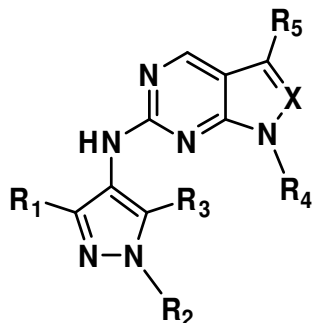


Claims

1. A compound selected from the group consisting of a compound represented by the following Formula 1, and a pharmaceutically acceptable salt, hydrate, solvate, thereof:

[Formula 1]



in the above formula,

X is CH or N;

R₁ is hydrogen, halogen, or C₁₋₄ alkyl or C₁₋₄ alkoxy unsubstituted or substituted with one or more halogens;

R₂ is C₁₋₆ alkyl, C₁₋₃ alkoxy C₁₋₆ alkyl, C₃₋₆ cycloalkyl C₁₋₆ alkyl, C₁₋₆ alkoxy, C₃₋₆ cycloalkyl, 4- to 7-membered heterocycloalkyl, or C₆₋₁₀ aryl unsubstituted or substituted with one or more halogens;

wherein the 4- to 7-membered heterocycloalkyl may be substituted with C₁₋₄ alkyl, C₁₋₄ alkylcarbonyl unsubstituted or substituted with one or more halogens, C₃₋₆ cycloalkylcarbonyl, 4- to 7-membered heterocycloalkylcarbonyl unsubstituted or substituted with C₁₋₄ alkyl, C₁₋₄ alkylsulfonyl, C₃₋₆ cycloalkylsulfonyl, or oxetanyl, and the heterocycloalkyl contains at least one atom selected from N, O, and S,

R₃ is hydrogen, halogen, or C₁₋₄ alkyl;

R₄ is C₁₋₆ alkyl or C₃₋₆ cycloalkyl unsubstituted or substituted with one or more halogens; and

R₅ is halogen, or C₁₋₄ alkyl substituted with one or more halogens.

2. The compound of claim 1, wherein R₁ is hydrogen, halogen, trifluoro C₁₋₄ alkyl, C₁₋₄ alkyl, or C₁₋₄ alkoxy.

3. The compound of claim 1, wherein R₄ is trifluoro C₁₋₄ alkyl, C₁₋₄ alkyl, or C₃₋₆ cycloalkyl.

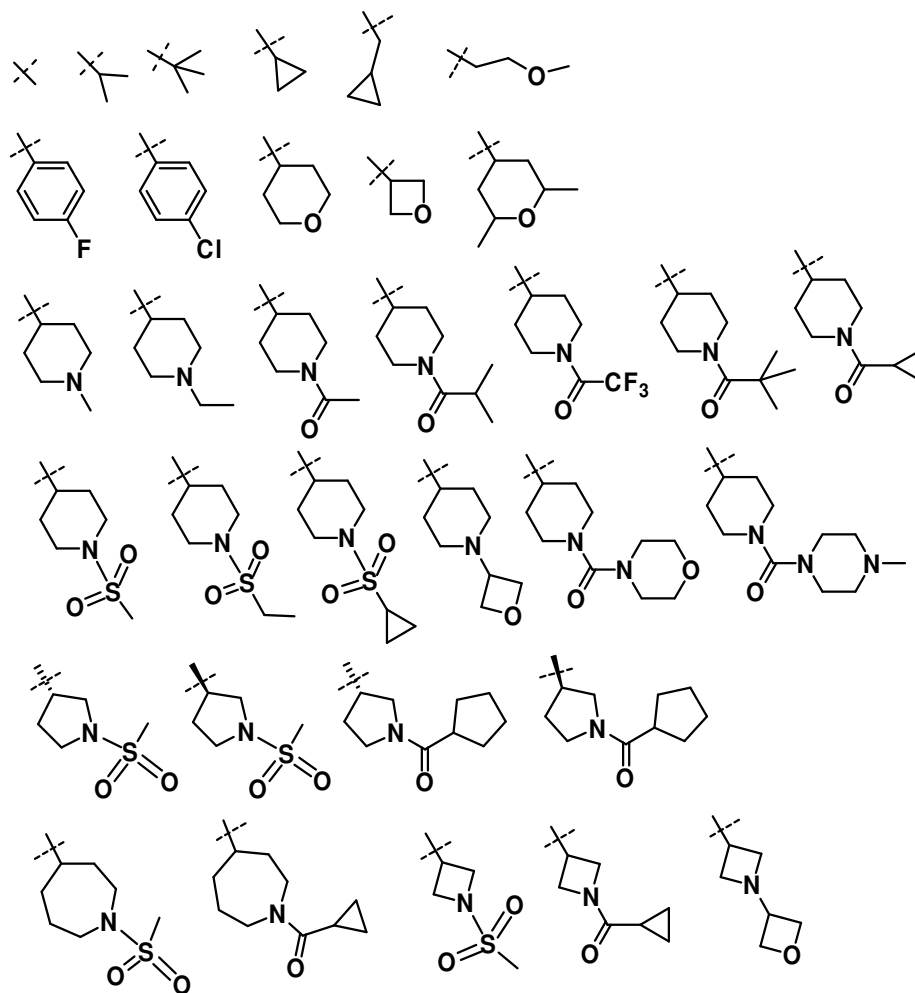
4. The compound of claim 1, wherein R₅ is halogen or trifluoro C₁₋₄ alkyl,.

5. The compound of claim 1, wherein R₂ is C₁₋₄ alkyl, C₁₋₃ alkoxy C₁₋₄ alkyl, C₃₋₆ cycloalkyl C₁₋₄ alkyl, C₁₋₄ alkoxy, C₃₋₆ cycloalkyl, 4- to 7-membered heterocycloalkyl, or C₆₋₁₀ aryl substituted with F or Cl,

wherein the 4- to 7-membered heterocycloalkyl may be substituted with C₁₋₄ alkyl, trifluoro C₁₋₄ alkylcarbonyl, C₁₋₄ alkylcarbonyl, C₃₋₆ cycloalkylcarbonyl, 4- to 7-membered heterocycloalkylcarbonyl unsubstituted or substituted with C₁₋₄ alkyl, C₁₋₄ alkylsulfonyl, C₃₋₆ cycloalkylsulfonyl, or oxetanyl, and

the heterocycloalkyl contains at least one atom selected from N and O.

6. The compound of claim 5, wherein R₂ is selected from the following substituents:



in the above substituents, , , and  refer to the sites to be bonded.

7. The compound of claim 1, wherein the compound represented by Formula 1 is selected from the group consisting of the following compounds:

- 1) N-(5-chloro-1-methyl-1H-pyrazol-4-yl)-7-methyl-5-(trifluoromethyl)-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 2) 5-chloro-N-(1-isopropyl-3-methoxy-1H-pyrazol-4-yl)-7-methyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 3) 5-chloro-N-(3-chloro-1-isopropyl-1H-pyrazol-4-yl)-7-methyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 4) 5-chloro-7-methyl-N-(1-(tetrahydro-2H-pyran-4-yl)-3-(trifluoromethyl)-1H-pyrazol-4-yl)-7H-pyrrolo[2,3-d]pyrimidin-2-amine,

- 5) 5-chloro-N-(5-chloro-1-methyl-1H-pyrazol-4-yl)-7-methyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 6) 5-chloro-N-(5-chloro-1-methyl-1H-pyrazol-4-yl)-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 7) 5-chloro-N-(3-chloro-1-isopropyl-1H-pyrazol-4-yl)-7-isopropyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 8) 5-chloro-N-(3-chloro-1-isopropyl-1H-pyrazol-4-yl)-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 9) 5-chloro-N-(1-isopropyl-3-(trifluoromethyl)-1H-pyrazol-4-yl)-7-methyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 10) 5-chloro-N-(1-(2-methoxyethyl)-3-(trifluoromethyl)-1H-pyrazol-4-yl)-7-methyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 11) N-(1-butyl-3-(trifluoromethyl)-1H-pyrazol-4-yl)-5-chloro-7-methyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 12) 5-chloro-N-(3-chloro-1-(2-methoxyethyl)-1H-pyrazol-4-yl)-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 13) 5-chloro-N-(3-chloro-1-(cyclopropylmethyl)-1H-pyrazol-4-yl)-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 14) 5-chloro-N-(3-chloro-1-cyclopropyl-1H-pyrazol-4-yl)-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 15) 5-chloro-N-(3-chloro-1-cyclopropyl-1H-pyrazol-4-yl)-7-cyclopropyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 16) 5-chloro-N-(5-chloro-1-(oxetan-3-yl)-1H-pyrazol-4-yl)-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 17) 5-chloro-N-(3-chloro-1-(1-methylpiperidin-4-yl)-1H-pyrazol-4-yl)-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 18) 5-chloro-N-(3-chloro-1-(tetrahydro-2H-pyran-4-yl)-1H-pyrazol-4-yl)-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 19) 5-chloro-N-(3-chloro-1-(2,6-dimethyltetrahydro-2H-pyran-4-yl)-1H-pyrazol-4-yl)-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,

- 20) 5-chloro-N-(3-chloro-1-(1-ethylpiperidin-4-yl)-1H-pyrazol-4-yl)-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 21) 5-chloro-N-(3-chloro-1-(4-fluorophenyl)-1H-pyrazol-4-yl)-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 22) 5-chloro-N-(5-chloro-1-(4-chlorophenyl)-1H-pyrazol-4-yl)-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 23) 1-(4-(5-chloro-4-(5-chloro-7-methyl-7H-pyrrolo[2,3-d]pyrimidin-2-ylamino)-1H-pyrazol-1-yl)piperidin-1-yl)ethanone,
- 24) (4-(3-chloro-4-(5-chloro-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-ylamino)-1H-pyrazol-1-yl)piperidin-1-yl)(cyclopropyl)methanone,
- 25) 5-chloro-N-(3-chloro-1-(1-(methylsulfonyl)piperidin-4-yl)-1H-pyrazol-4-yl)-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 26) 1-(4-(3-chloro-4-(5-chloro-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-ylamino)-1H-pyrazol-1-yl)piperidin-1-yl)-2-methylpropane-1-one,
- 27) 5-chloro-N-(5-chloro-1-(1-(oxetan-3-yl)piperidin-4-yl)-1H-pyrazol-4-yl)-7-methyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 28) 5-chloro-N-(5-chloro-1-(1-(oxetan-3-yl)piperidin-4-yl)-1H-pyrazol-4-yl)-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 29) 5-chloro-N-(5-chloro-1-(1-(oxetan-3-yl)piperidin-4-yl)-1H-pyrazol-4-yl)-7-cyclopropyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 30) 5-chloro-N-(3-chloro-1-(1-(methylsulfonyl)piperidin-4-yl)-1H-pyrazol-4-yl)-7-cyclopropyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 31) (4-(3-chloro-4-(5-chloro-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-ylamino)-1H-pyrazol-1-yl)piperidin-1-yl)(morpholino)methanone,
- 32) (4-(3-chloro-4-(5-chloro-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-ylamino)-1H-pyrazol-1-yl)piperidin-1-yl)(4-methylpiperazin-1-yl)methanone,
- 33) 1-(4-(3-chloro-4-(5-chloro-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-ylamino)-1H-pyrazol-1-yl)piperidin-1-yl)-2,2-dimethylpropane-1-one,
- 34) 5-chloro-N-(3,5-dimethyl-1-(1-(methylsulfonyl)piperidin-4-yl)-1H-pyrazol-4-yl)-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,

- 35) 5-chloro-N-(3-chloro-1-(1-(cyclopropylsulfonyl)piperidin-4-yl)-1H-pyrazol-4-yl)-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 36) (R)-5-chloro-N-(3-chloro-1-(1-(methylsulfonyl)pyrrolidin-3-yl)-1H-pyrazol-4-yl)-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 37) (S)-5-chloro-N-(3-chloro-1-(1-(methylsulfonyl)pyrrolidin-3-yl)-1H-pyrazol-4-yl)-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 38) (R)-(3-(3-chloro-4-(5-chloro-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-ylamino)-1H-pyrazol-1-yl)pyrrolidin-1-yl)(cyclopentyl)methanone,
- 39) (S)-(3-(3-chloro-4-(5-chloro-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-ylamino)-1H-pyrazol-1-yl)pyrrolidin-1-yl)(cyclopentyl)methanone,
- 40) 5-chloro-N-(3-chloro-1-(1-(methylsulfonyl)azetidin-3-yl)-1H-pyrazol-4-yl)-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 41) (3-(3-chloro-4-(5-chloro-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-ylamino)-1H-pyrazol-1-yl)azetidin-1-yl)(cyclopropyl)methanone,
- 42) 5-chloro-N-(3-chloro-1-(1-(methylsulfonyl)azepan-4-yl)-1H-pyrazol-4-yl)-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-amine,
- 43) (4-(3-chloro-4-(5-chloro-7-ethyl-7H-pyrrolo[2,3-d]pyrimidin-2-ylamino)-1H-pyrazol-1-yl)azepan-1-yl)(cyclopropyl)methanone,
- 44) 3-chloro-N-(3-chloro-1-(4-fluorophenyl)-1H-pyrazol-4-yl)-1-ethyl-1H-pyrazolo[3,4-d]pyrimidin-6-amine,
- 45) 3-chloro-N-(5-chloro-1-(1-(oxetan-3-yl)piperidin-4-yl)-1H-pyrazol-4-yl)-1-ethyl-1H-pyrazolo[3,4-d]pyrimidin-6-amine,
- 46) 3-chloro-N-(3-chloro-1-(1-(methylsulfonyl)piperidin-4-yl)-1H-pyrazol-4-yl)-1-cyclopropyl-1H-pyrazolo[3,4-d]pyrimidin-6-amine,
- 47) 3-chloro-N-(3-chloro-1-(1-(cyclopropylsulfonyl)piperidin-4-yl)-1H-pyrazol-4-yl)-1-ethyl-1H-pyrazolo[3,4-d]pyrimidin-6-amine,
- 48) 1-(4-(3-chloro-4-(3-chloro-1-ethyl-1H-pyrazolo[3,4-d]pyrimidin-6-ylamino)-1H-pyrazol-1-yl)piperidin-1-yl)-2,2,2-trifluoroethanone,
- 49) 3-chloro-N-(3-chloro-1-(1-(methylsulfonyl)piperidin-4-yl)-1H-pyrazol-4-yl)-1-(2,2,2-trifluoroethyl)-1H-pyrazolo[3,4-d]pyrimidin-6-amine,

- 50) 3-chloro-N-(5-chloro-1-(1-(oxetan-3-yl)piperidin-4-yl)-1H-pyrazol-4-yl)-1-(2,2,2-trifluoroethyl)-1H-pyrazolo[3,4-d]pyrimidin-6-amine,
- 51) 3-chloro-N-(3-chloro-1-(1-(methylsulfonyl)azepan-4-yl)-1H-pyrazol-4-yl)-1-ethyl-1H-pyrazolo[3,4-d]pyrimidin-6-amine,
- 52) (4-(3-chloro-4-(3-chloro-1-ethyl-1H-pyrazolo[3,4-d]pyrimidin-6-ylamino)-1H-pyrazol-1-yl)azepan-1-yl)(cyclopropyl)methanone,
- 53) 1-(4-(3-chloro-4-(3-chloro-1-ethyl-1H-pyrazolo[3,4-d]pyrimidin-6-ylamino)-1H-pyrazol-1-yl)piperidin-1-yl)-2,2-dimethylpropane-1-one,
- 54) (4-(3-chloro-4-(3-chloro-1-ethyl-1H-pyrazolo[3,4-d]pyrimidin-6-ylamino)-1H-pyrazol-1-yl)piperidin-1-yl)(morpholino)methanone,
- 55) 3-chloro-N-(3-chloro-1-(1-(methylsulfonyl)piperidin-4-yl)-1H-pyrazol-4-yl)-1-ethyl-1H-pyrazolo[3,4-d]pyrimidin-6-amine,
- 56) (4-(3-chloro-4-(3-chloro-1-ethyl-1H-pyrazolo[3,4-d]pyrimidin-6-ylamino)-5-methyl-1H-pyrazol-1-yl)piperidin-1-yl)(cyclopropyl)methanone,
- 57) (4-(3-chloro-4-(3-chloro-1-ethyl-1H-pyrazolo[3,4-d]pyrimidin-6-ylamino)-1H-pyrazol-1-yl)piperidin-1-yl)(cyclopropyl)methanone,
- 58) 1-(4-(3-chloro-4-(3-chloro-1-ethyl-1H-pyrazolo[3,4-d]pyrimidin-6-ylamino)-1H-pyrazol-1-yl)piperidin-1-yl)ethanone,
- 59) 3-chloro-N-(3-chloro-1-(1-(ethylsulfonyl)piperidin-4-yl)-1H-pyrazol-4-yl)-1-ethyl-1H-pyrazolo[3,4-d]pyrimidin-6-amine,
- 60) (3-(3-chloro-4-(3-chloro-1-ethyl-1H-pyrazolo[3,4-d]pyrimidin-6-ylamino)-1H-pyrazol-1-yl)azetidin-1-yl)(cyclopropyl)methanone,
- 61) 3-chloro-N-(5-chloro-1-(1-(oxetan-3-yl)azetidin-3-yl)-1H-pyrazol-4-yl)-1-ethyl-1H-pyrazolo[3,4-d]pyrimidin-6-amine,
- 62) 3-chloro-N-(5-chloro-1-(1-(methylsulfonyl)piperidin-4-yl)-1H-pyrazol-4-yl)-1-ethyl-1H-pyrazolo[3,4-d]pyrimidin-6-amine.

8. The compound of claim 1, wherein the pharmaceutically acceptable salt is one or more selected from the group consisting of hydrochloride, hydrobromide, hydroiodide, sulfate, nitrate, methanesulfonate, ethanesulfonate, benzenesulfonate,

and toluenesulfonate.

9. A pharmaceutical composition for use in the prevention or treatment of a degenerative brain disease, the pharmaceutical composition comprising the compound of any one of claims 1 to 8 as an active ingredient.

10. The pharmaceutical composition of claim 9, wherein the degenerative brain disease is Parkinson's disease.

11. The pharmaceutical composition of claim 9, which has an inhibitory activity selective to LRRK2(leucine-rich repeat kinase 2).

12. A use of the compound of any one of claims 1 to 8 for the preparation of a medicament for preventing or treating a degenerative brain disease.