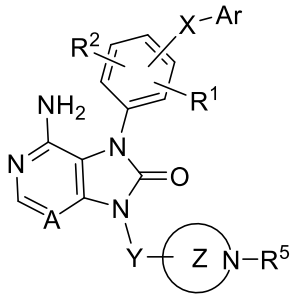
What is claimed is:

1. A compound of Formula (I):



(I)

wherein:

R^1 and R^2 are independently hydrogen, alkyl, alkoxy, halolakyl, or halo;

X is –O-, -CONR-, –NRCO-, or –NR-CO-NR' where R and R' are independently hydrogen or alkyl;

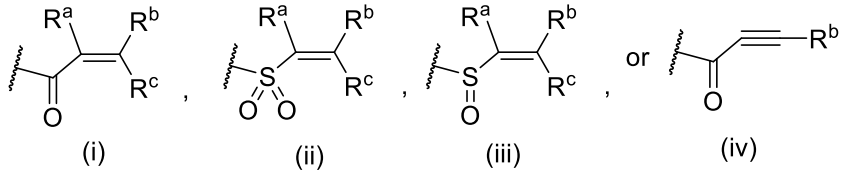
Ar is heteroaryl or phenyl where heteroaryl and phenyl are optionally substituted with one, two, or three substituents independently selected from alkyl, halo, haloalkyl, alkoxy, and hydroxy;

A is –N- or $–CR^3$- wherein R^3 is hydrogen, alkyl, cyclopropyl, halo, haloalkyl, haloalkoxy, alkoxy, or cyano;

Y is bond or alkylene;

ring Z is heterocycloamino optionally substituted with one or two substituents independently selected from alkyl, hydroxy, alkoxy, and fluoro;

R^5 is a group of formula (i), (ii), (iii) or (iv):



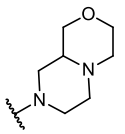
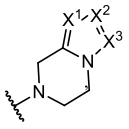
(i) (ii) (iii) (iv)

wherein:

R^a is hydrogen, fluoro, or cyano; provided that when R^a is cyano then R^b is hydrogen and R^c is not hydrogen;

R^b is hydrogen or alkyl; and

R^c is hydrogen, hydroxyalkyl, alkoxyalkyl, alkyl (optionally substituted with one or two substituents independently selected from hydroxy, hydoxyalkyl, heteroaryl (optionally substituted with one or two substituents independently selected from alkyl and heterocyclyl wherein heterocyclyl is optioally substituted with one or two substituents

independently selected from halo and alkyl), and -$CONR^9R^{10}$ (where R^9 and R^{10} are independently hydrogen or alkyl, or R^9 and R^{10} together with the nitrogen atom to which they are attached form a heterocyclyl optionally substituted with one or two substituents selected from alkyl and heterocyclyl)), cycloalkyl (optionally substituted with one or two substituents independenly selected from halo, alkyl, alkoxyalkyl and aryl; or wherein two adjacent substituents of the cycloalkyl together with the carbon atoms to which they are attached form a heterocyclyl group), heterocyclylalkyl, heterocyclyl (wherein heterocyclyl and heterocyclyl in heterocyclylalkyl are optionally substituted with one, two, or three substituents where two of the optional substituents are independently selected from alkyl, alkoxy, hydroxy, halo, amino, and oxo, and one of the optional substituent is alkyl, hydroxyalkyl, alkoxy, alkoxyalkyl, acyl, haloalkyl, alkylsulfonyl, alkoxycarbonyl, or heterocyclyl wherein the heterocyclyl is substituted with one or two substitutents independently selected from hydrogen, alkyl, halo, hydroxy, and alkoxy), or -(alkylene)-NR^6R^7 (where R^6 and R^7 are independently hydrogen, alkyl, haloalkyl, hydroxyalkyl, alkoxyalkyl, cycloalkyl, or heterocyclyl wherein the heterocyclyl is optionally substituted with one or two substituents independently selected from alkyl, halo, hydroxy, hydroxyalkyl, alkoxyalkyl, acyl, and alkoxycarbonyl; or R^6 and R^7 together with the nitrogen atom to which they are attached form  or  where one or two of X^1, X^2 and X^3 are nitrogen and the rest are carbon and the ring is optionally substituted with one or two substituents independently selected from alkyl, haloalkyl, and halo); and/or

a pharmaceutically acceptable salt thereof provided that:

when A is –N-, then R^a is cyano and R^c is heterocycloaminolalkyl wherein the heterocycloamino in heterocycloaminoalkyl is optionally substituted with one or two substituents independently selected from alkyl, alkoxy, hydroxy, halo, amino, and oxo, and the nitrogen atom of heterocycloamino is substituted with heterocyclyl wherein the heterocyclyl is substituted with one or two substituents independently selected from hydrogen, alkyl, halo, hydroxy, and alkoxy.

2. The compound of claim 1 and/or a pharmaceutically acceptable salt thereof wherein A is –CR^3-.

3. The compound of claim 2 and/or a pharmaceutically acceptable salt thereof wherein R^3 is hydrogen, methyl, ethyl, isopropyl, fluoro, or chloro.

4. The compound of claim 3 and/or a pharmaceutically acceptable salt thereof wherein R^3 is hydrogen.

5. The compound of claim 1 and/or a pharmaceutically acceptable salt thereof wherein A is –N-.

6. The compound of any of claims 1 to 5 and/ or a pharmaceutically acceptable salt thereof wherein –X-Ar is attached to carbon at the 4-position of the phenyl ring, the carbon of the phenyl ring attached to N of the cyclic urea ring being position 1.

7. The compound of any of claims 1 to 6 and / or a pharmaceutically acceptable salt thereof wherein X is –O-.

8. The compound of claim 7 and/or a pharmaceutically acceptable salt thereof wherein Ar is pyridinyl, pyrimidinyl, thienyl, or pyrazinyl optionally substituted with one, two, or three substituents independently selected from alkyl, halo, haloalkyl, alkoxy, and hydroxy.

9. The compound of claim 7 and/or a pharmaceutically acceptable salt thereof wherein Ar is phenyl where phenyl is optionally substituted with one, two, or three substituents independently selected from alkyl, halo, haloalkyl, alkoxy, and hydroxy.

10. The compound of any of claims 1 to 9 and/or a pharmaceutically acceptable salt thereof wherein R^1 and R^2 are independently hydrogen or halo, preferably hydrogen or fluoro.

11. The compound of claim 10 and/or a pharmaceutically acceptable salt thereof wherein R^1 and R^2 are hydrogen or R^1 is hydrogen and R^2 is fluoro.

12. The compound of any of claims 1 to 11 and/or a pharmaceutically acceptable salt thereof wherein Y is a bond and ring Z is piperidinyl wherein the carbon atom at the 3-position of the piperidinyl ring is attached to the nitrogen atom of the cyclic urea ring,

13. The compound of claim 12 and/or a pharmaceutically acceptable salt thereof wherein the stereochemistry at carbon of the piperidinyl attached to the cyclic urea nitrogen is (R).

14. The compound of any of claims 1-4 and 6 to 13 and/or a pharmaceutically acceptable salt thereof wherein R^a is hydrogen.

15. The compound of claim 13 or 14 and/or a pharmaceutically acceptable salt thereof wherein R^5 is a group of formula (i).

16. The compound of claim 13 and/or a pharmaceutically acceptable salt thereof wherein R^5 is a group of formula (iv).

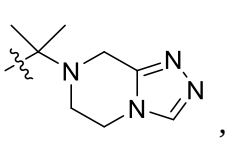
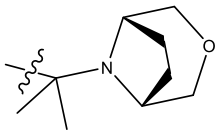
17. The compound of claim 14 or 15 and/or a pharmaceutically acceptable salt thereof wherein R^b and R^c are hydrogen.

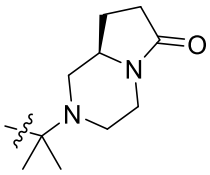
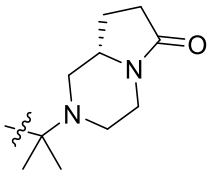
18. The compound of claim 14 or a pharmaceutically acceptable salt thereof wherein R^b is hydrogen and R^c is alkyl or -(alkylene)-NR^6R^7 (where R^6 and R^7 are independently hydrogen, alkyl, haloalkyl, hydroxyalkyl, alkoxyalkyl, cycloalkyl, or heterocyclyl wherein the heterocyclyl is optionally substituted with one or two substituents independently selected from alkyl, halo, hydroxy, hydroxyalkyl, alkoxyalkyl, acyl, and alkoxycarbonyl), preferably R^6 and R^7 are independently hydrogen or alkyl.

19. The compound of any of claims 1-13 and/or a pharmaceutically acceptable salt thereof wherein R^a is cyano.

20. The compound of claim 19 and/or a pharmaceutically acceptable salt thereof wherein R^5 is a group of formula (i).

21. The compound of 20 and/or a pharmaceutically acceptable salt thereof wherein R^c is heterocyclylalkyl wherein the heterocyclyl in heterocyclylalkyl is optionally substituted with one, two, or three substituents where two of the optional substituents are independently selected from alkyl, alkoxy, hydroxy, halo, amino, and oxo, and one of the optional substituent is alkyl, hydroxyalkyl, alkoxyalkyl, acyl, haloalkyl, alkylsulfonyl, alkoxycarbonyl, or another heterocyclyl wherein the another heterocyclyl is optionally substituted with one or two substitutents independently selected from alkyl, halo, hydroxy, and alkoxy.

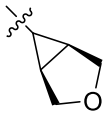
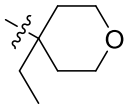
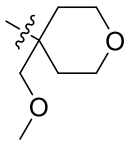
22. The compound of claim 21 and/or a pharmaceutically acceptable salt thereof wherein R^c is –$C(CH_3)_2$morpholine-4-yl, –$C(CH_3)_2$-4-(2,2,2-trifluoroethyl)piperazin-1-yl, –$C(CH_3)_2$-4-(1-methyl)piperidin-1-yl, , , –$C(CH_3)_2$-4-ethyl-3-oxopiperazin -1-yl, $C(CH_3)_2$tetrahydropyran-4-yl, -$C(CH_3)_2$-4-methoxycarbonylpiperazin-1-yl, -$C(CH_3)_2$-4-(oxetan-4-yl)piperazin-1-yl, -$C(CH_3)_2$-4-(3-methyloxetan-4-yl)piperazin-1-yl, -$C(CH_3)_2$-4-*t*-butoxycarbonylpiperazin-1-yl, -$C(CH_3)_2$-4-acetylpiperazin-1-yl, -$C(CH_3)_2$-4-methoxycarbonylpiperazin-1-yl, , -$C(CH_3)_2$-piperazin-1-yl, , -$C(CH_3)_2$-3,3-difluoropyrrolidin-1-yl, , -$C(CH_3)_2$-(S)-3-methoxypyrrolidin-1-yl, -$C(CH_3)_2$-(R)-3-methoxypyrrolidin-1-yl,

-$C(CH_3)_2$-(S)-2-(methoxymethyl)pyrrolidin-1-yl, -$C(CH_3)_2$-(R)-2-(methoxymethyl)pyrrolidin-1-yl,  ,  , -$C(CH_3)_2$-4-methylpiperazin-1-yl, -$C(CH_3)_2$-4-ethylpiperazin-1-yl, -$C(CH_3)_2$-4-isopropylpiperazin-1-yl, -$C(CH_3)_2$-4-(2-methoxyethyl)piperazin-1-yl, -$C(CH_3)_2$-4-acetylpiperazin-1-yl, -$C(CH_3)_2$-4-(3R,5S)-3,4,5-trimethylpiperazin-1-yl, -$C(CH_3)_2$-4-(3R,5S)-3,5-dimethylpiperazin-1-yl, -$C(CH_3)_2$-4-(3R,5S)-dimethylmorpholin-4-yl, -$C(CH_3)_2$-piperidin-1-yl, -$C(CH_3)_2$-pyrrolidin-1-yl, -$C(CH_3)_2$-3-oxo-piperazin-1-yl, or -$C(CH_3)_2$-(3-oxo-4-methylpiperazin-1-yl).

23. The compound of claim 20 and/or a pharmaceutically acceptable salt thereof wherein R^c is unsubstituted alkyl.

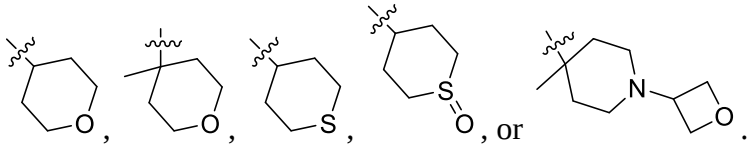
24. The compound of claim 23 and/or a pharmaceutically acceptable salt thereof wherein R^c is *tert*-butyl.

25. The compound of claim 20 and/or a pharmaceutically acceptable salt thereof wherein R^c is cycloalkyl, which is optionally substituted with one or two substituents independenly selected from halo, alkyl, alkoxyalkyl and aryl; or wherein two adjacent substituents of the cycloalkyl together with the carbon atoms to which they are attached form a heterocyclyl group.

26. The compound of claim 25 and/or a pharmaceutically acceptable salt thereof wherein R^c is 1-methylcyclobutyl, 1-phenylcyclopropyl, 1-methylcyclopropyl, 2,2-difluorocyclopropyl,  ,  , or  .

27. The compound of claim 20 and/or a pharmaceutically acceptable salt thereof wherein R^c is heterocyclyl which is optionally substituted with one, two, or three substituents where two of the optional substituents are independently selected from alkyl, alkoxy, hydroxy, halo, amino, and oxo, and one of the optional substituent is alkyl, hydroxyalkyl, alkoxy, alkoxyalkyl, acyl, haloalkyl, alkylsulfonyl, alkoxycarbonyl, or heterocyclyl wherein the heterocyclyl is substituted with one or two substitutents independently selected from hydrogen, alkyl, halo, hydroxy, and alkoxy.

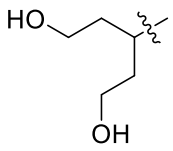
28. The compound of claim 27 and/or a pharmaceutically acceptable salt thereof wherein R^c is



29. The compound of claim 20 and/or a pharmaceutically acceptable salt thereof wherein R^c is alkyl which is optionally substituted with one or two substituents independently selected from hydroxy, hydoxyalkyl, and heteroaryl which is substituted with one or two substituents independently selected from alkyl and heterocyclyl wherein heterocyclyl is optioally substituted with one or two substituents independently selected from halo and alkyl.

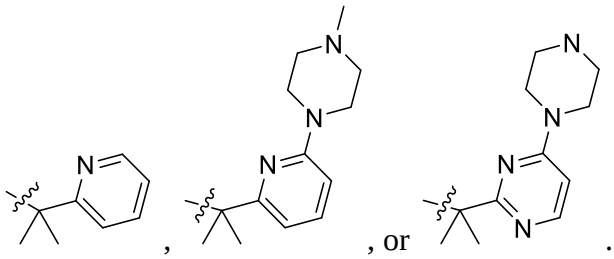
30. The compound of claim 29 and/or a pharmaceutically acceptable salt thereof wherein R^c is alkyl which is substituted with one or two hydroxy substituents.

31. The compound of claim 30 and/or a pharmaceutically acceptable salt thereof wherein R^c is



32. The compound of claim 20 and/or a pharmaceutically acceptable salt thereof wherein R^c is alkyl which is substituted with a heteroaryl that is optionally substituted with one or two substituents independently selected from alkyl and heterocyclyl wherein heterocyclyl is optioally substituted with one or two substituents independently selected from halo and alkyl.

33. The compound of claim 32 and/or a pharmaceutically acceptable salt thereof wherein R^c is



34. The compound of claim 20 and/or a pharmaceutically acceptable salt thereof wherein R^c is alkyl that is substituted with -$CONR^9R^{10}$, where R^9 and R^{10} are independently hydrogen or alkyl, or R^9 and R^{10} together with the nitrogen atom to which they are attached form a heterocyclyl optionally substituted with one or two substituents selected from alkyl and heterocyclyl.

35. The compound of claim 34 and/or a pharmaceutically acceptable salt thereof wherein R^9 and R^{10} are both hydrogen or alkyl.

36. The compound of claim 35 and/or a pharmaceutically acceptable salt thereof wherein

R^c is $–C(CH_3)_2\text{-}CONH_2$ or $–C(CH_3)_2\text{-}CON(CH_3)_2$.

37. The compound of claim 34 and/or a pharmaceutically acceptable salt thereof wherein R^9 and R^{10} together with the nitrogen atom to which they are attached form a heterocyclyl optionally substituted with one or two substituents selected from alkyl and heterocyclyl.

38. The compound of of claim 37 and/or a pharmaceutically acceptable salt thereof wherein the heterocyclyl formed by R^9 and R^{10} together with the nitrogen atom to which they are attached is 4-methylpiperazinyl, or 4-(oxetan-3-yl)piperazin-1-yl.

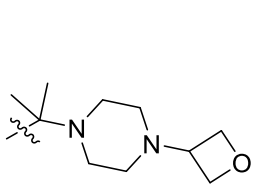
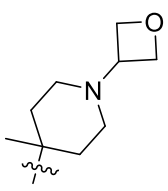
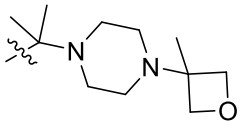
39. The compound of any of claims 1-11 and/or a pharmaceutically acceptable salt thereof wherein Y is alkylene and ring Z is pyrrolidinyl.

40. The compound of claim 39 and/or a pharmaceutically acceptable salt thereof wherein Y is methylene and ring Z is 2-pyrrolidinyl.

41. The compound of claim 40 and/or a pharmaceutically acceptable salt thereof wherein R^5 is a group of formula (i) or (iv).

42. The compound of any of claims 1, 5, and 6-13, and/or a pharmaceutically acceptable salt thereof wherein R^5 is a group of formula (i), R^a is cyano, R^b is hydrogen and R^c is heterocyclylalkyl, wherein heterocyclyl in heterocyclylalkyl is optionally substituted with one, two, or three substituents where two of the optional substituents are independently selected from alkyl, alkoxy, hydroxy, halo, amino, and oxo, and one of the optional substituent is alkyl, hydroxyalkyl, alkoxy, alkoxyalkyl, acyl, haloalkyl, alkylsulfonyl, alkoxycarbonyl, or heterocyclyl wherein the heterocyclyl is substituted with one or two substitutents independently selected from hydrogen, alkyl, halo, hydroxy, and alkoxy.

43. The compound of claim 42 and/or a pharmaceutically acceptable salt thereof wherein R^c is

, , or .

44. A compound selected from the group consisting of:

(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4,4-dimethylpent-2-enenitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-3-(tetrahydro-2H-pyran-4-yl)acrylonitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-3-(1-methylcyclobutyl)acrylonitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-methyl-4-morpholinopent-2-enenitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-methyl-4-(4-(oxetan-3-yl)piperazin-1-yl)pent-2-enenitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-methyl-4-(4-(2,2,2-trifluoroethyl)piperazin-1-yl)pent-2-enenitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-methyl-4-(1-methylpiperidin-4-yl)pent-2-enenitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-3-cyclobutylacrylonitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-(4-(2-methoxyethyl)piperazin-1-yl)-4-methylpent-2-enenitrile;
(R)-methyl 4-(5-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidin-1-yl)-4-cyano-2-methyl-5-oxopent-3-en-2-yl)piperazine-1-carboxylate;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-6-hydroxy-4-(2-hydroxyethyl)hex-2-enenitrile;
(S)-2-(2-((4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)methyl)pyrrolidine-1-carbonyl)-4,4-dimethylpent-2-enenitrile;
(S)-2-(2-((4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)methyl)pyrrolidine-1-carbonyl)-4-methyl-4-(4-(oxetan-3-yl)piperazin-1-yl)pent-2-enenitrile;
(S)-2-(2-((4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)methyl)pyrrolidine-1-carbonyl)-4-methyl-4-morpholinopent-2-enenitrile;
(S)-methyl 4-(5-(2-((4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)methyl)pyrrolidin-1-yl)-4-cyano-2-methyl-5-oxopent-3-en-2-yl)piperazine-1-carboxylate;

(R)-1-(1-acryloylpiperidin-3-yl)-4-amino-3-(4-phenoxyphenyl)-1H-imidazo[4,5-c]pyridin-2(3H)-one;
(R)-4-amino-1-(1-(but-2-ynoyl)piperidin-3-yl)-3-(4-phenoxyphenyl)-1H-imidazo[4,5-c]pyridin-2(3H)-one;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-methyl-4-(4-methyl-3-oxopiperazin-1-yl)pent-2-enenitrile;
2-((R)-3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-((3R,5S)-3,5-dimethylpiperazin-1-yl)-4-methylpent-2-enenitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-3-(tetrahydro-2H-thiopyran-4-yl)acrylonitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-methyl-4-(3-oxopiperazin-1-yl)pent-2-enenitrile;
(S)-1-((1-acryloylpyrrolidin-2-yl)methyl)-4-amino-3-(4-phenoxyphenyl)-1H-imidazo[4,5-c]pyridin-2(3H)-one;
(S)-4-amino-1-((1-(but-2-ynoyl)pyrrolidin-2-yl)methyl)-3-(4-phenoxyphenyl)-1H-imidazo[4,5-c]pyridin-2(3H)-one;
(R)-2-(3-(4-amino-3-(4-(2,6-difluorophenoxy)phenyl)-2-oxo-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-methyl-4-(4-(oxetan-3-yl)piperazin-1-yl)pent-2-enenitrile;
(R)-2-(3-(4-amino-3-(4-(2,3-difluorophenoxy)phenyl)-2-oxo-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-methyl-4-(4-(oxetan-3-yl)piperazin-1-yl)pent-2-enenitrile;
(R)-2-(3-(4-amino-3-(3-fluoro-4-phenoxyphenyl)-2-oxo-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-methyl-4-(4-(oxetan-3-yl)piperazin-1-yl)pent-2-enenitrile;
(R)-2-(3-(4-amino-3-(2-fluoro-4-phenoxyphenyl)-2-oxo-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-methyl-4-(4-(oxetan-3-yl)piperazin-1-yl)pent-2-enenitrile;
(R)-2-(3-(4-amino-3-(3-methyl-4-phenoxyphenyl)-2-oxo-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-methyl-4-(4-(oxetan-3-yl)piperazin-1-yl)pent-2-enenitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-(5,6-dihydro-[1,2,4]triazolo[4,3-a]pyrazin-7(8H)-yl)-4-

methylpent-2-enenitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-methyl-4-(4-(3-methyloxetan-3-yl)piperazin-1-yl)pent-2-enenitrile;
(R)-2-(3-(6-amino-8-oxo-7-(4-phenoxyphenyl)-7H-purin-9(8H)-yl)piperidine-1-carbonyl)-4-methyl-4-(4-(oxetan-3-yl)piperazin-1-yl)pent-2-enenitrile;
(R)-2-(3-(6-amino-8-oxo-7-(4-phenoxyphenyl)-7H-purin-9(8H)-yl)piperidine-1-carbonyl)-3-(4-methyl-1-(oxetan-3-yl)piperidin-4-yl)acrylonitrile;
(R)-2-(3-(6-amino-8-oxo-7-(4-phenoxyphenyl)-7H-purin-9(8H)-yl)piperidine-1-carbonyl)-4-methyl-4-(4-(3-methyloxetan-3-yl)piperazin-1-yl)pent-2-enenitrile;
(S)-2-(2-((4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)methyl)pyrrolidine-1-carbonyl)-4-methyl-4-(4-methylpiperazin-1-yl)pent-2-enenitrile;
(S)-2-(2-((4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)methyl)pyrrolidine-1-carbonyl)-4-methyl-4-(4-methyl-3-oxopiperazin-1-yl)pent-2-enenitrile;
(S)-2-(2-((4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)methyl)pyrrolidine-1-carbonyl)-4-methyl-4-(methyl(oxetan-3-yl)amino)pent-2-enenitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-3-(4-methyltetrahydro-2H-pyran-4-yl)acrylonitrile;
(R)-2-(3-(4-amino-3-(4-(2-fluorophenoxy)phenyl)-2-oxo-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-methyl-4-(4-(oxetan-3-yl)piperazin-1-yl)pent-2-enenitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-3-(1-oxidotetrahydro-2H-thiopyran-4-yl)acrylonitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-(4-ethyl-3-oxopiperazin-1-yl)-4-methylpent-2-enenitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-3-cyclopropylacrylonitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-3-(4-methyl-1-(oxetan-3-yl)piperidin-4-yl)acrylonitrile;
(R)-tert-butyl 4-(5-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidin-1-yl)-4-cyano-2-methyl-5-oxopent-3-en-2-yl)piperazine-1-carboxylate;

(R)-4-(4-acetylpiperazin-1-yl)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-methylpent-2-enenitrile;
2-((R)-3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-((1R,5S)-3-oxa-8-azabicyclo[3.2.1]octan-8-yl)-4-methylpent-2-enenitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-3-(1-phenylcyclopropyl)acrylonitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-methyl-4-(piperazin-1-yl)pent-2-enenitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-3-(1-methylcyclopropyl)acrylonitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4,4-dimethyl-5-(4-methylpiperazin-1-yl)-5-oxopent-2-enenitrile;
(R)-5-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidin-1-yl)-4-cyano-N,N,2,2-tetramethyl-5-oxopent-3-enamide;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4,4-dimethyl-5-(4-(oxetan-3-yl)piperazin-1-yl)-5-oxopent-2-enenitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-3-(2,2-difluorocyclopropyl)acrylonitrile;
2-((R)-3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-3-((1R,5S)-3-oxabicyclo[3.1.0]hexan-6-yl)acrylonitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-methyl-4-(6-(4-methylpiperazin-1-yl)pyridin-2-yl)pent-2-enenitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-methyl-4-(pyridin-2-yl)pent-2-enenitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-methyl-4-(4-(4-methylpiperazin-1-yl)pyrimidin-2-yl)pent-2-enenitrile;
(R)-4-amino-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-methylpent-2-enenitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-

yl)piperidine-1-carbonyl)-4-(3,3-difluoropyrrolidin-1-yl)-4-methylpent-2-enenitrile;
2-((R)-3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-((S)-3-methoxypyrrolidin-1-yl)-4-methylpent-2-enenitrile;
2-((R)-3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-((R)-3-methoxypyrrolidin-1-yl)-4-methylpent-2-enenitrile;
2-((R)-3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-methyl-4-((R)-6-oxohexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl)pent-2-enenitrile;
2-((R)-3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-((R)-2-(methoxymethyl)pyrrolidin-1-yl)-4-methylpent-2-enenitrile;
2-((R)-3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-((S)-2-(methoxymethyl)pyrrolidin-1-yl)-4-methylpent-2-enenitrile;
2-((R)-3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-4-methyl-4-((S)-6-oxohexahydropyrrolo[1,2-a]pyrazin-2(1H)-yl)pent-2-enenitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-3-(4-ethyltetrahydro-2H-pyran-4-yl)acrylonitrile;
(R)-2-(3-(4-amino-2-oxo-3-(4-phenoxyphenyl)-2,3-dihydro-1H-imidazo[4,5-c]pyridin-1-yl)piperidine-1-carbonyl)-3-(4-(methoxymethyl)tetrahydro-2H-pyran-4-yl)acrylonitrile; and
(R)-4-amino-1-(1-(2-fluoroacryloyl)piperidin-3-yl)-3-(4-phenoxyphenyl)-1H-imidazo[4,5-c]pyridin-2(3H)-one;

an E or Z isomer, and/or a pharmaceutically acceptable salt of any of the foregoing compounds.

45. A pharmaceutical composition comprising a compound and/or a pharmaceutically acceptable salt of any one of Claims 1 to 44 and a pharmaceutically acceptable excipient.

46. ~~A method of inhibiting BTK in a mammal in need thereof which method comprises administering to the mammal (such as a human) in need of such treatment, a pharmaceutical composition comprising~~ Use of a therapeutically effective amount of a compound of any one of claims 1 to 44, or an (E) or (Z) isomer thereof, and/~~-~~or a pharmaceutically acceptable salt of any of the foregoing compounds and a

pharmaceutically acceptable excipient in the manufacture of a medicament for inhibiting BTK in a mammal.

47. ~~A method of treating an autoimmune disease, inflammatory disease, or cancer in a mammal in need thereof comprising administering to the mammal (such as a human) in need of such treatment, a pharmaceutical composition comprising~~Use of a therapeutically effective amount of a compound of any one of claims 1 to 44, or an (E) or (Z) isomer thereof, and/ or a pharmaceutically acceptable salt of any of the foregoing compounds and a pharmaceutically acceptable excipient in the manufacture of a medicament for treating an autoimmune disease, inflammatory disease, or cancer in a mammal.

48. The ~~method~~ use of Claim 47 wherein the disease is acute necrotizing hemorrhagic leukoencephalitis, acute disseminated encephalomyelitis, autoimmune inner ear disease (AIED), autoimmune retinopathy, axonal & neuronal neuropathies, chronic inflammatory demyelinating polyneuropathy (CIDP), demyelinating neuropathies, Devic's disease (neuromyelitis optica), experimental allergic encephalomyelitis, giant cell arteritis (temporal arteritis), Guillain-Barre syndrome, Lambert-Eaton syndrome, chronic Meniere's disease, myasthenia gravis, neuromyotonia, opsoclonus-myoclonus syndrome, optic neuritis, paraneoplastic cerebellar degeneration, peripheral neuropathy, perivenous encephalomyelitis, restless legs syndrome, stiff person syndrome, sympathetic ophthalmia, Takayasu's arteritis, temporal arteritis/Giant cell arteritis, transverse myelitis, multiple sclerosis, dysautonomia, age-related macular degeneration (wet and dry), corneal transplantation, encephalitis, meningitis, vasculitis, and systemic lupus erythematosus (SLE).

49. The ~~method~~ use of claim 47 wherein the disease is rheumatoid arthritis, psoriatic arthritis, lupus, uveitis, myasthenia gravis, warm autoimmune hemolytic anemia, Wegener's granulomatosis, Sjogren's disease, Sjogren's dry eye, non-Sjogren's dry eye disease, psoriasis, pemphigus, urticaria or asthma.

50. The ~~method~~ use of Claim 47 wherein the disease is diffuse large B cell lymphoma, follicular lymphoma, chronic lymphocytic lymphoma, chronic lymphocytic leukemia, B-cell prolymphocytic leukemia, small lymphocytic lymphoma (SLL), multiple myeloma, B-cell non-Hodgkin lymphoma, lymphoplamascytic lymphoma/Waldenstrom macroglobulinemia, splenic marginal zone lymphoma, plasma cell myeloma, plasmacytoma, extranodal marginal zone B cell lymphoma, nodal marginal zone B cell lymphoma, mantle cell lymphoma, mediastinal (thymic) large B cell lymphoma,

intravascular large B cell lymphoma, primary effusion lymphoma, burkitt lymphoma/leukemia, and lymphomatoid granulomatosis.

51. The ~~method~~ use of any of claims 46-50 wherein the compound and/or a pharmaceutically acceptable salt thereof is to be administered in combination with one or more anti-cancer or anti-inflammatory agents.