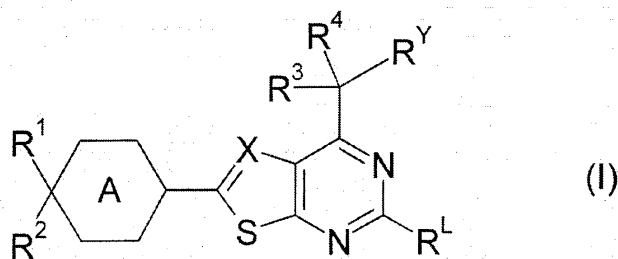


Claims

[Claim 1] A compound of the formula (I) or a salt thereof:

[Chem. 20]



(in the formula,

X is CH,

R¹ is lower alkyl,

R² is lower alkyl,

in which R¹ and R² may form a cycloalkane together with carbon atoms to which they are bonded,

R³ is -H,

R⁴ is -H,

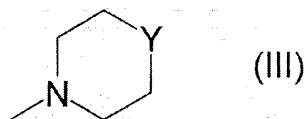
A ring is a cyclohexane ring,

R^Y is -NR^AR^B,

R^A and R^B form cyclic amino which may be substituted, together with a nitrogen atom to which they are bonded,

in which the cyclic amino is a group represented by the following formula (III):

[Chem. 21]



Y is NH, O, S, S (=O)₂, or CH₂, and

R^L is lower alkyl).

[Claim 2] The compound or a salt thereof according to claim 1, wherein

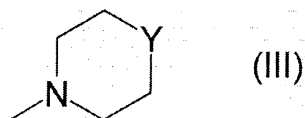
R^Y is -NR^AR^B,

R^A and R^B form cyclic amino which may be substituted with R^0 , together with a nitrogen atom to which they are bonded,

in which the cyclic amino is a group represented by the following formula (III):

[Chem. 22]

5



and

R^0 is a group selected from the following Group Z:

Group Z:

10

(1) =O,

(2) -OH,

(3) -O-lower alkyl,

(4) halogen,

(5) -CN,

15

(6) lower alkyl,

(7) halo-lower alkyl,

(8) lower alkylene-OH,

(9) lower alkylene-O-lower alkyl,

(10) -C(=O)-lower alkyl,

20

(11) -C(=O)-lower alkylene-OH,

(12) -C(=O)-lower alkylene-CN, and

(13) cycloalkyl.

[Claim 3] The compound or a salt thereof according to claim 2, wherein the group selected from the Group Z is a group selected from:

25

Group Z1:

(1) -OH,

(2) lower alkyl, and

(3) -C(=O)-lower alkylene-OH.

30

[Claim 4] The compound or a salt thereof according to claim 3, wherein Y is O, S, or S (=O)₂.

[Claim 5] The compound or a salt thereof according to claim 4, wherein R^L is CH₃.

[Claim 6] The compound or a salt thereof according to claim 1, which is selected from the following compound group:

- 6-(4,4-dimethylcyclohexyl)-4-[(1,1-dioxo-1 λ^6 -thiomorpholin-4-yl)methyl]-2-methylthieno[2,3-d]pyrimidine,
 5 trans-1-{[6-(4,4-dimethylcyclohexyl)-2-methylthieno[2,3-d]pyrimidin-4-yl)methyl}piperidine-3,4-diol,
 1-{[6-(4,4-dimethylcyclohexyl)-2-methylthieno[2,3-d]pyrimidin-4-yl)methyl}piperidin-4-ol,
 10 6-(4,4-dimethylcyclohexyl)-2-methyl-4-(thiomorpholin-4-ylmethyl)thieno[2,3-d]pyrimidine,
 6-(4,4-dimethylcyclohexyl)-4-[(3,3-dimethylmorpholin-4-yl)methyl]-2-methylthieno[2,3-d]pyrimidine, and
 1-{[6-(4,4-dimethylcyclohexyl)-2-methylthieno[2,3-d]pyrimidin-4-yl)methyl}-2,2-dimethylpiperidin-4-ol.

[Claim 7] The compound or a salt thereof according to claim 6, which is 6-(4,4-dimethylcyclohexyl)-4-[(1,1-dioxo-1 λ^6 -thiomorpholin-4-yl)methyl]-2-methylthieno[2,3-d]pyrimidine.

[Claim 8] The compound or a salt thereof according to claim 6, which is trans-1-{[6-(4,4-dimethylcyclohexyl)-2-methylthieno[2,3-d]pyrimidin-4-yl)methyl}piperidine-3,4-diol.

[Claim 9] The compound or a salt thereof according to claim 6, which is 1-{[6-(4,4-dimethylcyclohexyl)-2-methylthieno[2,3-d]pyrimidin-4-yl)methyl}piperidin-4-ol.

[Claim 10] The compound or a salt thereof according to claim 6, which is 6-(4,4-dimethylcyclohexyl)-2-methyl-4-(thiomorpholin-4-ylmethyl)thieno[2,3-d]pyrimidine.

[Claim 11] The compound or a salt thereof according to claim 6, which is 6-(4,4-dimethylcyclohexyl)-4-[(3,3-dimethylmorpholin-4-yl)methyl]-2-methylthieno[2,3-d]pyrimidine.

[Claim 12] The compound or a salt thereof according to claim 6, which is 1-{[6-(4,4-dimethylcyclohexyl)-2-methylthieno[2,3-d]pyrimidin-4-yl)methyl}-2,2-dimethylpiperidin-4-ol.

[Claim 13] A pharmaceutical composition comprising the compound or a salt thereof according to claim 1 and a pharmaceutically acceptable excipient.

5 [Claim 14] The pharmaceutical composition according to claim 13, which is a GABA_B positive allosteric modulator.

10 [Claim 15] The pharmaceutical composition according to claim 13, which is a pharmaceutical composition for use in treating a disease selected from a group consisting of schizophrenia, CIAS, cognitive impairment, fragile X syndrome, autism spectrum disorder, spasticity, anxiety disorder, substance addiction, pain, fibromyalgia, and Charcot-Marie-Tooth disease.

15 [Claim 16] Use of the compound or a salt thereof according to claim 1 for the preparation of a pharmaceutical composition for preventing or treating a disease selected from a group consisting of schizophrenia, CIAS, cognitive impairment, fragile X syndrome, autism spectrum disorder, spasticity, anxiety disorder, substance addiction, pain, fibromyalgia, and Charcot-Marie-Tooth disease.

20 [Claim 17] The compound or a salt thereof according to claim 1, for use in treating a disease selected from a group consisting of schizophrenia, CIAS, cognitive impairment, fragile X syndrome, autism spectrum disorder, spasticity, anxiety disorder, substance addiction, pain, fibromyalgia, and Charcot-Marie-Tooth disease.