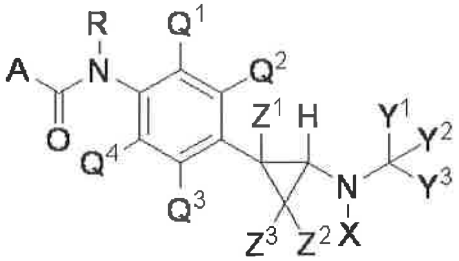
CLAIMS

1. A compound represented by the formula



(I)

wherein ~~A is a hydrocarbon group optionally having substituent(s), or a heterocyclic group optionally having substituent(s);~~

~~R is a hydrogen atom, a hydrocarbon group optionally having substituent(s), or a heterocyclic group optionally having substituent(s); or~~

~~A and R are optionally bonded to each other to form a ring optionally having substituent(s);~~

~~Q^1, Q^2, Q^3 and Q^4 are each independently a hydrogen atom or a substituent; Q^1 and Q^2, and Q^3 and Q^4, are each optionally bonded to each other to form a ring optionally having substituent(s);~~

~~X is a hydrogen atom, an acyclic hydrocarbon group optionally having substituent(s), or a saturated cyclic group optionally having substituent(s);~~

~~Y^1, Y^2 and Y^3 are each independently a hydrogen atom, a hydrocarbon group optionally having substituent(s), or a heterocyclic group optionally having substituent(s);~~

~~X and Y^1, and Y^1 and Y^2, are each optionally bonded to each other to form a ring optionally having substituent(s); and~~

~~Z^1, Z^2 and Z^3 are each independently a hydrogen atom or a substituent,~~

~~or a salt thereof.~~

~~2. The compound according to claim 1, wherein~~

~~A is~~

~~(1) a C_{3-8} cycloalkyl group optionally having substituent(s),~~

(2) a C_{6-14} aryl group optionally having substituent(s),
(3) a C_{6-14} aryl C_{1-6} alkyl group optionally having substituent(s),
(4) a C_{6-14} aryl C_{1-6} alkyl C_{6-14} aryl group optionally having substituent(s),
(5) a 4- to 11-membered heterocyclic group containing, as a ring-constituting atom besides carbon atom, 1 to 3 hetero atoms selected from a nitrogen atom, a sulfur atom and an oxygen atom, and optionally having substituent(s), or
(6) a C_{10-14} cyclic hydrocarbon group optionally having substituent(s);
R is a hydrogen atom or a C_{1-6} alkyl group optionally having substituent(s); or
A and R are optionally bonded to each other to form a 4- to 10-membered heterocycle optionally having substituent(s), or a salt thereof.

3. The compound according to claim 1, wherein
Q^1 is a hydrogen atom or a C_{1-6} alkyl group, and
Q^2, Q^3 and Q^4 are each a hydrogen atom,
or a salt thereof.

4. The compound according to claim 1, wherein
X is a hydrogen atom or an optionally substituted C_{1-6} alkyl group;
Y^1, Y^2 and Y^3 are each independently
(1) a hydrogen atom,
(2) a C_{1-20} alkyl group optionally having substituent(s),
(3) a C_{3-8} cycloalkyl group optionally having substituent(s),
(4) a C_{6-14} aryl group optionally having substituent(s),
(5) a C_{6-14} aryl C_{1-6} alkyl group optionally having substituent(s),
(6) a 5- to 7-membered monocyclic aromatic heterocyclic group containing, as a ring-constituting atom besides carbon atom, 1 to 4 hetero atoms selected from a nitrogen atom, a sulfur atom

~~and an oxygen atom, and optionally having substituent(s), or~~

~~(7) a bicyclic or tricyclic aromatic heterocyclic group~~

~~containing, as a ring-constituting atom besides carbon atom, 1 to~~

~~4 hetero atoms selected from a nitrogen atom, a sulfur atom and~~

~~an oxygen atom, and optionally having substituent(s);~~

~~X and Y^1 are optionally bonded to each other to form, together~~

~~with the adjacent nitrogen atom and carbon atom,~~

~~a 5- to 7-membered monocyclic nitrogen-containing nonaromatic~~

~~heterocycle containing, as a ring-constituting atom besides~~

~~carbon atom, one nitrogen atom, and optionally further containing~~

~~one hetero atom selected from a nitrogen atom, a sulfur atom and~~

~~an oxygen atom, and optionally having substituent(s);~~

~~Y^1 and Y^2 are optionally bonded to each other to form, together~~

~~with the adjacent carbon atom,~~

~~(1) a 5- to 7-membered monocyclic nonaromatic heterocycle~~

~~containing, as a ring-constituting atom besides carbon atom, one~~

~~or two hetero atoms selected from a nitrogen atom, a sulfur atom~~

~~and an oxygen atom, and optionally having substituent(s),~~

~~or~~

~~(2) a 7- to 10-membered bridged heterocycle containing, as a~~

~~ring-constituting atom besides carbon atom, one or two hetero~~

~~atoms selected from a nitrogen atom, a sulfur atom and an oxygen~~

~~atom, and optionally having substituent(s),~~

~~or a salt thereof.~~

~~5. The compound according to claim 1, wherein~~

~~Z^1, Z^2 and Z^3 are each a hydrogen atom, or a salt thereof.~~

~~6. The compound according to claim 1, wherein~~

A is

a phenyl-C_{1-6} alkyl group,

a C_{3-6} cycloalkyl group,

a tetrahydronaphthyl group,

a phenyl group,

(10) a thiazolyl group,

~~(11) a piperidyl group optionally having 1 to 3 C_{1-6} alkyl groups,~~

(11~~12~~) an imidazopyridyl group,

(12~~13~~) an imidazothiazolyl group,

(13~~14~~) a thienopyridyl group, or

(14~~15~~) a 1,8-naphthyridinyl group;

Y^1 and Y^2 are optionally bonded to each other to form, together with the adjacent carbon atom,

a C_{3-8} cycloalkane ring,

a pyrrolidine ring,

a piperidine ring,

a tetrahydropyran ring,

a 2,3-dihydroindene ring,

a fluorene ring,

a 8-azabicyclo[3.2.1]octane ring, or

a tetrahydrothiopyran ring, each of which optionally has 1 to 3 substituents selected from

(1) a halogen atom,

(2) a C_{1-6} alkyl group optionally having 1 to 3 substituents selected from a halogen atom and a phenyl group,

(3) a C_{3-6} cycloalkyl group,

(4) an oxo group,

(5) a phenyl group,

(6) a C_{2-6} alkenyloxy-carbonyl group, and

(7) a C_{1-6} alkyl-carbonyl group;

X and Y^1 are optionally bonded to each other to form a pyrrolidine ring, together with the adjacent nitrogen atom and carbon atom; and

Z^1, Z^2 and Z^3 are each a hydrogen atom,

or a pharmacologically acceptable salt thereof.

2~~7~~. The compound according to claim 1, wherein

A is

a phenyl group optionally having 1 to 3 C_{1-6} alkyl groups

substituted by 1 to 3 halogen atoms,
a biphenylyl group, or
a pyrazolyl group;
R is a hydrogen atom; or
A and R are optionally bonded to each other to form a dihydroisoindole ring having 1 or 2 oxo groups;
Q^1 is a hydrogen atom or a C_{1-6} alkyl group;
Q^2, Q^3 and Q^4 are each a hydrogen atom;
X is a hydrogen atom;
Y^1, Y^2 and Y^3 are each independently a hydrogen atom or a C_{3-8} cycloalkyl group;
Y^1 and Y^2 are optionally bonded to each other to form, together with the adjacent carbon atom,
a piperidine ring optionally having 1 to 3 C_{1-6} alkyl groups; and
Z^1, Z^2 and Z^3 are each a hydrogen atom,
or a pharmacologically acceptable salt thereof.

38. The compound according to claim 1, which is N-(4-{trans-2-[(cyclopropylmethyl)amino]cyclopropyl}phenyl)biphenyl-4-carboxamide or a pharmacologically acceptable salt thereof.

49. The compound according to claim 1, which is N-(4-{trans-2-[(1-methylpiperidin-4-yl)amino]cyclopropyl}phenyl)-3-(trifluoromethyl)benzamide or a pharmacologically acceptable salt thereof.

510. The compound according to claim 1, which is N-(4-{trans-2-[(cyclopropylmethyl)amino]cyclopropyl}phenyl)-1H-pyrazole-4-carboxamide or a pharmacologically acceptable salt thereof.

611. ~~A~~ The compound according to claim 1, which is selected from
(1) N-(4-{trans-2-[(cyclopropylmethyl)amino]cyclopropyl}-2-methylphenyl)benzamide,
(2) N-(4-{trans-2-[(cyclopropylmethyl)amino]cyclopropyl}phenyl)-3-

(trifluoromethoxy)benzamide,

(3) N-(4-{trans-2-[(cyclopropylmethyl)amino]cyclopropyl}phenyl)benzamide,

(4) N-(4-{trans-2-[(cyclopropylmethyl)amino]cyclopropyl}phenyl)-cyclohexanecarboxamide,

(5) N-(4-{trans-2-[(1,1-dioxidotetrahydro-2H-thiopyran-4-yl)amino]cyclopropyl}phenyl)-3-(trifluoromethyl)benzamide,

(6) N-(4-{trans-2-[(cyclopropylmethyl)amino]cyclopropyl}phenyl)-1,3-dimethyl-1H-pyrazole-5-carboxamide,

(7) N-(4-{trans-2-[(cyclopropylmethyl)amino]cyclopropyl}phenyl)-1,5-dimethyl-1H-pyrazole-3-carboxamide,

(8) N-(4-{trans-2-[(cyclopropylmethyl)amino]cyclopropyl}phenyl)-1-methyl-3-(trifluoromethyl)-1H-pyrazole-4-carboxamide,

(9) N-(4-{trans-2-[(cyclopropylmethyl)amino]cyclopropyl}phenyl)-1-methyl-5-(trifluoromethyl)-1H-pyrazole-4-carboxamide, and

(10) N-(4-{trans-2-[(cyclopropylmethyl)amino]cyclopropyl}phenyl)-1-methyl-1H-pyrazole-4-carboxamide,

or a pharmacologically acceptable salt thereof.

7~~12~~. A medicament comprising the compound according to claim 1 or a pharmacologically acceptable salt thereof.

8~~13~~. The medicament according to claim 7~~12~~, which is a prophylactic or therapeutic agent for cancer.

~~14. The medicament according to claim 12, which is an LSD1 inhibitor.~~

9~~15~~. The medicament according to claim 7~~12~~, which is a

prophylactic or therapeutic agent for schizophrenia, Alzheimer's disease, Parkinson's disease or Huntington's chorea.

~~16. A method for the prophylaxis or treatment of schizophrenia, Alzheimer's disease, Parkinson's disease or Huntington's chorea, comprising administering an effective amount of the compound according to claim 1 or a salt thereof to a mammal.~~

10~~17~~. Use of the compound according to claim 1 or a pharmacologically acceptable salt thereof for the production of a prophylactic or therapeutic agent for schizophrenia, Alzheimer's disease, Parkinson's disease or Huntington's chorea.

11~~18~~. The compound according to claim 1 or a pharmacologically acceptable salt thereof for use in the prophylaxis or treatment of schizophrenia, Alzheimer's disease, Parkinson's disease or Huntington's chorea.

~~19. A method of inhibiting LSD1, comprising administering an effective amount of the compound according to claim 1 or a salt thereof to a mammal.~~

12. Use of the compound according to claim 1 or a pharmacologically acceptable salt thereof for the production of a prophylactic or therapeutic agent for cancer.

13. The compound according to claim 1 or a pharmacologically acceptable salt thereof for use in the prophylaxis or treatment of cancer.