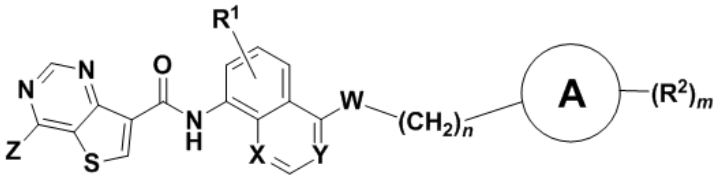
CLAIMS

1. A thieno[3,2-d]pyrimidine derivative of formula (I) or a pharmaceutically acceptable salt thereof:



(I)

wherein,

A is C_{6-10} arylene or 5- to 10-membered heteroarylene;

W is O, NH or -NHNH-;

X and Y are each independently CH or N;

Z is hydrogen or NR^3R^4, wherein said R^3 and R^4 are each independently hydrogen, C_{1-6} alkyl or $-(CH_2)q-B-$, B representing NR^5R^6 or C_{3-6} cycloalkyl;

R^1 is hydrogen or C_{1-3} alkyl, wherein said alkyl is unsubstituted or substituted with one or more halogen atoms;

each R^2 is independently hydrogen, halogen, $-CF_3$, -OH, -CN, C_{1-6} alkoxy, C_{1-6} alkyl, C_{2-4} alkynyl, $-NR^7R^8$, $-NHSO_2R^9$, $-SO_2R^{10}$, $-C(O)R^{11}$, $-NHC(O)R^{12}$, $-S(O)R^{14}$, 3- to 6-membered heterocycloalkyl, C_{6-10} aryloxy, or 5- to 10-membered heteroaryl, wherein said R^2 is connected to A by $-(CH_2)_p-$ or substituted with C_{1-4} alkyl, C_{2-4}alkynyl, or one or more halogen atoms;

R^5, R^6, R^7, R^8, R^9, R^{10}, R^{11}, R^{12} and R^{14} are each independently hydrogen, $-NH_2$, C_{1-6} alkyl, C_{1-6} alkoxy or C_{3-6} cycloalkyl, said alkyl, alkoxy or cycloalkyl being unsubstituted or substituted with one or more halogen atoms;

q is 0;

p is an integer ranging from 0 to 1;

m is an integer ranging from 0 to 3; and

n is an integer ranging from 0 to 1.

2. The thieno[3,2-d]pyrimidine derivative or a pharmaceutically acceptable salt thereof of claim

1, wherein W is NH.

3. The thieno[3,2-d]pyrimidine derivative or a pharmaceutically acceptable salt thereof of claim 1, wherein Z is NR^3R^4.

4. The thieno[3,2-d]pyrimidine derivative or a pharmaceutically acceptable salt thereof of claim 1, wherein X is CH and Y is N.

5. The thieno[3,2-d]pyrimidine derivative or a pharmaceutically acceptable salt thereof of claim 1, wherein W is NH, Z is NR^3R^4, X is CH and Y is N.

6. A thieno[3,2-d]pyrimidine derivative or a pharmaceutically acceptable salt thereof, which is selected from the group consisting of:

1) 4-amino-N-(1-((4-chlorophenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

2) 4-amino-N-(6-methyl-1-((3-(trifluoromethyl)phenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

3) N-(1-((4-chlorophenyl)amino)-6-methylisoquinolin-5-yl)-4-(cyclopropylamino)thieno[3,2-d]pyrimidine-7-carboxamide;

4) 4-(cyclopropylamino)-N-(6-methyl-1-((3-(trifluoromethyl)phenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

5) 4-amino-N-(6-methyl-1-((3-(4-methyl-1H-imidazol-1-yl)-5-(trifluoromethyl)phenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

6) 4-(cyclopropylamino)-N-(6-methyl-1-((3-(4-methyl-1H-imidazol-1-yl)-5-(trifluoromethyl)phenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

7) 4-amino-N-(1-((4-((4-ethylpiperazin-1-yl)methyl)-3-(trifluoromethyl)phenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

8) 4-(cyclopropylamino)-N-(1-((4-((4-ethylpiperazin-1-yl)methyl)-3-(trifluoromethyl)phenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

9) N-(1-((4-((4-ethylpiperazin-1-yl)methyl)-3-(trifluoromethyl)phenyl)amino)-6-methylisoquinolin-5-yl)-4-(methylamino)thieno[3,2-d]pyrimidine-7-carboxamide;

10) 4-amino-N-(1-((4-(4-ethylpiperazin-1-yl)phenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

11) 4-amino-N-(1-((4-((4-ethylpiperazin-1-yl)methyl)phenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

12) 4-amino-N-(6-methyl-1-((3-(trifluoromethyl)phenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

13) 4-amino-N-(1-((4-chloro-3-(trifluoromethyl)phenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

14) 4-amino-N-(1-((2-methoxy-5-(trifluoromethyl)phenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

15) 4-amino-N-(6-methyl-1-((4-(trifluoromethyl)phenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

16) 4-amino-N-(1-((4-methoxyphenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

17) 4-amino-N-(6-methyl-1-(p-tolylamino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

18) 4-amino-N-(1-((4-isopropylphenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

19) 4-amino-N-(1-((5-(t-butyl)isoxazol-3-yl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

20) 4-amino-N-(1-((4-fluorophenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

21) 4-amino-N-(6-methyl-1-(thiazol-2-ylamino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

22) 4-amino-N-(1-((4-cyanophenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

23) 4-amino-N-(6-methyl-1-(quinolin-5-ylamino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

24) 4-amino-N-(1-((4-ethoxyphenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-

d]pyrimidine-7-carboxamide;

25) 4-amino-N-(6-methyl-1-((4-phenoxyphenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

26) 4-amino-N-(1-((4-hydroxyphenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

27) 4-amino-N-(1-((4-isopropoxyphenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

28) 4-amino-N-(1-((4-dimethylaminophenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

30) 4-amino-N-(1-((3,4-dimethoxyphenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

31) 4-amino-N-(1-((3-fluoro-4-methoxyphenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

32) 4-amino-N-(6-methyl-1-((3,4,5-trimethoxyphenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

36) 4-amino-N-(4-((4-chlorophenyl)amino)-7-methylquinazolin-8-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

37) 4-(cyclopropylamino)-N-(1-((4-methoxyphenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

38) 4-amino-N-(1-((3-chlorophenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

39) 4-amino-N-(1-((3-bromophenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

40) 4-amino-N-(1-((2,4-dichlorophenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

41) 4-amino-N-(1-((3,4-dichlorophenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

42) 4-amino-N-(1-((3,5-dichlorophenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

43) 4-amino-N-(6-methyl-1-((3,4,5-trichlorophenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

44) 4-amino-N-(1-((4-chloro-3-methoxyphenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

45) 4-amino-N-(1-benzylamino-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

46) 4-amino-N-(6-methyl-1-phenoxyisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

47) 4-amino-N-(6-methyl-1-((4-morpholinophenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

48) N-(1-((4-(1H-pyrrol-1-yl)phenyl)amino)-6-methylisoquinolin-5-yl)-4-aminothieno[3,2-d]pyrimidine-7-carboxamide;

49) 4-amino-N-(6-methyl-1-(pyrimidin-4-ylamino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

50) 4-amino-N-(1-((4-(difluoromethoxy)phenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

51) 4-amino-N-(6-methyl-1-((4-(trifluoromethoxy)phenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

52) 4-amino-N-(1-((4-chlorophenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

53) 4-amino-N-(5-((4-chlorophenyl)amino)naphthalen-1-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

54) 4-amino-N-(1-((4-ethynylphenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

57) 4-amino-N-(1-((4-(fluoromethoxy)phenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

58) N-(1-(4-chlorophenylamino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

59) 4-amino-N-(1-((4-chloro-3-((dimethylamino)methyl)phenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

60) 4-amino-N-(1-((4-chloro-3-(pyrrolidin-1-ylmethyl)phenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

61) 4-amino-N-(1-((4-chloro-3-((diethylamino)methyl)phenyl)amino)-6-

methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

63) 4-amino-N-(1-((4-chloro-3-(piperidin-1-ylmethyl)phenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

64) 4-amino-N-(1-((4-chloro-3-(morpholinomethyl)phenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

65) 4-amino-N-(1-((4-chloro-3-((4-methylpiperazin-1-yl)methyl)phenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

66) 4-amino-N-(1-((4-chloro-3-((diisopropylamino)methyl)phenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

67) 4-amino-N-(6-methyl-1-((3-(methylsulfonamido)phenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

68) tert-butyl 4-(5-((5-(4-aminothieno[3,2-d]pyrimidine-7-carboxamido)-6-methylisoquinolin-1-yl)amino)-2-chlorobenzyl)piperazine-1-carboxylate;

69) 4-amino-N-(1-((4-chloro-3-(piperazin-1-ylmethyl)phenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

70) 4-amino-N-(1-((3-chloro-4-methoxyphenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

73) 4-amino-N-(1-((4-chloro-2-fluorophenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

74) 4-amino-N-(1-((4-bromo-2-fluorophenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

75) 4-amino-N-(1-((4-methoxybenzyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

76) 4-amino-N-(1-((4-chlorobenzyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

77) 4-amino-N-(1-(2-(4-chlorophenyl)hydrazinyl)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

78) 4-amino-N-(1-((3-((dimethylamino)methyl)phenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

79) 4-amino-N-(6-methyl-1-((4-oxo-4H-chromen-6-yl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

80) N-(1-((3-acetylphenyl)amino)-6-methylisoquinolin-5-yl)-4-aminothieno[3,2-d]pyrimidine-7-carboxamide;

82) 4-amino-N-(6-methyl-1-((3-(trifluoromethoxy)phenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

83) N-(1-((4-acetylphenyl)amino)-6-methylisoquinolin-5-yl)-4-aminothieno[3,2-d]pyrimidine-7-carboxamide;

84) 4-amino-N-(6-methyl-1-((4-(methylsulfonamido)phenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

85) 4-amino-N-(6-methyl-1-((3-(methylsulfonyl)phenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

86) 4-amino-N-(1-((4-chloro-3-(methoxymethyl)phenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

87) 4-amino-N-(1-((4-methoxy-3-(methylsulfonamido)phenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

88) 4-amino-N-(1-((4-chloro-3-(methylsulfonamido)phenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

89) 4-amino-N-(1-((6-chloropyridin-3-yl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

90) 4-amino-N-(1-((2-chloropyridin-4-yl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

91) 4-amino-N-(6-methyl(4-(methylsulfonamidomethyl)phenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

92) 4-amino-N-(6-methyl-1-((3-(methylsulfonamidomethyl)phenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

93) 4-amino-N-(1-((4-chloro-3-fluorophenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

94) 4-amino-N-(1-((3-bromo-4-chlorophenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

96) N-(1-((3-acetamidophenyl)amino)-6-methylisoquinolin-5-yl)-4-aminothieno[3,2-d]pyrimidine-7-carboxamide;

97) 4-amino-N-(6-methyl-1-((1-methyl-1H-indazol-6-yl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

98) 4-amino-N-(6-methyl-1-((4-(methylsulfinyl)phenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

99) 4-amino-N-(6-methyl-1-((2-methyl-1,3-dioxoisoindolin-5-yl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

100) 4-amino-N-(1-((6-methoxypyridin-3-yl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

101) 4-amino-N-(6-methyl-1-((3-(2,2,2-trifluoroacetyl)phenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

102) 4-amino-N-(6-methyl-1-((4-propionylphenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

103) 4-amino-N-(1-((4-hexanoylphenyl)amino)-6-methylisoquinolin-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

104) N-(1-((1-acetyl-1H-indazol-6-yl)amino)-6-methylisoquinolin-5-yl)-4-aminothieno[3,2-d]pyrimidine-7-carboxamide;

105) 4-amino-N-(1-((3-chloro-4-fluorophenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

107) 4-amino-N-(6-methyl-1-((2-methyl-2H-indazol-6-yl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

108) methyl 4-((5-(4-aminothieno[3,2-d]pyrimidine-7-carboxamido)-6-methylisoquinolin-1-yl)amino)benzoate;

109) 4-amino-N-(6-methyl-1-((1-methyl-1H-indazol-5-yl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

110) 4-amino-N-(6-methyl-1-((2-methyl-2H-indazol-5-yl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

111) 4-amino-N-(6-methyl-1-((6-methylpyridin-3-yl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

112) 4-amino-N-(6-methyl-1-((1-methyl-1H-indol-6-yl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

113) tert-butyl 6-((5-(4-aminothieno[3,2-d]pyrimidine-7-carboxamido)-6-

methylisoquinolin-1-yl)amino)-1H-indazol-1-carboxylate;

114) N-(1-((1H-indazol-6-yl)amino)-6-methylisoquinolin-5-yl)-4-aminothieno[3,2-d]pyrimidine-7-carboxamide hydrochloride;

115) 4-amino-N-(1-((5-chloro-2-fluorophenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

116) 4-amino-N-(1-((3-chloro-2-fluorophenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

117) 4-amino-N-(1-((3-fluoro-4-(4-methylpiperazin-1-yl)phenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

118) 4-amino-N-(1-((3-chloro-1-methyl-1H-indazol-6-yl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

119) 4-amino-N-(6-methyl-1-((4-(prop-2-yn-1-yloxy)phenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

120) 4-amino-N-(1-((2-methoxy-4-morpholinophenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

121) 4-amino-N-(1-(benzo[d]thiazol-6-ylamino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

122) N-(1-((1H-indazol-5-yl)amino)-6-methylisoquinolin-5-yl)-4-aminothieno[3,2-d]pyrimidine-7-carboxamide; and

123) 4-amino-N-(1-((3-chloro-2,4-difluorophenyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide .

7. A pharmaceutical composition comprising the compound of any one of claims 1 to 6 or a pharmaceutically acceptable salt thereof, and a pharmaceutically acceptable carrier, excipient or additive.

8. The pharmaceutical composition of claim 7, wherein the pharmaceutical composition is to be used for preventing or treating a disease caused by abnormal activation of a protein kinase.

9. The pharmaceutical composition of claim 7, wherein the pharmaceutical composition further

comprises a drug selected from the group consisting of cell signal transduction inhibitors, mitosis inhibitors, alkylating agents, antimetabolites, antibiotics, growth factor inhibitors, cell cycle inhibitors, topoisomerase inhibitors, biological reaction modifiers, antihormonal agents, antiandrogen, cell differentiation/proliferation/survival inhibitors, apoptosis inhibitors, inflammation inhibitors and P-glycoprotein inhibitors.

10. The pharmaceutical composition of claim 9 wherein the drug is a cell signal transduction inhibitor.

11. The pharmaceutical composition of claim 7, wherein said composition is an oral composition.

12. The pharmaceutical composition of claim 7, wherein said composition is in the form of a tablet, a pill, powder, a capsule, syrup, an emulsion or a microemulsion.

13. Use of the compound of claim 1, or a pharmaceutically acceptable salt thereof, for the manufacture of a medicament for preventing or treating a disease caused by abnormal activation of a protein kinase.

14. The use of claim 13, wherein said protein kinase is selected from the group consisting of: ALK, AMPK, Aurora A, Aurora B, Aurora C, Axl, Blk, Bmx, BTK, CaMK, CDK2/cyclinE, CDK5/p25, CHK1, CK2, c-RAF, DDR1, DDR2, DMPK, EGFR1, Her2, Her4, EphA1, EphB1, FAK, FGFR2, FGFR3, FGFR4, Flt-1, Flt-3, Flt-4, Fms (CSF-1), Fyn, GSK3beta, HIPK1, IKKbeta, IGFR-1R, IR, Itk, JAK2, JAK3, KDR, Kit, Lck, Lyn, MAPK1, MAPKAP-K2, MEK1, Met, MKK6, MLCK, NEK2, p70S6K, PAK2, PDGFR alpha, PDGFR beta, PDK1, Pim-1, PKA, PKBalpha, PKCalpha, Plk1, Ret, ROCK-I, Rsk1, SAPK2a, SGK, Src, Syk, Tie-2, Tec, Trk and ZAP-70.

15. The use of claim 13 or 14, wherein said disease is selected from the group consisting of: gastric cancer, lung cancer, liver cancer, colorectal cancer, small intestine cancer, pancreatic cancer, brain cancer, bone cancer, melanoma, breast cancer, sclerosing adenosis, uterine

cancer, cervical cancer, head and neck cancer, esophagus cancer, thyroid cancer, parathyroid cancer, renal cancer, sarcoma, prostate cancer, urethral cancer, bladder cancer, blood cancer, lymphoma, fibroadenoma, inflammation, diabetes, obesity, psoriasis, rheumatoid arthritis, hemangioma, acute or chronic kidney disease, coronary restenosis, autoimmune diseases, asthma, neurodegenerative diseases, acute infection or ocular diseases caused by angiogenesis.

16. A thieno[3,2-d]pyrimidine derivative or a pharmaceutically acceptable salt thereof, which is selected from the group consisting of:

29) 4-amino-N-(l-((2,3-dihydrobenzo[b][l ,4]dioxin-6-yl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

33) 4-amino-N-(6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

34) 4-amino-N-(l-(benzo[d][l ,3]dioxol-5-ylamino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

35) 4-amino-N-(6-methyl-1-((5,6,7,8-tetrahydronaphthalen-2-yl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrin idine-7-carboxamide;

55) 4-amino-N-(l -(isopropylamino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

56) 4-amino-N-(l-(indolin-6-ylamino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

62) 4-amino-N-(l -((1,4-diethyl-l ,2,3, 4-tetrahydroquinoxalin-6-yl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

71) 4-amino-N-(1-((3-(dimethylcarbamoyl)phenyl)amino)-6- methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

72) 4-amino-N-(6-methyl-l-((3-(methylcarbamoyl)phenyl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

81) 4-amino-N-(1-((4-(2-methoxyethoxy)phenyl)amino)-6- methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

95) 4-amino-N-(1-((4-(dimethylcarbamoyl)phenyl)amino)-6- methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

106) 4-amino-N-(6-methyl-l -((5-oxo-5,6,7,8-tetrahydronaphthalen-2-yl)amino)isoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide;

124) 4-amino-N-(1-((3-(dimethylamino)propyl)amino)-6-methylisoquinolin-5-yl)thieno[3,2-d]pyrimidine-7-carboxamide; and

125) 4-amino-N-(6-methyl-1-(piperidin-l-yl)isoquinolin-5-yl)thieno[3 ,2-d]pyrimidine-7-carboxamide.

17. A pharmaceutical composition comprising the compound of claim 16 or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable excipient.

18. The pharmaceutical composition of claim 17, wherein said pharmaceutical composition is to be used for preventing or treating a disease caused by abnormal activation of a protein kinase.

19. The pharmaceutical composition of claim 17, wherein the pharmaceutical composition further comprises a drug selected from the group consisting of cell signal transduction inhibitors, mitosis inhibitors, alkylating agents, antimetabolites, antibiotics, growth factor inhibitors, cell cycle inhibitors, topoisomerase inhibitors, biological reaction modifiers, antihormonal agents, antiandrogen, cell differentiation/proliferation/survival inhibitors, apoptosis inhibitors, inflammation inhibitors and P-glycoprotein inhibitors.

20. The pharmaceutical composition of claim 19 wherein the drug is a cell signal transduction inhibitor.

21. The pharmaceutical composition of claim 17, wherein said composition is an oral formulation.

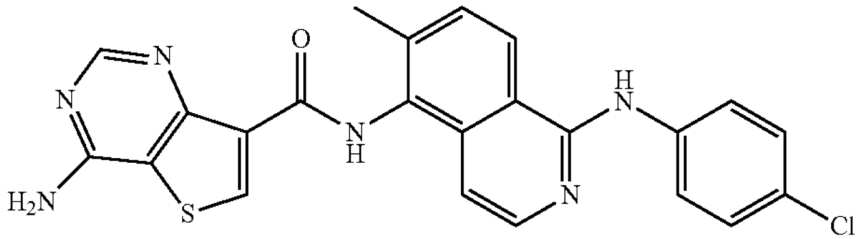
22. The pharmaceutical composition of claim 17, wherein said composition is in the form of a tablet, a pill, powder, a capsule, syrup, an emulsion or a microemulsion.

23. Use of the compound of claim 16 or a pharmaceutically acceptable salt thereof for the manufacture of a medicament for preventing or treating a disease caused by abnormal activation of a protein kinase.

24. The use of claim 23, wherein said protein kinase is selected from the group consisting of: ALK, AMPK, Aurora A, Aurora B, Aurora C, Axl, Blk, Bmx, BTK, CaMK, CDK2/cyclinE, CDK5/p25, CHK1, CK2, c-RAF, DDR1, DDR2, DMPK, EGFR1, Her2, Her4, EphA1, EphB1, FAK, FGFR2, FGFR3, FGFR4, Flt-1, Flt-3, Flt-4, Fms (CSF-1), Fyn, GSK3beta, HIPK1, IKKbeta, IGFR-1R, IR, Itk, JAK2, JAK3, KDR, Kit, Lck, Lyn, MAPK1, MAPKAP-K2, MEK1, Met, MKK6, MLCK, NEK2, p70S6K, PAK2, PDGFR alpha, PDGFR beta, PDK1, Pim-1, PKA, PKBalpha, PKCalpha, Plk1, Ret, ROCK-I, Rsk1, SAPK2a, SGK, Src, Syk, Tie-2, Tec, Trk and ZAP-70.

25. The use of claim 23, wherein said disease is selected from the group consisting of: gastric cancer, lung cancer, liver cancer, colorectal cancer, small intestine cancer, pancreatic cancer, brain cancer, bone cancer, melanoma, breast cancer, sclerosing adenosis, uterine cancer, cervical cancer, head and neck cancer, esophagus cancer, thyroid cancer, parathyroid cancer, renal cancer, sarcoma, prostate cancer, urethral cancer, bladder cancer, blood cancer, lymphoma, fibroadenoma, inflammation, diabetes, obesity, psoriasis, rheumatoid arthritis, hemangioma, acute or chronic kidney disease, coronary restenosis, autoimmune diseases, asthma, neurodegenerative diseases, acute infection or ocular diseases caused by angiogenesis.

26. A thieno[3,2-d]pyrimidine derivative or a pharmaceutically acceptable salt thereof of the following structure:

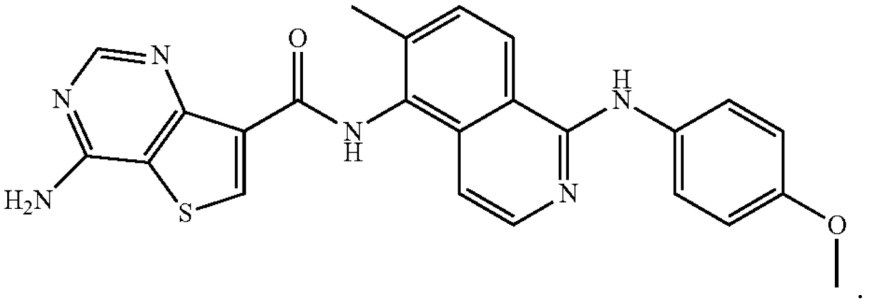


27. A pharmaceutical composition comprising the thieno[3,2-d]pyrimidine derivative of claim 26 or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable excipient.

28. Use of the compound of claim 26 for the manufacture of a medicament for treating cancer, wherein the cancer is lung cancer, pancreatic cancer, colorectal cancer, or liver cancer.

29. The use of claim 28 wherein the medicament further comprises a cell signal transduction inhibitor.

30. A thieno[3,2-d]pyrimidine derivative or a pharmaceutically acceptable salt thereof of the following structure:

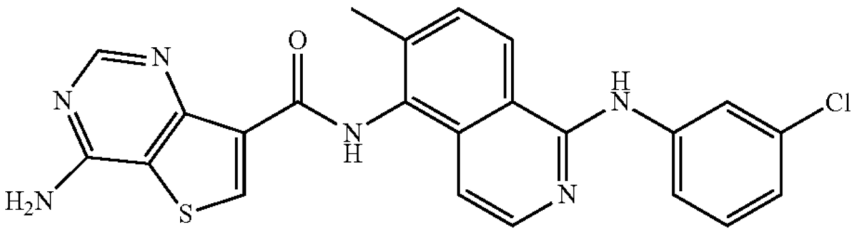


31. A pharmaceutical composition comprising the thieno[3,2-d]pyrimidine derivative of claim 30 or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable excipient.

32. Use of the compound of claim 30 for the manufacture of a medicament for treating cancer, wherein the cancer is lung cancer, pancreatic cancer, colorectal cancer, or liver cancer.

33. The use of claim 32 wherein the medicament further comprises a cell signal transduction inhibitor.

34. A thieno[3,2-d]pyrimidine derivative or a pharmaceutically acceptable salt thereof of the following structure:



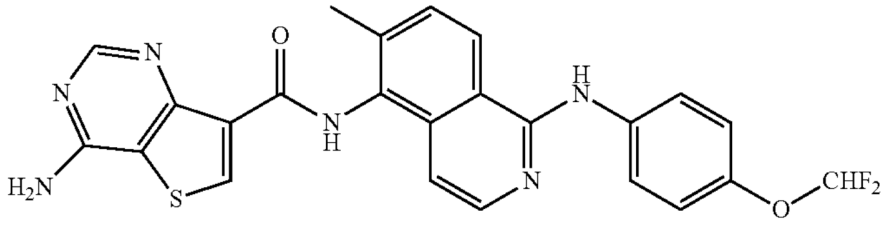
.

35. A pharmaceutical composition comprising the thieno[3,2-d]pyrimidine derivative of claim 34 or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable excipient.

36. Use of the compound of claim 34 for the manufacture of a medicament for treating cancer, wherein the cancer is lung cancer, pancreatic cancer, colorectal cancer, or liver cancer.

37. The use of claim 36 wherein the medicament further comprises a cell signal transduction inhibitor.

38. A thieno[3,2-d]pyrimidine derivative or a pharmaceutically acceptable salt thereof of the following structure:



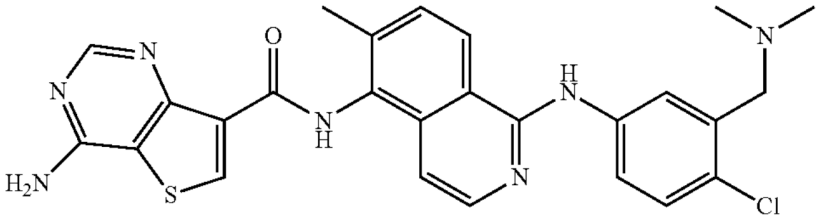
.

39. A pharmaceutical composition comprising the thieno[3,2-d]pyrimidine derivative of claim 38 or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable excipient.

40. Use of the compound of claim 38 for the manufacture of a medicament for treating cancer, wherein the cancer is lung cancer, pancreatic cancer, colorectal cancer, or liver cancer.

41. The use of claim 40 wherein the medicament further comprises a cell signal transduction inhibitor.

42. A thieno[3,2-d]pyrimidine derivative or a pharmaceutically acceptable salt thereof of the following structure:

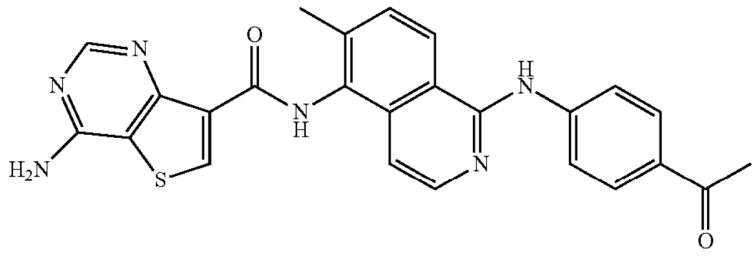


43. A pharmaceutical composition comprising the thieno[3,2-d]pyrimidine derivative of claim 42 or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable excipient.

44. Use of the compound of claim 42 for the manufacture of a medicament for treating cancer, wherein the cancer is lung cancer, pancreatic cancer, colorectal cancer, or liver cancer.

45. The use of claim 44 wherein the medicament further comprises a cell signal transduction inhibitor.

46. A thieno[3,2-d]pyrimidine derivative or a pharmaceutically acceptable salt thereof of the following structure:

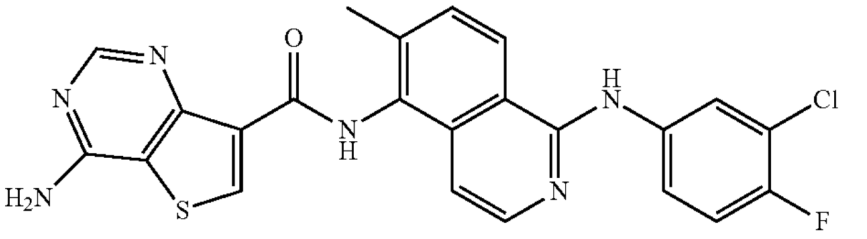


47. A pharmaceutical composition comprising the thieno[3,2-d]pyrimidine derivative of claim 46 or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable excipient.

48. Use of the compound of claim 46 for the manufacture of a medicament for treating cancer, wherein the cancer is lung cancer, pancreatic cancer, colorectal cancer, or liver cancer.

49. The use of claim 48 wherein the medicament further comprises a cell signal transduction inhibitor.

50. A thieno[3,2-d]pyrimidine derivative or a pharmaceutically acceptable salt thereof of the following structure:

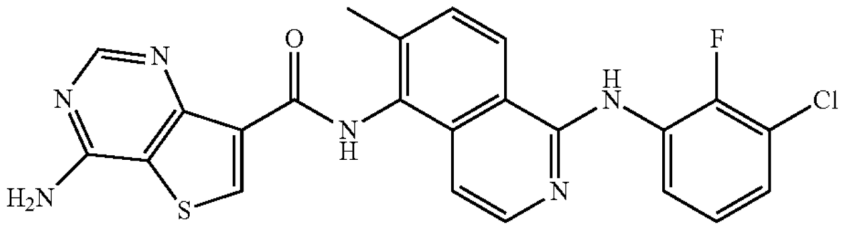


51. A pharmaceutical composition comprising the thieno[3,2-d]pyrimidine derivative of claim 50 or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable excipient.

52. Use of the compound of claim 50 for the manufacture of a medicament for treating cancer, wherein the cancer is lung cancer, pancreatic cancer, colorectal cancer, or liver cancer.

53. The use of claim 52 wherein the medicament further comprises a cell signal transduction inhibitor.

54. A thieno[3,2-d]pyrimidine derivative or a pharmaceutically acceptable salt thereof, of the following structure:



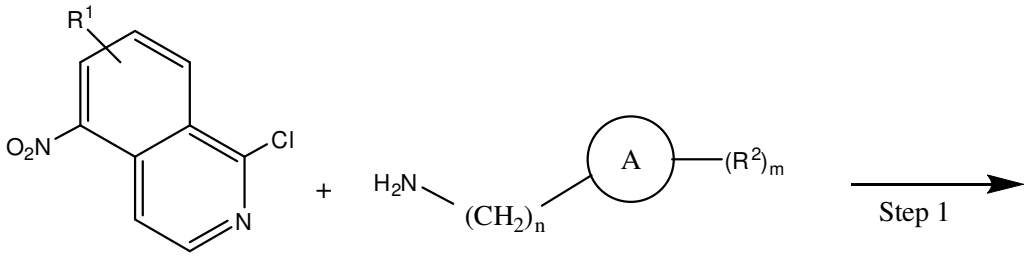
.

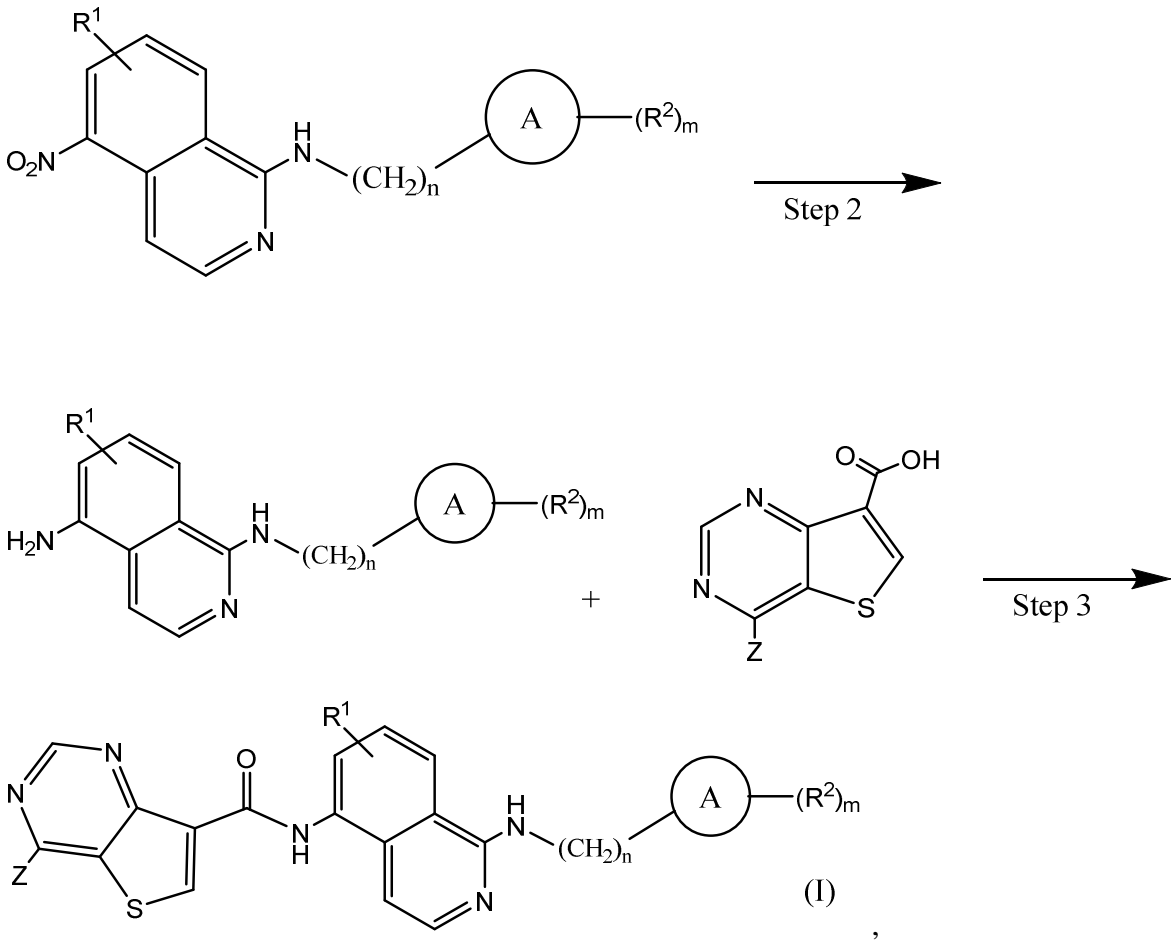
55. A pharmaceutical composition comprising the thieno[3,2-d]pyrimidine derivative of claim 54 or a pharmaceutically acceptable salt thereof and a pharmaceutically acceptable excipient.

56. Use of the compound of claim 54 for the manufacture of a medicament for treating cancer, wherein the cancer is lung cancer, pancreatic cancer, colorectal cancer, or liver cancer.

57. The use of claim 56 wherein the medicament further comprises a cell signal transduction inhibitor.

58. A method of preparing a thieno[3,2-d]pyrimidine compound of formula (I) or a pharmaceutically acceptable salt thereof, the method comprising reaction steps 1 to 3:





,

wherein:

A is C_{6-10} arylene or 5- to 10-membered heteroarylene;

Z is hydrogen or NR^3R^4, wherein said R^3 and R^4 are each independently hydrogen, C_{1-6} alkyl or -$(CH_2)_q$-B, B representing NR^5R^6 or C_{3-6} cycloalkyl;

R^1 is hydrogen or C_{1-3} alkyl, wherein said alkyl is unsubstituted or substituted with one or more halogen atoms;

each R^2 is independently hydrogen, halogen, $-CF_3$, -OH, -CN, C_{1-6} alkoxy, C_{1-6} alkyl, C_{2-4} alkynyl, $-NR^7R^8$, $-NHSO_2R^9$, $-SO_2R^{10}$, $-C(O)R^{11}$, $-NHC(O)R^{12}$, $-S(O)R^{14}$, 3- to 6-membered heterocycloalkyl, C_{6-10} aryloxy, or 5- to 10-membered heteroaryl, wherein said R^2 is

connected to A by -$(CH_2)_p$- or substituted with C_{1-4} alkyl, C_{2-4}alkynyl, or one or more halogen atoms;

R^5, R^6, R^7, R^8, R^9, R^{10}, R^{11}, R^{12} and R^{14} are each independently hydrogen, -NH_2, C_{1-6} alkyl, C_{1-6} alkoxy or C_{3-6} cycloalkyl, said alkyl, alkoxy or cycloalkyl being unsubstituted or substituted with one or more halogen atoms;

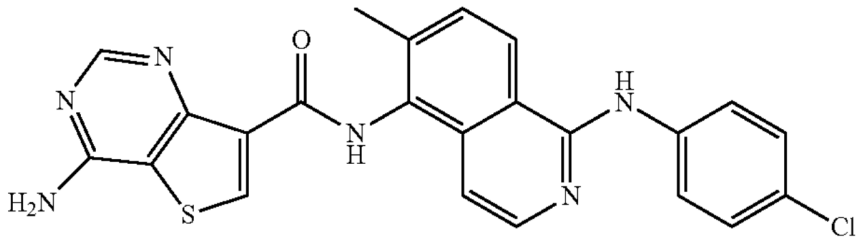
q is 0;

p is an integer ranging from 0 to 1;

m is an integer ranging from 0 to 3; and

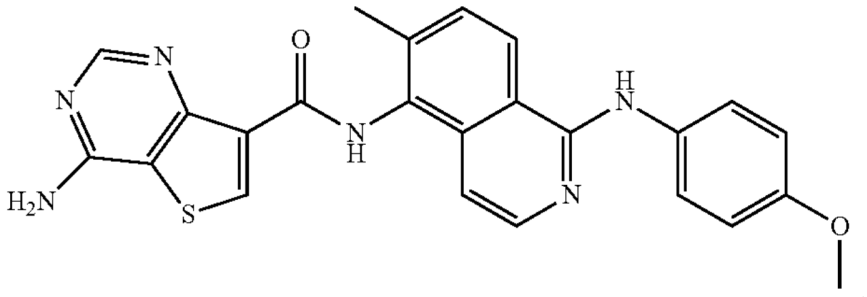
n is 0 or 1.

59. The method of claim 58 wherein formula (I) or a pharmaceutically acceptable salt thereof is of the structure:



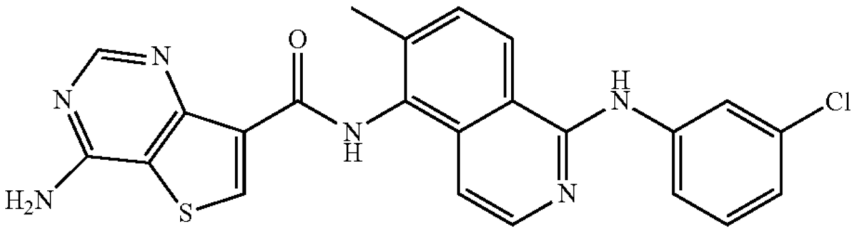
.

60. The method of claim 58 wherein formula (I) or a pharmaceutically acceptable salt thereof is of the structure:

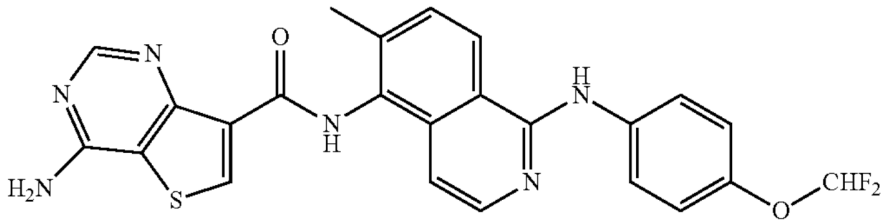


.

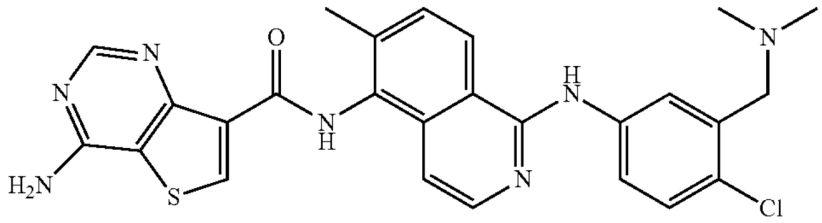
61. The method of claim 58 wherein formula (I) or a pharmaceutically acceptable salt thereof is of the structure:



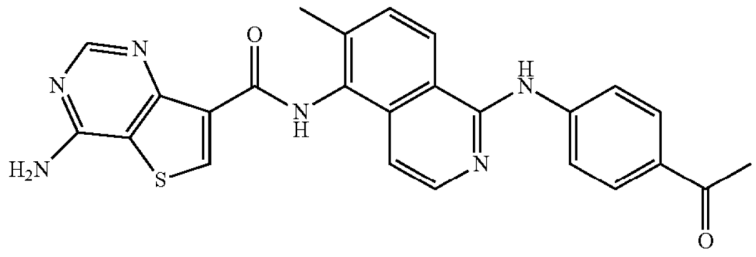
62. The method of claim 58 wherein formula (I) or a pharmaceutically acceptable salt thereof is of the structure:



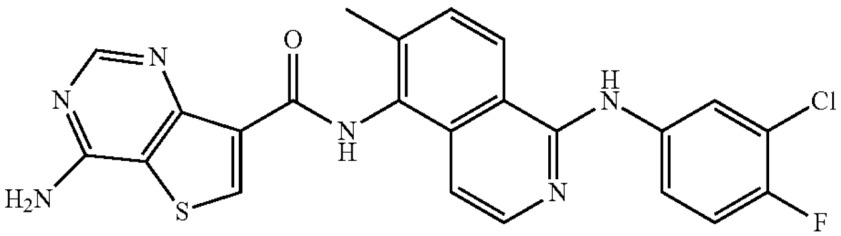
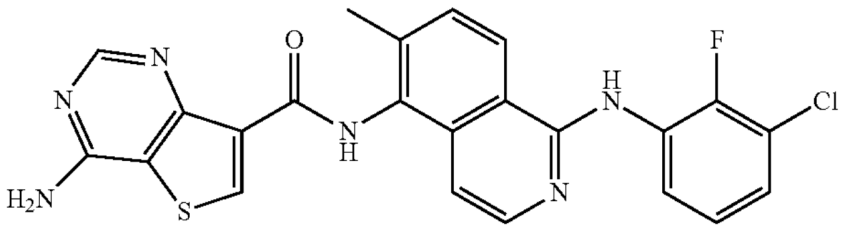
63. The method of claim 58 wherein formula (I) or a pharmaceutically acceptable salt thereof is of the structure:



64. The method of claim 58 wherein formula (I) or a pharmaceutically acceptable salt thereof is of the structure:



65. The method of claim 58 wherein formula (I) or a pharmaceutically acceptable salt thereof is of the structure:



66. The method of claim 58 wherein formula (I) or a pharmaceutically acceptable salt thereof is of the structure: