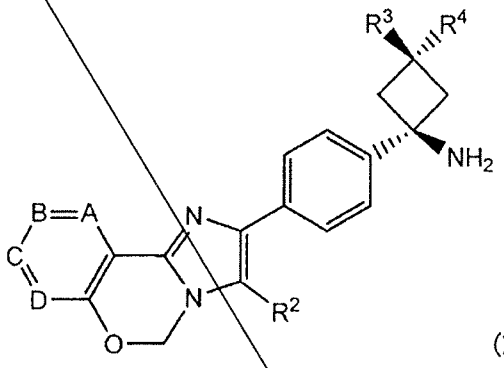
CLAIMS

[Claim 1]

An imidazooxazine compound represented by Formula (I) or a salt thereof,



(I)

wherein

A, B, C, and D represent an N atom or C-R^{1a}, an N atom or C-R^{1b}, an N atom or C-R^{1c}, and an N atom or C-R^{1d}, respectively;

R^{1a}, R^{1b}, R^{1c}, and R^{1d} are the same or different, and each represents hydrogen, halogen, cyano, optionally substituted C_{1-6} alkyl, optionally substituted C_{1-6} alkoxy, substituted carbonyl, or an optionally substituted unsaturated heterocyclic group;

R^2 represents optionally substituted aryl or an optionally substituted unsaturated heterocyclic group; and

R^3 and R^4 are the same or different, and each represents hydrogen, hydroxy, optionally substituted C_{1-6} alkyl, or optionally substituted C_{3-7} cycloalkyl.

[Claim 2]

The imidazooxazine compound according to Claim 1 or a salt thereof, wherein

A, B, C, and D represent an N atom or C-R^{1a}, an N atom or C-R^{1b}, an N atom or C-R^{1c}, and an N atom or C-R^{1d}, respectively;

R^{1a}, R^{1b}, R^{1c}, and R^{1d} are the same or different, and each represents hydrogen, halogen, cyano, optionally substituted C_{1-6} alkyl, C_{1-6} alkoxy, substituted carbonyl, or an optionally

substituted unsaturated heterocyclic group;

R^2 represents C_{6-10} aryl or a 5- to 6-membered monocyclic unsaturated heterocyclic group having 1 to 4 hetero atoms selected from the group consisting of N, S, and O;

R^3 represents hydrogen, optionally substituted C_{1-6} alkyl, or optionally substituted C_{3-7} cycloalkyl; and

R^4 represents hydrogen or hydroxy.

[Claim 3]

The imidazooxazine compound according to Claim 1 or 2 or a salt thereof, wherein

A, B, C, and D represent C-R^{1a}, C-R^{1b}, C-R^{1c}, and C-R^{1d}, respectively, or one or two of A, B, C, and D represent an N atom;

at least two of R^{1a}, R^{1b}, R^{1c}, and R^{1d} represent hydrogen, and the other(s) represent(s) halogen, cyano, C_{1-6} alkyl that may have hydroxyl group(s) as substituent(s), C_{1-6} alkoxy, carbonyl having hydroxyl, amino, or mono- or di-(C_{1-6} alkoxy)amino as a substituent, optionally substituted mono- or di-(C_{1-6} alkyl)aminocarbonyl, or an unsaturated heterocyclic group;

R^2 represents phenyl, pyridyl, or thienyl;

R^3 represents hydrogen, methyl, ethyl, or cyclopropyl; and

R^4 represents hydrogen or hydroxy.

[Claim 4]

The imidazooxazine compound according to Claim 1 or 2 or a salt thereof, wherein

A, B, C, and D represent C-R^{1a}, C-R^{1b}, C-R^{1c}, and C-R^{1d}, respectively, or one or two of A, B, C, and D represent an N atom;

at least two of R^{1a}, R^{1b}, R^{1c}, and R^{1d} represent hydrogen, and the other(s) represent(s) chlorine, fluorine, cyano, methyl, hydroxymethyl, methoxy, ethoxy, amino, carboxyl, carbamoyl, methylaminocarbonyl, dimethylaminocarbonyl, ethylaminocarbonyl,

hydroxyethylaminocarbonyl, ethoxyaminocarbonyl, or pyrazolyl;

R^2 represents phenyl, pyridyl, or thienyl;

R^3 represents hydrogen, methyl, ethyl, or cyclopropyl; and

R^4 represents hydrogen or hydroxy.

[Claim 5]

An imidazooxazine compound selected from the group consisting of the following (a) to (t), or a salt thereof:

(a) trans-3-amino-1-cyclopropyl-3-(4-(10-fluoro-3-phenyl-5H-benzo[e]imidazo[1,2-c][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(b) trans-3-amino-1-cyclopropyl-3-(4-(10-fluoro-3-(pyridin-4-yl)-5H-benzo[e]imidazo[1,2-c][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(c) trans-3-amino-1-cyclopropyl-3-(4-(3-phenyl-5H-benzo[e]imidazo[1,2-c][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(d) trans-3-amino-1-cyclopropyl-3-(4-(10-methoxy-3-phenyl-5H-benzo[e]imidazo[1,2-c][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(e) trans-3-amino-1-cyclopropyl-3-(4-(9-methoxy-3-phenyl-5H-benzo[e]imidazo[1,2-c][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(f) trans-3-amino-1-cyclopropyl-3-(4-(8-methoxy-3-phenyl-5H-benzo[e]imidazo[1,2-c][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(g) trans-3-amino-1-cyclopropyl-3-(4-(3-phenyl-5H-imidazo[1,2-c]pyrido[2,3-e][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(h) trans-3-amino-1-methyl-3-(4-(3-phenyl-5H-imidazo[1,2-c]pyrido[2,3-e][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(i) trans-3-amino-1-ethyl-3-(4-(3-phenyl-5H-imidazo[1,2-c]pyrido[2,3-e][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(j) trans-3-amino-1-cyclopropyl-3-(4-(3-phenyl-5H-imidazo[1,2-c]pyrido[3,4-e][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(k) trans-3-amino-1-methyl-3-(4-(3-phenyl-5H-

imidazo[1,2-c]pyrido[3,4-e][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(l) trans-3-amino-1-cyclopropyl-3-(4-(3-phenyl-5H-imidazo[1,2-c]pyrido[4,3-e][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(m) trans-3-amino-1-methyl-3-(4-(3-phenyl-5H-imidazo[1,2-c]pyrido[4,3-e][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(n) trans-3-amino-1-cyclopropyl-3-(4-(3-phenyl-5H-imidazo[1,2-c]pyrido[3,2-e][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(o) trans-3-amino-1-cyclopropyl-3-(4-(3-phenyl-5H-imidazo[1,2-c]pyrazino[2,3-e][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(p) trans-3-amino-3-(4-(9-(hydroxymethyl)-3-phenyl-5H-benzo[e]imidazo[1,2-c][1,3]oxazin-2-yl)phenyl)-1-methylcyclobutanol,

(q) 2-(4-(trans-1-amino-3-hydroxy-3-methylcyclobutyl)phenyl)-3-phenyl-5H-benzo[e]imidazo[1,2-c][1,3]oxazine-9-carbonitrile,

(r) trans-3-amino-1-methyl-3-(4-(3-phenyl-9-(1H-pyrazol-5-yl)-5H-benzo[e]imidazo[1,2-c][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(s) 2-(4-(trans-1-amino-3-hydroxy-3-methylcyclobutyl)phenyl)-N-methyl-3-phenyl-5H-benzo[e]imidazo[1,2-c][1,3]oxazine-8-carboxamide, and

(t) 2-(4-(trans-1-amino-3-hydroxy-3-methylcyclobutyl)phenyl)-N-ethoxy-3-phenyl-5H-benzo[e]imidazo[1,2-c][1,3]oxazine-8-carboxamide.

[Claim 6]

A pharmaceutical composition comprising an effective amount of the imidazooxazine compound according to any one of Claims 1 to 5 or a salt thereof, and a pharmaceutical carrier.

[Claim 7]

An antitumor drug comprising an effective amount of the imidazooxazine compound according to any one of Claims 1 to 5 or a salt thereof, and a pharmaceutical carrier.

[Claim 8]

An AKT inhibitor comprising the imidazooxazine compound according to any one of Claims 1 to 5 or a salt thereof as an active ingredient.

[Claim 9]

The AKT inhibitor according to Claim 8 which is an AKT1 and AKT2 inhibitor.

[Claim 10]

A method for preventing or treating cancer, comprising administering, to a mammal, the imidazooxazine compound according to any one of Claims 1 to 5 or a salt thereof in an effective amount for cancer prevention or cancer treatment.

[Claim 11]

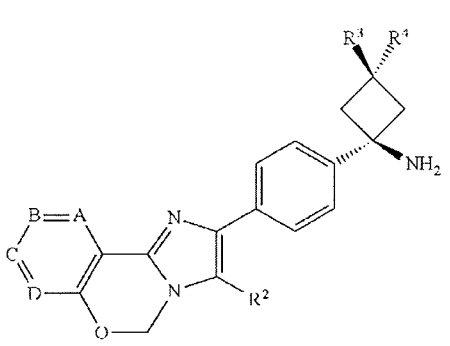
Use of the imidazooxazine compound according to any one of Claims 1 to 5 or a salt thereof for the production of a preventive or therapeutic agent for cancer.

[Claim 12]

The imidazooxazine compound according to any one of Claims 1 to 5 or a salt thereof for use in the prevention or treatment of cancer.

CLAIMS

1. An imidazooxazine compound represented by Formula (I) or a salt thereof,



(I)

wherein

A, B, C, and D represent an N atom or C—R^{1a}, an N atom or C—R^{1b}, an N atom or C—R^{1c}, and an N atom or C—R^{1d}, respectively;

R^{1a}, R^{1b}, R^{1c}, and R^{1d} are the same or different, and each represents hydrogen, halogen, cyano, optionally substituted C_{1-6} alkyl, optionally substituted C_{1-6} alkoxy, substituted carbonyl, or an optionally substituted unsaturated heterocyclic group;

R^2 represents optionally substituted aryl or an optionally substituted unsaturated heterocyclic group; and

R^3 and R^4 are the same or different, and each represents hydrogen, hydroxy, optionally substituted C_{1-6} alkyl, or optionally substituted C_{3-7} cycloalkyl, and

wherein a substituent of the substituted carbonyl is selected from the group consisting of: hydroxyl, amino, optionally substituted mono- or di-(C_{1-6} alkyl)amino, and mono- or di-(C_{1-6} alkoxy)amino; and

wherein a substituent of the optionally substituted groups is selected from the group consisting of: halogen, hydroxyl, cyano, amino, nitro, oxo, carboxy, carbamoyl, alkyl,

cycloalkyl, alkenyl, alkynyl, alkoxy, acyl, acyloxy, alkoxycarbonyl, saturated heterocyclic group, an unsaturated heterocyclic group, aryl, halogenoalkyl, aralkyl, saturated heterocyclic alkyl, alkylamino, acylamino, and aralkyloxy.

2. The imidazooxazine compound according to claim 1 or a salt thereof, wherein

A, B, C, and D represent an N atom or C—R^{1a}, an N atom or C—R^{1b}, an N atom or C—R^{1c}, and an N atom or C—R^{1d}, respectively;

R^{1a}, R^{1b}, R^{1c}, and R^{1d} are the same or different, and each represents hydrogen, halogen, cyano, optionally substituted C_{1-6} alkyl, C_{1-6} alkoxy, substituted carbonyl, or an optionally substituted unsaturated heterocyclic group;

R^2 represents C_{6-10} aryl or a 5- to 6-membered monocyclic unsaturated heterocyclic group having 1 to 4 hetero atoms selected from the group consisting of N, S, and O;

R^3 represents hydrogen, optionally substituted C_{1-6} alkyl, or optionally substituted C_{3-7} cycloalkyl; and

R^4 represents hydrogen or hydroxyl, and

wherein a substituent of the substituted carbonyl is selected from the group consisting of: hydroxyl, amino, optionally substituted mono- or di-(C_{1-6} alkyl)amino, and mono- or di-(C_{1-6} alkoxy)amino; and

wherein a substituent of the optionally substituted groups is selected from the group consisting of: halogen, hydroxyl, cyano, amino, nitro, oxo, carboxy, carbamoyl, alkyl, cycloalkyl, alkenyl, alkynyl, alkoxy, acyl, acyloxy, alkoxycarbonyl, saturated heterocyclic group, an unsaturated heterocyclic group, aryl, halogenoalkyl, aralkyl, saturated heterocyclic alkyl, alkylamino, acylamino, and aralkyloxy.

3. The imidazooxazine compound according to claim 1 or a salt thereof, wherein

A, B, C, and D represent C–R^{1a}, C–R^{1b}, C–R^{1c}, and C–R^{1d}, respectively, or one or two of A, B, C, and D represent an N atom;

at least two of R^{1a}, R^{1b}, R^{1c}, and R^{1d} represent hydrogen, and the other(s) represent(s) halogen, cyano, C_{1-6} alkyl that may have hydroxyl group(s) as substituent(s), C_{1-6} alkoxy, carbonyl having hydroxyl, amino, or mono- or di-(C_{1-6} alkoxy)amino as a substituent, optionally substituted mono- or di-(C_{1-6} alkyl)aminocarbonyl, or an unsaturated heterocyclic group;

R^2 represents phenyl, pyridyl, or thienyl;

R^3 represents hydrogen, methyl, ethyl, or cyclopropyl; and

R^4 represents hydrogen or hydroxy, and

wherein a substituent of the optionally substituted groups is selected from the group consisting of: halogen, hydroxyl, cyano, amino, nitro, oxo, carboxy, carbamoyl, alkyl, cycloalkyl, alkenyl, alkynyl, alkoxy, acyl, acyloxy, alkoxycarbonyl, saturated heterocyclic group, an unsaturated heterocyclic group, aryl, halogenoalkyl, aralkyl, saturated heterocyclic alkyl, alkylamino, acylamino, and aralkyloxy.

4. The imidazooxazine compound according to claim 1 or a salt thereof, wherein

A, B, C, and D represent C–R^{1a}, C–R^{1b}, C–R^{1c}, and C–R^{1d}, respectively, or one or two of A, B, C, and D represent an N atom;

at least two of R^{1a}, R^{1b}, R^{1c}, and R^{1d} represent hydrogen, and the other(s) represent(s) chlorine, fluorine, cyano, methyl, hydroxymethyl, methoxy, ethoxy, amino, carboxyl, carbamoyl, methylaminocarbonyl, dimethylaminocarbonyl, ethylaminocarbonyl, hydroxyethylaminocarbonyl, ethoxyaminocarbonyl, or pyrazolyl;

R^2 represents phenyl, pyridyl, or thienyl;

R^3 represents hydrogen, methyl, ethyl, or cyclopropyl; and

R^4 represents hydrogen or hydroxy.

5. An imidazooxazine compound selected from the group consisting of the following (a) to (t), or a salt thereof:

(a) trans-3-amino-1-cyclopropyl-3-(4-(10-fluoro-3-phenyl-5H-benzo[e]imidazo[1,2-c][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(b) trans-3-amino-1-cyclopropyl-3-(4-(10-fluoro-3-(pyridine-4-yl)-5H-benzo[e]imidazo[1,2-c][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(c) trans-3-amino-1-cyclopropyl-3-(4-(3-phenyl-5H-benzo[e]imidazo[1,2-c][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(d) trans-3-amino-1-cyclopropyl-3-(4-(10-methoxy-3-phenyl-5H-benzo[e]imidazo[1,2-c][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(e) trans-3-amino-1-cyclopropyl-3-(4-(9-methoxy-3-phenyl-5H-benzo[e]imidazo[1,2-c][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(f) trans-3-amino-1-cyclopropyl-3-(4-(8-methoxy-3-phenyl-5H-benzo[e]imidazo[1,2-c][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(g) trans-3-amino-1-cyclopropyl-3-(4-(3-phenyl-5H-imidazo[1,2-c]pyrido[2,3-e][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(h) trans-3-amino-1-methyl-3-(4-(3-phenyl-5H-imidazo[1,2-c]pyrido[2,3-e][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(i) trans-3-amino-1-ethyl-3-(4-(3-phenyl-5H-imidazo[1,2-c]pyrido[2,3-e][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(j) trans-3-amino-1-cyclopropyl-3-(4-(3-phenyl-5H-imidazo[1,2-c]pyrido[3,4-e][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(k) trans-3-amino-1-methyl-3-(4-(3-phenyl-5H-imidazo[1,2-c]pyrido[3,4-e][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(l) trans-3-amino-1-cyclopropyl-3-(4-(3-phenyl-5H-imidazo[1,2-c]pyrido[4,3-e][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(m) trans-3-amino-1-methyl-3-(4-(3-phenyl-5H-imidazo[1,2-c]pyrido[4,3-e][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(n) trans-3-amino-1-cyclopropyl-3-(4-(3-phenyl-5H-imidazo[1,2-c]pyrido[3,2-e][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(o) trans-3-amino-1-cyclopropyl-3-(4-(3-phenyl-5H-imidazo[1,2-c]pyrazino[2,3-e][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(p) trans-3-amino-3-(4-(9-(hydroxymethyl)-3-phenyl-5H-benzo[e]imidazo[1,2-c][1,3]oxazin-2-yl)phenyl)-1-methylcyclobutanol,

(q) 2-(4-(trans-1-amino-3-hydroxy-3-methylcyclobutyl)phenyl)-3-phenyl-5H-benzo[e]imidazo[1,2-c][1,3]oxazine-9-carbonitrile,

(r) trans-3-amino-1-methyl-3-(4-(3-phenyl-9-(1H-pyrazol-5-yl)-5H-benzo[e]imidazo[1,2-c][1,3]oxazin-2-yl)phenyl)cyclobutanol,

(s) 2-(4-(trans-1-amino-3-hydroxy-3-methylcyclobutyl)phenyl)-N-methyl-3-phenyl-5H-benzo[e]imidazo[1,2-c][1,3]oxazine-8-carboxamide, and

(t) 2-(4-(trans-1-amino-3-hydroxy-3-methylcyclobutyl)phenyl)-N-ethoxy-3-phenyl-5H-benzo[e]imidazo[1,2-c][1,3]oxazine-8-carboxamide.

6. A pharmaceutical composition comprising an effective amount of the imidazooxazine compound according to claim 1 or a salt thereof, and a pharmaceutical carrier.

7. The pharmaceutical composition of claim 6, wherein the pharmaceutical composition has antitumor properties.