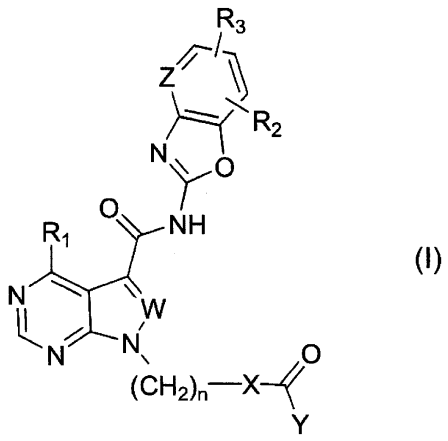
Claims

1. A preventive and/or therapeutic agent for an immune disease, which comprises a compound represented by the following general formula (I), or a salt thereof as an active ingredient:



(I)

wherein X represents a nitrogen-containing C3-C10 heterocycloalkylene which may have one or more substituents;

Y represents $-C(R_4)=C(R_5)(R_6)$ or $-C\equiv C-R_7$;

W and Z each independently represent N or CH;

n represents an integer from 0 to 2;

R_1 represents an amino group which may have one or more substituents;

R_2 and R_3, which may be identical or different, each represent a hydrogen atom, a halogen atom, a C1-C6 alkyl group which may have one or more substituents, a C1-C6 alkoxy group which may have one or more substituents, a C3-C7 cycloalkyl group which may have one or more substituents, a C6-C14 aromatic hydrocarbon group which may have one or more substituents, a 4- to 10-membered monocyclic or polycyclic unsaturated heterocyclic group containing 1 to 3 heteroatoms of the same kind or different kinds selected from the group consisting of a nitrogen atom, an oxygen atom and a sulfur atom, which may have one or more substituents, or a cyano group; and

R_4, R_5, R_6 and R_7, which may be identical or different, each represent a hydrogen atom, or a C1-C6 alkyl group which

may have one or more substituents.

2. The preventive and/or therapeutic agent for an immune disease according to claim 1, wherein in general formula (I),

X represents a nitrogen-containing C3-C10 heterocycloalkylene;

n represents 0; and

R_1 represents an amino group.

3. The preventive and/or therapeutic agent for an immune disease according to claim 1 or 2, wherein in general formula (I),

X represents azetidinylene, pyrrolidinylene, or piperidinylene;

n represents 0; and

R_1 represents an amino group.

4. The preventive and/or therapeutic agent for an immune disease according to any one of claims 1 to 3, wherein in general formula (I),

X represents azetidinylene, pyrrolidinylene, or piperidinylene;

Y represents $-C(R_4)=C(R_5)(R_6)$ or $-C\equiv C-R_7$;

n represents 0;

R_1 represents an amino group;

any one of R_2 and R_3 represents a hydrogen atom or a C1-C6 alkyl group, and the other represents a hydrogen atom, a halogen atom, a C1-C6 alkyl group, a halogeno-C1-C6 alkyl group, a C1-C4 alkoxy-substituted C1-C6 alkyl group, a C1-C6 alkoxy group, a phenyl group which may have one or more substituents of a halogen atom, a 4- to 6-membered monocyclic unsaturated heterocyclic group containing one sulfur atom, or a cyano group;

when Y represents $-C(R_4)=C(R_5)(R_6)$,

R_4, R_5 and R_6, which may be identical or different, each represent a hydrogen atom, a C1-C6 alkyl group, a C1-C6 alkyl group that is substituted with an amino group substituted with

two C1-C6 alkyl groups (the C1-C6 alkyl groups may form a 4- to 8-membered heterocycloalkyl group together with the nitrogen atom to which these alkyl groups are bonded); and

when Y represents -C≡C-R_7,

R_7 represents a hydrogen atom or a C1-C6 alkyl group.

5. The preventive and/or therapeutic agent for an immune disease according to any one of claims 1 to 4, wherein in general formula (I),

X represents 1,3-azetidinylene, 1,3-pyrrolidinylene, or 1,3-piperidinylene;

Y represents -C(R_4)=C(R_5)(R_6) or -C≡C-R_7;

when Z represents N, W represents N, while when Z represents CH, W represents N or CH;

n represents 0;

R_1 represents an amino group;

any one of R_2 and R_3 represents a hydrogen atom or a C1-C4 alkyl group, and the other represents a hydrogen atom, a halogen atom, a C1-C4 alkyl group, a halogeno-C1-C4 alkyl group, a C1-C4 alkoxy-substituted C1-C4 alkyl group, a C1-C4 alkoxy group, a phenyl group which may have one or more substituents of a halogen atom, a 4- to 6-membered monocyclic unsaturated heterocyclic group containing one sulfur atom, or a cyano group;

when Y represents -C(R_4)=C(R_5)(R_6),

R_4, R_5 and R_6, which may be identical or different, each represent a hydrogen atom, a C1-C6 alkyl group, a C1-C6 alkyl group that is substituted with an amino group substituted with two C1-C6 alkyl groups (the C1-C6 alkyl groups may form a 4- to 8-membered heterocycloalkyl group together with the nitrogen atom to which these alkyl groups are bonded); and

when Y represents -C≡C-R_7,

R_7 represents a hydrogen atom or a C1-C4 alkyl group.

6. The preventive and/or therapeutic agent for an immune disease according to any one of claims 1 to 5, wherein in general formula (I),

X represents 1,3-azetidinylene, 1,3-pyrrolidinylene, or 1,3-piperidinylene;

Y represents $-C(R_4)=C(R_5)(R_6)$ or $-C\equiv C-R_7$;

when Z represents N, W represents N, while when Z represents CH, W represents N or CH;

n represents 0;

R_1 represents an amino group;

any one of R_2 and R_3 represents a hydrogen atom or a methyl group, and the other represents a hydrogen atom, a halogen atom, a methyl group, a trifluoromethyl group, a methoxyethyl group, a methoxy group, a phenyl group, a 4-chlorophenyl group, a 2-thienyl group, or a cyano group;

when Y represents $-C(R_4)=C(R_5)(R_6)$,

R_4, R_5 and R_6, which may be identical or different, each represent a hydrogen atom, a methyl group, a dimethylaminomethyl group, a methylethylaminomethyl group, a diethylaminomethyl group, a methylisopropylaminomethyl group, a 1-piperidinylmethyl group, or a 1-pyrrolidinylmethyl group; and

when Y represents $-C\equiv C-R_7$,

R_7 represents a methyl group.

7. The preventive and/or therapeutic agent for an immune disease according to any one of claims 1 to 6, wherein in general formula (I),

(1) when Z represents N, and W represents N,

X represents 1,3-piperidinylene,

and Y represents a vinyl group;

(2) when Z represents CH, and W represents N,

X represents 1,3-pyrrolidinylene or 1,3-piperidinylene,

and Y represents $-C(R_4)=C(R_5)(R_6)$ or $-C\equiv C-(R_7)$, and

when Y represents $-C(R_4)=C(R_5)(R_6)$,

R_4, R_5 and R_6, which may be identical or different, each represent a hydrogen atom, a methyl group, a dimethylaminomethyl group, a methylethylaminomethyl group, a diethylaminomethyl group, a methylisopropylaminomethyl group,

a 1-piperidinylmethyl group, or a 1-pyrrolidinylmethyl group;

when Y represents -C≡C-(R_7),

R_7 represents a methyl group; and

(3) when Z represents CH, and W represents CH,

X represents 1,3-azetidinylene or 1,3-pyrrolidinylene,

and Y represents -C(R_4)=C(R_5)(R_6), and

R_4, R_5 and R_6, which may be identical or different, each represent a hydrogen atom, a dimethylaminomethyl group, a methylethylaminomethyl group, a diethylaminomethyl group, a methylisopropylaminomethyl group, a 1-piperidinylmethyl group, or a 1-pyrrolidinylmethyl group;

n represents 0;

R_1 represents an amino group;

any one of R_2 and R_3 represents a hydrogen atom or a methyl group, and the other represents a hydrogen atom, a halogen atom, a trifluoromethyl group, a methoxyethyl group, a phenyl group, a 2-thienyl group, or a cyano group.

8. The preventive and/or therapeutic agent for an immune disease according to any one of claims 1 to 7, wherein in general formula (I),

X represents 1,3-piperidinylene;

Y represents a vinyl group;

Z represents CH;

W represents N;

n represents 0;

R_1 represents an amino group; and

any one of R_2 and R_3 represents a hydrogen atom, and the other represents a hydrogen atom, a halogen atom, or a cyano group.

9. The preventive and/or therapeutic agent for an immune disease according to any one of claims 1 to 8, wherein the active ingredient is selected from the following compounds:

(1) (R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(5-chlorobenzo[d

]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(2)
(R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(5-bromobenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(3)
(R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(5-(thiophen-2-yl)benzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(4)
(R)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-methacryloylpiperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(5)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(but-2-enoyl)piperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(6)
(R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(5-cyanobenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(7)
(R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(5-methoxybenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(8)
(R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(5-(2-methoxyethyl)benzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]
pyrimidine-3-carboxamide,

(9)
(R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(oxazolo[4,5-b]pyridin-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(10)
(R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(4-methylbenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(11)
(R)-4-amino-N-(5-fluorobenzo[d]oxazol-2-yl)-1-(1-methacryloylpiperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(12)
(R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(5-fluorobenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(13)
(R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(benzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(14)
(R,E)-4-amino-N-(benzo[d]oxazol-2-yl)-1-(1-(but-2-enoyl)piperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(15)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-(dimethylamino)but-2-enoyl)piperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(16)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-ethyl(methyl)amino)but-2-enoyl)piperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(17)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-diethylamino)but-2-enoyl)piperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(18)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-isopropyl(methyl)amino)but-2-enoyl)piperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(19)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-(pyrrolidin-1-yl)but-2-enoyl)piperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(20)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-(piperidin-1-yl)but-2-enoyl)piperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(21)
(R,E)-4-amino-N-(5-(thiophen-2-yl)benzo[d]oxazol-2-yl)-1-(1-(4-(dimethylamino)but-2-enoyl)piperidin-3-yl)-1H-pyrazolo[

3,4-d]pyrimidine-3-carboxamide,

(22)
(R)-4-amino-N-(benzo[d]oxazol-2-yl)-1-(1-but-2-ynoyl)piperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(23)
(R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(5,6-dimethylbenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(24)
(R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(25)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(but-2-enoyl)pyrrolidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(26)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(3-methylbut-2-enoyl)pyrrolidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(27)
(R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(benzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(28)
(R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-(thiophen-2-yl)benzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(29)
(R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-methylbenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(30)
(R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-fluorobenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(31)
(R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-(4-chlorophenyl)benzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(32)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-(dimethylamino)but-2-enoyl)pyrrolidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(33)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-ethyl(methyl)amino)but-2-enoyl)pyrrolidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(34)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-diethylamino)but-2-enoyl)pyrrolidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(35)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-isopropyl(methyl)amino)but-2-enoyl)pyrrolidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(36)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-(pyrrolidin-1-yl)but-2-enoyl)pyrrolidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(37)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-(piperidin-1-yl)but-2-enoyl)pyrrolidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(38)
(R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-methoxybenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(39)
(R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-cyanobenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(40)
(R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-(2-methoxyethyl)benzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(41)
(R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-phenylbenzo[

d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(42)

(R,E)-4-amino-N-(5-phenylbenzo[d]oxazol-2-yl)-1-(1-(4-(dimethylamino)but-2-enoyl)pyrrolidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(43)

(R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-(trifluoromethyl)benzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(44)

(R,E)-4-amino-N-(5-(trifluoromethyl)benzo[d]oxazol-2-yl)-1-(1-(4-(dimethylamino)but-2-enoyl)pyrrolidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(45)

1-(1-acryloylazetidin-3-yl)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(46)

7-(1-acryloylazetidin-3-yl)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,

(47)

(E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-7-(1-(4-(dimethylamino)but-2-enoyl)azetidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,

(48)

(R)-7-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,

(49)

(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-7-(1-(4-(dimethylamino)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,

(50)

(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-7-(1-(4-(ethyl(methyl)amino)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,

(51)

(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-7-(1-(4-(diet

hylamino)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,
(52)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-7-(1-(4-(isop
ropyl(methyl)amino)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,
(53)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-7-(1-(4-(pyrr
olidin-1-yl)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,
(54)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-7-(1-(4-(pipe
ridin-1-yl)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,
(55)
(R)-7-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-phenylbenzo[
d]oxazol-2-yl)-7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,
(56)
(R,E)-4-amino-N-(5-phenylbenzo[d]oxazol-2-yl)-7-(1-(4-(dime
thylamino)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,
(57)
(R,E)-4-amino-N-(5-phenylbenzo[d]oxazol-2-yl)-7-(1-(4-(ethy
l(methyl)amino)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,
(58)
(R,E)-4-amino-N-(5-phenylbenzo[d]oxazol-2-yl)-7-(1-(4-(diet
hylamino)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,
(59)
(R,E)-4-amino-N-(5-phenylbenzo[d]oxazol-2-yl)-7-(1-(4-(isop
ropyl(methyl)amino)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,
(60)
(R,E)-4-amino-N-(5-phenylbenzo[d]oxazol-2-yl)-7-(1-(4-(pyrr
olidin-1-yl)but-2-enoyl)pyrrolidin-3-yl)

7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,

(61)

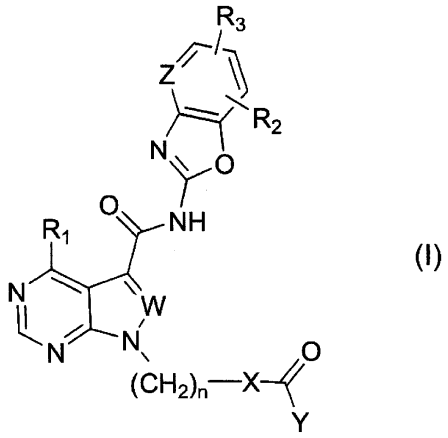
(R,E)-4-amino-N-(5-phenylbenzo[d]oxazol-2-yl)-7-(1-(4-(piperidin-1-yl)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide.

10. The preventive and/or therapeutic agent for an immune disease according to any one of claims 1 to 9, wherein the immune disease is an allergic disease, an autoimmune disease, or an inflammatory disease.

11. The preventive and/or therapeutic agent for an immune disease according to any one of claims 1 to 10, wherein the immune disease is atopic dermatitis, rheumatoid arthritis, systemic lupus erythematosus, allergic rhinitis, or pollinosis.

12. The preventive and/or therapeutic agent for an immune disease according to any one of claims 1 to 11, wherein the immune disease is rheumatoid arthritis.

13. A use of a compound or a salt thereof for producing a preventive and/or therapeutic agent for an immune disease, wherein the compound is represented by the following general formula (I):



(I)

wherein X represents a nitrogen-containing C3-C10 heterocycloalkylene which may have one or more substituents;

Y represents -C(R_4)=C(R_5)(R_6) or -C≡C-R_7;

W and Z each independently represent N or CH;

n represents an integer from 0 to 2;

R_1 represents an amino group which may have one or more substituents;

R_2 and R_3, which may be identical or different, each represent a hydrogen atom, a halogen atom, a C1-C6 alkyl group which may have one or more substituents, a C1-C6 alkoxy group which may have one or more substituents, a C3-C7 cycloalkyl group which may have one or more substituents, a C6-C14 aromatic hydrocarbon group which may have one or more substituents, a 4- to 10-membered monocyclic or polycyclic unsaturated heterocyclic group containing 1 to 3 heteroatoms of the same kind or different kinds selected from the group consisting of a nitrogen atom, an oxygen atom and a sulfur atom, which heterocyclic group may have one or more substituents, or a cyano group; and

R_4, R_5, R_6 and R_7, which may be identical or different, each represent a hydrogen atom, or a C1-C6 alkyl group which may have one or more substituents.

14. The use according to claim 13, wherein in general formula (I),

X represents a nitrogen-containing C3-C10 heterocycloalkylene;

n represents 0; and

R_1 represents an amino group.

15. The use according to claim 13 or 14, wherein in general formula (I),

X represents azetidinylene, pyrrolidinylene, or piperidinylene;

n represents 0; and

R_1 represents an amino group.

16. The use according to any one of claims 13 to 15, wherein

in general formula (I),

X represents azetidinylene, pyrrolidinylene, or piperidinylene;

Y represents $-C(R_4)=C(R_5)(R_6)$ or $-C\equiv C-R_7$;

n represents 0;

R_1 represents an amino group;

any one of R_2 and R_3 represents a hydrogen atom or a C1-C6 alkyl group, and the other represents a hydrogen atom, a halogen atom, a C1-C6 alkyl group, a halogeno-C1-C6 alkyl group, a C1-C4 alkoxy-substituted C1-C6 alkyl group, a C1-C6 alkoxy group, a phenyl group which may have one or more substituents of a halogen atom, a 4- to 6-membered monocyclic unsaturated heterocyclic group containing one sulfur atom, or a cyano group;

when Y represents $-C(R_4)=C(R_5)(R_6)$,

R_4, R_5 and R_6, which may be identical or different, each represent a hydrogen atom, a C1-C6 alkyl group, a C1-C6 alkyl group that is substituted with an amino group substituted with two C1-C6 alkyl groups (the C1-C6 alkyl groups may form a 4- to 8-membered heterocycloalkyl group together with the nitrogen atom to which these alkyl groups are bonded); and

when Y represents $-C\equiv C-R_7$,

R_7 represents a hydrogen atom or a C1-C6 alkyl group.

17. The use according to any one of claims 13 to 16, wherein in general formula (I),

X represents 1,3-azetidinylene, 1,3-pyrrolidinylene, or 1,3-piperidinylene;

Y represents $-C(R_4)=C(R_5)(R_6)$ or $-C\equiv C-R_7$;

when Z represents N, W represents N, while when Z represents CH, W represents N or CH;

n represents 0;

R_1 represents an amino group;

any one of R_2 and R_3 represents a hydrogen atom or a C1-C4 alkyl group, and the other represents a hydrogen atom, a halogen atom, a C1-C4 alkyl group, a halogeno-C1-C4 alkyl group, a C1-C4 alkoxy-substituted C1-C4 alkyl group, a C1-C4 alkoxy group, a

phenyl group which may have one or more substituents of a halogen atom, a 4- to 6-membered monocyclic unsaturated heterocyclic group containing one sulfur atom, or a cyano group;

when Y represents $-C(R_4)=C(R_5)(R_6)$,

R_4, R_5 and R_6, which may be identical or different, each represent a hydrogen atom, a C1-C6 alkyl group, a C1-C6 alkyl group that is substituted with an amino group substituted with two C1-C6 alkyl groups (the C1-C6 alkyl groups may form a 4- to 8-membered heterocycloalkyl group together with the nitrogen atom to which these alkyl groups are bonded); and

when Y represents $-C\equiv C-R_7$,

R_7 represents a hydrogen atom or a C1-C4 alkyl group.

18. The use according to any one of claims 13 to 17, wherein in general formula (I),

X represents 1,3-azetidinylene, 1,3-pyrrolidinylene, or 1,3-piperidinylene;

Y represents $-C(R_4)=C(R_5)(R_6)$ or $-C\equiv C-R_7$;

when Z represents N, W represents N, while when Z represents CH, W represents N or CH;

n represents 0;

R_1 represents an amino group;

any one of R_2 and R_3 represents a hydrogen atom or a methyl group, and the other represents a hydrogen atom, a halogen atom, a methyl group, a trifluoromethyl group, a methoxyethyl group, a methoxy group, a phenyl group, a 4-chlorophenyl group, a 2-thienyl group, or a cyano group;

when Y represents $-C(R_4)=C(R_5)(R_6)$,

R_4, R_5 and R_6, which may be identical or different, each represent a hydrogen atom, a methyl group, a dimethylaminomethyl group, a methylethylaminomethyl group, a diethylaminomethyl group, a methylisopropylaminomethyl group, a 1-piperidinylmethyl group, or a 1-pyrrolidinylmethyl group; and

when Y represents $-C\equiv C-R_7$,

R_7 represents a methyl group.

19. The use according to any one of claims 13 to 18, wherein in general formula (I),

(1) when Z represents N, and W represents N,

X represents 1,3-piperidinylene,

and Y represents a vinyl group;

(2) when Z represents CH, and W represents N,

X represents 1,3-pyrrolidinylene or 1,3-piperidinylene,

and Y represents $-C(R_4)=C(R_5)(R_6)$ or $-C\equiv C-(R_7)$, and

when Y represents $-C(R_4)=C(R_5)(R_6)$,

R_4, R_5 and R_6, which may be identical or different, each represent a hydrogen atom, a methyl group, a dimethylaminomethyl group, a methylethylaminomethyl group, a diethylaminomethyl group, a methylisopropylaminomethyl group, a 1-piperidinylmethyl group, or a 1-pyrrolidinylmethyl group;

when Y represents $-C\equiv C-(R_7)$,

R_7 represents a methyl group; and

(3) when Z represents CH, and W represents CH,

X represents 1,3-azetidinylene or 1,3-pyrrolidinylene,

and Y represents $-C(R_4)=C(R_5)(R_6)$, and

R_4, R_5 and R_6, which may be identical or different, each represent a hydrogen atom, a dimethylaminomethyl group, a methylethylaminomethyl group, a diethylaminomethyl group, a methylisopropylaminomethyl group, a 1-piperidinylmethyl group, or a 1-pyrrolidinylmethyl group;

n represents 0;

R_1 represents an amino group;

any one of R_2 and R_3 represents a hydrogen atom or a methyl group, and the other represents a hydrogen atom, a halogen atom, a trifluoromethyl group, a methoxyethyl group, a phenyl group, a 2-thienyl group, or a cyano group.

20. The use according to any one of claims 13 to 19, wherein in general formula (I),

X represents 1,3-piperidinylene;

Y represents a vinyl group;

Z represents CH;

W represents N;

n represents 0;

R_1 represents an amino group; and

any one of R_2 and R_3 represents a hydrogen atom, and the other represents a hydrogen atom, a halogen atom, or a cyano group.

21. The use according to any one of claims 13 to 20, wherein the compound represented by the general formula (I) is selected from the following compounds:

(1)
(R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(2)
(R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(5-bromobenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(3)
(R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(5-(thiophen-2-yl)benzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(4)
(R)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-methacryloylpiperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(5)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(but-2-enoyl)piperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(6)
(R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(5-cyanobenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(7)
(R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(5-methoxybenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(8)

(R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(5-(2-methoxyethyl)benzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(9)

(R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(oxazolo[4,5-b]pyridin-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(10)

(R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(4-methylbenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(11)

(R)-4-amino-N-(5-fluorobenzo[d]oxazol-2-yl)-1-(1-methacryloylpiperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(12)

(R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(5-fluorobenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(13)

(R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(benzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(14)

(R,E)-4-amino-N-(benzo[d]oxazol-2-yl)-1-(1-(but-2-enoyl)piperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(15)

(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-(dimethylamino)but-2-enoyl)piperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(16)

(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-ethyl(methyl)amino)but-2-enoyl)piperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(17)

(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-diethylamino)but-2-enoyl)piperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(18)

(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-isopr

opyl(methyl)amino)but-2-enoyl)piperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(19) (R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-(pyrrolidin-1-yl)but-2-enoyl)piperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(20) (R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-(piperidin-1-yl)but-2-enoyl)piperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(21) (R,E)-4-amino-N-(5-(thiophen-2-yl)benzo[d]oxazol-2-yl)-1-(1-(4-(dimethylamino)but-2-enoyl)piperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(22) (R)-4-amino-N-(benzo[d]oxazol-2-yl)-1-(1-but-2-ynoyl)piperidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(23) (R)-1-(1-acryloylpiperidin-3-yl)-4-amino-N-(5,6-dimethylbenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(24) (R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(25) (R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(but-2-enoyl)pyrrolidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(26) (R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(3-methylbut-2-enoyl)pyrrolidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(27) (R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(benzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(28)

(R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-(thiophen-2-yl)benzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(29)

(R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-methylbenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(30)

(R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-fluorobenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(31)

(R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-(4-chlorophenyl)benzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(32)

(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-(dimethylamino)but-2-enoyl)pyrrolidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(33)

(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-ethyl(methyl)amino)but-2-enoyl)pyrrolidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(34)

(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-diethylamino)but-2-enoyl)pyrrolidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(35)

(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-isopropyl(methyl)amino)but-2-enoyl)pyrrolidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(36)

(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-(pyrrolidin-1-yl)but-2-enoyl)pyrrolidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(37)

(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1-(1-(4-(piperidin-1-yl)but-2-enoyl)pyrrolidin-3-yl)-1H-pyrazolo[3,4-d]p

yrimidine-3-carboxamide,

(38)

(R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-methoxybenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(39)

(R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-cyanobenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(40)

(R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-(2-methoxyethyl)benzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(41)

(R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-phenylbenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(42)

(R,E)-4-amino-N-(5-phenylbenzo[d]oxazol-2-yl)-1-(1-(4-(dimethylamino)but-2-enoyl)pyrrolidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(43)

(R)-1-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-(trifluoromethyl)benzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(44)

(R,E)-4-amino-N-(5-(trifluoromethyl)benzo[d]oxazol-2-yl)-1-(1-(4-(dimethylamino)but-2-enoyl)pyrrolidin-3-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(45)

1-(1-acryloylazetidin-3-yl)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-1H-pyrazolo[3,4-d]pyrimidine-3-carboxamide,

(46)

7-(1-acryloylazetidin-3-yl)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,

(47)

(E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-7-(1-(4-(dimethylamino)but-2-enoyl)azetidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,

(48)
(R)-7-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,

(49)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-7-(1-(4-(dimethylamino)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,

(50)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-7-(1-(4-(ethyl(methyl)amino)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,

(51)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-7-(1-(4-(diethylamino)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,

(52)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-7-(1-(4-(isopropyl(methyl)amino)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,

(53)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-7-(1-(4-(pyrrolidin-1-yl)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,

(54)
(R,E)-4-amino-N-(5-chlorobenzo[d]oxazol-2-yl)-7-(1-(4-(piperidin-1-yl)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,

(55)
(R)-7-(1-acryloylpyrrolidin-3-yl)-4-amino-N-(5-phenylbenzo[d]oxazol-2-yl)-7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,

(56)
(R,E)-4-amino-N-(5-phenylbenzo[d]oxazol-2-yl)-7-(1-(4-(dimethylamino)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,

(57)
(R,E)-4-amino-N-(5-phenylbenzo[d]oxazol-2-yl)-7-(1-(4-(ethy

l(methyl)amino)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,

(58)
(R,E)-4-amino-N-(5-phenylbenzo[d]oxazol-2-yl)-7-(1-(4-(diet
hylamino)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,

(59)
(R,E)-4-amino-N-(5-phenylbenzo[d]oxazol-2-yl)-7-(1-(4-(isop
ropyl(methyl)amino)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,

(60)
(R,E)-4-amino-N-(5-phenylbenzo[d]oxazol-2-yl)-7-(1-(4-(pyrr
olidin-1-yl)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide,

(61)
(R,E)-4-amino-N-(5-phenylbenzo[d]oxazol-2-yl)-7-(1-(4-(pipe
ridin-1-yl)but-2-enoyl)pyrrolidin-3-yl)
7H-pyrrolo[2,3-d]pyrimidine-5-carboxamide.

22. The use according to any one of claims 13 to 21, wherein the immune disease is an allergic disease, an autoimmune disease, or an inflammatory disease.

23. The use according to any one of claims 13 to 22, wherein the immune disease is atopic dermatitis, rheumatoid arthritis, systemic lupus erythematosus, allergic rhinitis, or pollinosis.

24. The use according to any one of claims 13 to 23, wherein the immune disease is rheumatoid arthritis.