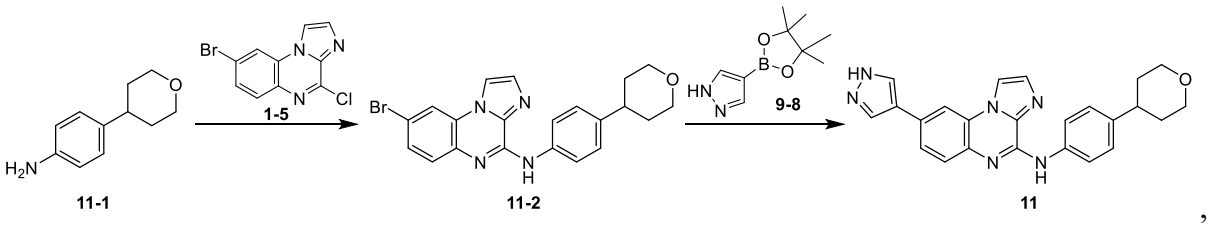
34. The method according to claim 33, wherein:
step 1 comprises adding triethylamine and acetyl chloride to a solution of the compound of formula 9-5 in dichloromethane, stirring the reaction solution at 25 degrees Celsius for 2 hours, adding water to the reaction solution, extracting the mixture three times with dichloromethane, and combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain the compound of formula 10-1;
step 2 comprises adding ammonium chloride and iron powder to a solution of the compound of formula 10-1 in ethanol and water under the protection of nitrogen,

stirring the reaction solution at 90 degrees Celsius 1 hour, then filtering the reaction solution, adding water to the filtrate, extracting the mixture three times with ethyl acetate, and combining, drying, filtering and concentrating the organic phases from the extraction to obtain the compound of formula 10-2;

step 3 comprises adding the compound of formula 10-2 and DIEA to a solution of the compound of formula 1-5 in dimethyl sulfoxide, stirring the reaction solution at 120 degrees Celsius for 16 hours, then cooling the reaction solution to room temperature, adding water to precipitate a solid, filtering the mixture, slurrying the filter cake from the filtering with isopropanol, and filtering and drying the slurry to obtain the compound of formula 10-3; and

step 4 comprises adding the compound of formula 10-3, the compound of formula 9-8, potassium carbonate and $Pd(dppf)Cl_2$ to 1,4-dioxane and water, then stirring the reaction solution at 100°C for 16 hours under the protection of nitrogen, adding water to the reaction solution, extracting the solution three times with dichloromethane, combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain a crude product, and separating and purifying the crude product by silica gel column chromatography to obtain the compound of formula 10.

35. A method for preparing a compound of formula 11, comprising:



,

step 1 of synthesizing a compound of formula 11-2 by reacting the compound of formula 11-1 with a compound of formula 1-5; and

step 2 of synthesizing the compound of formula 11 by reacting the compound of formula 11-2 with a compound of formula 9-8.

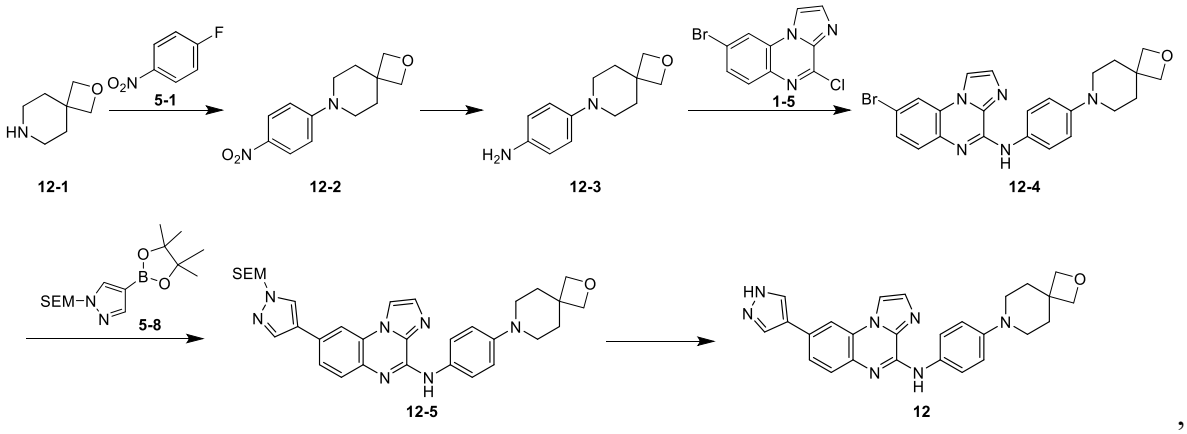
36. The method according to claim 35, wherein:

step 1 comprises mixing the compound of formula 1-5 and the compound of formula 11-1 and stirring the mixture at 120 degrees Celsius for 16 hours under the protection

of nitrogen, cooling the reaction solution to room temperature, adding dichloromethane and methanol and stirring the mixture for 15 minutes, filtering the mixture, collecting and drying the filter cake from the filtering under vacuum to obtain the compound of formula 11-2; and

step 2 comprises adding the compound of formula 11-2, the compound of formula 9-8, potassium carbonate and $Pd(dppf)Cl_2$ to 1,4-dioxane and water, then stirring the reaction solution at 100°C for 16 hours under the protection of nitrogen, adding water to the reaction solution, extracting the solution three times with dichloromethane, combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain a crude product, and separating and purifying the crude product by silica gel column chromatography to obtain the compound of formula 11.

37. A method for preparing a compound of formula 12, comprising:



,

step 1 of synthesizing a compound of formula 12-2 by reacting a compound of formula 12-1 with a compound of formula 5-1;

step 2 of synthesizing a compound of formula 12-3 from the compound of formula 12-2;

step 3 of synthesizing a compound of formula 12-4 by reacting the compound of formula 12-3 with a compound of formula 1-5;

step 4 of synthesizing a compound of formula 12-5 by reacting the compound of formula 12-4 with a compound of formula 5-8; and

step 5 of synthesizing the compound of formula 12 from the compound of formula 12-5.

38. The method according to claim 37, wherein:

step 1 comprises adding potassium carbonate and the compound of formula 12-1 to a solution of the compound of formula 5-1 in DMSO, stirring the reaction solution at 100 degrees Celsius for 16 hours, concentrating the reaction solution, adding water, and extracting the mixture three times with ethyl acetate, and combining, drying, filtering and concentrating the organic phases from the extraction to obtain the compound of formula 12-2;

step 2 comprises adding ammonium chloride and iron powder to a solution of the compound of formula 12-2 in ethanol and water under the protection of nitrogen, stirring the reaction solution at 100 degrees Celsius for 16 hours, then filtering the reaction solution, adding water to the filtrate, extracting the mixture three times with ethyl acetate, and combining, drying, filtering and concentrating the organic phases from the extraction to obtain the compound of formula 12-3;

step 3 comprises adding the compound of formula 12-3 and DIEA to a solution of the compound of formula 1-5 in isopropanol, stirring the reaction solution at 120 degrees Celsius for 16 hours, then cooling the reaction solution to room temperature, adding water, extracting the solution three times with ethyl acetate, and combining, drying, filtering and concentrating the organic phases from the extraction to obtain the compound of formula 12-4;

step 4 comprises adding the compound of formula 12-4, the compound of formula 5-8, potassium carbonate and $Pd(dppf)Cl_2$ to 1,4-dioxane and water, then stirring the reaction solution at 100°C for 16 hours under the protection of nitrogen, adding water to the reaction solution, extracting the solution three times with dichloromethane, combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating the organic phases from the extraction to obtain a crude product, and separating the crude product by silica gel column chromatography to obtain the compound of formula 12-5; and

step 5 comprises adding the compound of formula 12-5 to dioxane hydrochloride, stirring the reaction solution at 25 degrees Celsius for 16 hours, then adjusting the pH of the reaction solution to 8 with aqueous sodium hydroxide solution, adding water, extracting the solution twice with dichloromethane, and then combining, washing twice with saturated brine, drying over anhydrous sodium sulfate, filtering and concentrating

the organic phases to obtain the compound of formula 12.

39. Use of the compound or pharmaceutically acceptable salt thereof according to any one of claims 1-14 in the preparation of a spleen tyrosine kinase (Syk) and vascular endothelial growth factor 2 dual inhibitor related pharmaceutical.

40. The use according to claim 39, wherein the spleen tyrosine kinase and vascular endothelial growth factor 2 dual inhibitor related pharmaceutical is used for the treatment of allergic, autoimmune and inflammatory diseases such as dry eye and allergic conjunctivitis, retinal inflammatory diseases, age-related macular degeneration, proliferative diabetic retinopathy and retinopathy of prematurity, cancer, rheumatoid arthritis, glomerulonephritis, multiple vasculitides, idiopathic thrombocytopenic purpura, myasthenia gravis, allergic rhinitis, chronic obstructive pulmonary disease, adult respiratory distress syndrome and asthma.