In the formula (I), the "saturated heterocyclic group" represented by R^3 preferably indicates a monocyclic or bicyclic saturated heterocyclic group preferably having any one or two atoms selected from oxygen, nitrogen, and sulfur atom(s). Examples thereof include a pyrrolidinyl group, a piperidinyl group, a piperazinyl group, a hexamethyleneimino group, a morpholino group, a thiomorpholino group, a homopiperidinyl group, a tetrahydrofuryl group, and a tetrahydropyryl group. Of these, a tetrahydrofuryl group and a tetrahydropyryl group are preferable.

The group represented by R^3 is preferably an isobutyl group, a 2-methylbutyl group, an allyl group, a cyclopentyl group, a cyclopropylmethyl group, a 2,2-difluoroethyl group, a 2,2,2-trifluoroethyl group, a tetrahydrofuryl group, or a tetrahydropyryl group.

[0017]

It is more preferable that, in the formula (I), X represents an ethylene group or an -O-C_{1-4} alkylene group; R^1 represents a hydrogen atom or a C_{1-3} alkyl group; R^2 represents a hydrogen atom or a fluorine atom; and R^3 represents a C_{1-6} alkyl group, a C_{2-6} alkenyl group, a C_{3-6} cycloalkyl group, a (C_{3-6} cycloalkyl) C_{1-6} alkyl group, a halogeno-C_{1-6} alkyl group or a saturated heterocyclic group.

[0018]

In addition, it is further preferable that, in the formula (I), X represents an ethylene group or an -O-C_{1-4} alkylene group; R^1 represents a hydrogen atom or a C_{1-3} alkyl group; R^2 represents a hydrogen atom or a fluorine atom; and R^3 represents a C_{1-6} alkyl group, a C_{2-6} alkenyl group, C_{3-6} cycloalkyl group, A (C_{3-6} cycloalkyl) C_{1-6} alkyl group, a halogeno-C_{1-6} alkyl group, or a tetrahydrofuryl or tetrahydropyryl group.

[0019]

Moreover, it is particularly preferable that, in the formula (I), X represents an ethylene group or $-O-CH_2CH_2CH_2-$; R^1 represents a hydrogen atom, a methyl group or an ethyl group; R^2 represents a hydrogen atom or a fluorine atom; and R^3 represents an isobutyl group, a 2-methylbutyl group, an allyl group, a cyclopentyl group, a cyclopropylmethyl group, a 2,2-difluoroethyl group, a 2,2,2-trifluoroethyl group, a tetrahydrofuryl group or a tetrahydropyryl group.

[0020]

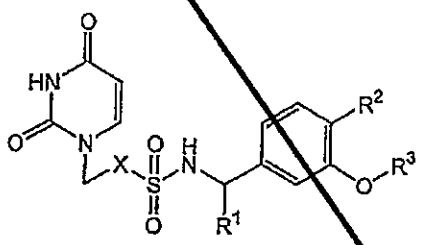
Examples of a pharmaceutically acceptable salt of the compound represented by the formula (I) include: acid addition salts with inorganic acids such as hydrochloric acid, hydrobromic acid, hydroiodic acid, sulfuric acid, nitric acid or phosphoric acid, or with organic acids such as formic acid, acetic acid, propionic acid, oxalic acid, malonic acid, succinic acid, fumaric acid, maleic acid, lactic acid, malic acid, citric acid, tartaric acid, carbonic acid, picric acid, methanesulfonic acid, paratoluenesulfonic acid or glutamic acid; salts with inorganic bases such as sodium, potassium, magnesium, calcium or aluminum, or with organic bases such as methylamine, ethylamine, meglumine or ethanolamine, or with basic amino acids such as lysine, arginine or ornithine; and ammonium salts. Moreover, the compound of the present invention includes an optical isomer and hydrate(s).

[0021]

The uracil compound of the present invention can be produced according to the following reaction steps.

Claims

1. An anti-tumor effect potentiator comprising, as an active ingredient, a uracil compound represented by the general formula (I) or a pharmaceutically acceptable salt thereof:



(I)

wherein X represents a C_{1-5} alkylene group and one of methylene groups constituting the alkylene group is optionally substituted with an oxygen atom;
R^1 represents a hydrogen atom or a C_{1-6} alkyl group; R^2 represents a hydrogen atom or a halogen atom; and R^3 represents a C_{1-6} alkyl group, a C_{2-6} alkenyl group, a C_{3-6} cycloalkyl group, a (C_{3-6} cycloalkyl) C_{1-6} alkyl group, a halogeno-C_{1-6} alkyl group or a saturated heterocyclic group.

2. The anti-tumor effect potentiator according to claim 1 comprising, as an active ingredient, a uracil compound or a pharmaceutically acceptable salt thereof, wherein, in the general formula (I), X represents an ethylene group or an -O-C_{1-4} alkylene group;
R^1 represents a hydrogen atom or a C_{1-3} alkyl group; and R^2 represents a hydrogen atom or a fluorine atom.

3. The anti-tumor effect potentiator according to claim 1 or 2 comprising, as an active ingredient, a uracil compound or a pharmaceutically acceptable salt thereof, wherein, in the general

formula (I), X represents an ethylene group or an $-O-CH_2CH_2CH_2-$ group;
R^1 represents a hydrogen atom, a methyl group or an ethyl group; R^2 represents a hydrogen atom or a fluorine atom;
and R^3 represents an isobutyl group, a 2-methylbutyl group, an allyl group, a cyclopentyl group, a cyclopropylmethyl group, a 2,2-difluoroethyl group, a 2,2,2-trifluoroethyl group, a tetrahydrofuryl group or a tetrahydropyryl group.

4. The anti-tumor effect potentiator according to claim 1 comprising, as an active ingredient, a uracil compound or a pharmaceutically acceptable salt thereof, which is selected from the following group:

- N-(3-(cyclopropylmethoxy)benzyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(cyclopentyloxy)phenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- 3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-((R)-1-(3-((R)-tetrahydrofuran-3-yloxy)phenyl)ethyl)propane-1-sulfonamide
- N-(3-(cyclopropylmethoxy)-4-fluorobenzyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(cyclopropylmethoxy)-4-fluorophenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- N-(1-(3-(cyclopropylmethoxy)phenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- N-(3-(cyclopentyloxy)benzyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(cyclopropylmethoxy)-4-fluorophenyl)propyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide

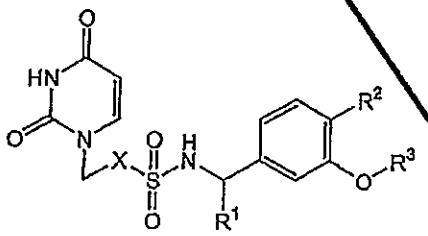
- (R)-N-(1-(3-(cyclopentyloxy)-4-fluorophenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-(1-(3-(2,2,2-trifluoroethoxy)phenyl)ethyl)propane-1-sulfonamide
- (R)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-(1-(3-isobutoxyphenyl)ethyl)propane-1-sulfonamide
- 3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-((R)-1-(3-((S)-2-methylbutoxy)phenyl)ethyl)propane-1-sulfonamide
- (R)-N-(1-(3-(2,2-difluoroethoxy)phenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-(1-(3-(tetrahydro-2H-pyran-4-yloxy)phenyl)ethyl)propane-1-sulfonamide
- (R)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-(1-(4-fluoro-3-(2,2,2-trifluoroethoxy)phenyl)ethyl)propane-1-sulfonamide
- (R)-N-(1-(3-(2,2-difluoroethoxy)-4-fluorophenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(allyloxy)phenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(cyclopropylmethoxy)phenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(cyclopropylmethoxy)phenyl)propyl)-3-(2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)propane-1-sulfonamide.

5. An anti-tumor drug comprising a combination of a uracil compound according to any of claims 1 to 4 or a pharmaceutically acceptable salt thereof and an anti-tumor agent.

6. The anti-tumor drug according to claim 5, wherein the anti-tumor agent is an antimetabolite.

7. The anti-tumor drug according to claim 5, wherein the anti-tumor agent is any of 5-fluorouracil (5-FU), tegafur/gimeracil/oteracil potassium (TS-1), tegafur/uracil (UFT), capecitabine, 5-fluoro-2'-deoxy-uridine (FdUrd) and pemetrexed.

8. A uracil compound represented by the general formula (I) or a pharmaceutically acceptable salt thereof for use in potentiation of anti-tumor effects:



(I)

(wherein X represents a C_{1-5} alkylene group and one of methylene groups constituting the alkylene group is optionally substituted with an oxygen atom;
R^1 represents a hydrogen atom or a C_{1-6} alkyl group; R^2 represents a hydrogen atom or a halogen atom; and R^3 represents a C_{1-6} alkyl group, a C_{2-6} alkenyl group, a C_{3-6} cycloalkyl group, a (C_{3-6} cycloalkyl) C_{1-6} alkyl group, a halogeno-C_{1-6} alkyl group or a saturated heterocyclic group).

9. The uracil compound according to claim 8 or a pharmaceutically acceptable salt thereof, wherein, in the general formula (I), X represents an ethylene group or an -O-C_{1-4} alkylene group, R^1 represents a hydrogen atom or a C_{1-3} alkyl group; and R^2 represents a hydrogen atom or a fluorine atom.

10. The uracil compound according to claim 8 or 9 or a pharmaceutically acceptable salt thereof, wherein, in the general formula (I), X represents an ethylene group or an $-O-CH_2CH_2CH_2-$ group;
R^1 represents a hydrogen atom, a methyl group or an ethyl group; R^2 represents a hydrogen atom or a fluorine atom;
and R^3 represents an isobutyl group, a 2-methylbutyl group, an allyl group, a cyclopentyl group, a cyclopropylmethyl group, a 2,2-difluoroethyl group, a 2,2,2-trifluoroethyl group, a tetrahydrofuryl group or a tetrahydropyryl group.

11. The uracil compound according to claim 8 or a pharmaceutically acceptable salt thereof, which is selected from the following group:

- N-(3-(cyclopropylmethoxy)benzyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(cyclopentyloxy)phenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- 3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-((R)-1-(3-((R)-tetrahydrofuran-3-yloxy)phenyl)ethyl)propane-1-sulfonamide
- N-(3-(cyclopropylmethoxy)-4-fluorobenzyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(cyclopropylmethoxy)-4-fluorophenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- N-(1-(3-(cyclopropylmethoxy)phenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- N-(3-(cyclopentyloxy)benzyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(cyclopropylmethoxy)-4-fluorophenyl)propyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide

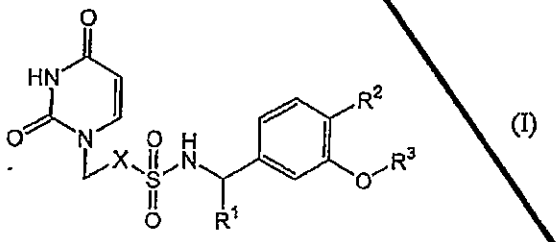
- (R)-N-(1-(3-(cyclopentyloxy)-4-fluorophenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-(1-(3-(2,2,2-trifluoroethoxy)phenyl)ethyl)propane-1-sulfonamide
- (R)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-(1-(3-isobutoxyphenyl)ethyl)propane-1-sulfonamide
- 3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-((R)-1-(3-((S)-2-methylbutoxy)phenyl)ethyl)propane-1-sulfonamide
- (R)-N-(1-(3-(2,2-difluoroethoxy)phenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-(1-(3-(tetrahydro-2H-pyran-4-yloxy)phenyl)ethyl)propane-1-sulfonamide
- (R)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-(1-(4-fluoro-3-(2,2,2-trifluoroethoxy)phenyl)ethyl)propane-1-sulfonamide
- (R)-N-(1-(3-(2,2-difluoroethoxy)-4-fluorophenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(allyloxy)phenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(cyclopropylmethoxy)phenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(cyclopropylmethoxy)phenyl)propyl)-3-(2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)propane-1-sulfonamide.

12. A combination of a uracil compound according to any of claims 8 to 11 or a pharmaceutically acceptable salt thereof and an anti-tumor agent for use in treating tumors.

13. The combination according to claim 12, wherein the anti-tumor agent is an antimetabolite.

14. The combination according to claim 12, wherein the anti-tumor agent is any of 5-fluorouracil (5-FU), tegafur/gimeracil/oteracil potassium (TS-1), tegafur/uracil (UFT), capecitabine, 5-fluoro-2'-deoxy-uridine (FdUrd) and pemetrexed.

15. A method for potentiating anti-tumor effects, which comprises administration of an effective amount of a uracil compound represented by the general formula (I) or a pharmaceutically acceptable salt thereof:



(I)

(wherein X represents a C_{1-5} alkylene group and one of methylene groups constituting the alkylene group is optionally substituted with an oxygen atom;
R^1 represents a hydrogen atom or a C_{1-6} alkyl group; R^2 represents a hydrogen atom or a halogen atom; and R^3 represents a C_{1-6} alkyl group, a C_{2-6} alkenyl group, a C_{3-6} cycloalkyl group, a (C_{3-6} cycloalkyl) C_{1-6} alkyl group, a halogeno-C_{1-6} alkyl group or a saturated heterocyclic group).

16. The method according to claim 15, wherein, in the general formula (I), X represents an ethylene group or an -O-C_{1-4} alkylene group;
R^1 represents a hydrogen atom or a C_{1-3} alkyl group; and R^2 represents a hydrogen atom or a fluorine atom.

17. The method according to claim 15 or 16, wherein, in the general formula (I), X represents an ethylene group or an -O-$CH_2CH_2CH_2$- group;
R^1 represents a hydrogen atom, a methyl group or an ethyl group; R^2 represents a hydrogen atom or a fluorine atom;
and R^3 represents an isobutyl group, a 2-methylbutyl group, an allyl group, a cyclopentyl group, a cyclopropylmethyl group, a 2,2-difluoroethyl group, a 2,2,2-trifluoroethyl group, a tetrahydrofuryl group or a tetrahydropyryl group.

18. The method according to claim 15, wherein the compound of the formula (I) is selected from the following group:
- N-(3-(cyclopropylmethoxy)benzyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(cyclopentyloxy)phenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- 3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-((R)-1-(3-((R)-tetrahydrofuran-3-yloxy)phenyl)ethyl)propane-1-sulfonamide
- N-(3-(cyclopropylmethoxy)-4-fluorobenzyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(cyclopropylmethoxy)-4-fluorophenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- N-(1-(3-(cyclopropylmethoxy)phenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- N-(3-(cyclopentyloxy)benzyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(cyclopropylmethoxy)-4-fluorophenyl)propyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(cyclopentyloxy)-4-fluorophenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide

- (R)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-(1-(3-(2,2,2-trifluoroethoxy)phenyl)ethyl)propane-1-sulfonamide
- (R)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-(1-(3-isobutoxyphenyl)ethyl)propane-1-sulfonamide
- 3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-((R)-1-(3-((S)-2-methylbutoxy)phenyl)ethyl)propane-1-sulfonamide
- (R)-N-(1-(3-(2,2-difluoroethoxy)phenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-(1-(3-(tetrahydro-2H-pyran-4-yloxy)phenyl)ethyl)propane-1-sulfonamide
- (R)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-(1-(4-fluoro-3-(2,2,2-trifluoroethoxy)phenyl)ethyl)propane-1-sulfonamide
- (R)-N-(1-(3-(2,2-difluoroethoxy)-4-fluorophenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(allyloxy)phenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(cyclopropylmethoxy)phenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(cyclopropylmethoxy)phenyl)propyl)-3-(2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)propane-1-sulfonamide.

19. A method for treating tumors comprising administration of a combination of a uracil compound according to any of claims 15 to 18 or a pharmaceutically acceptable salt thereof and an anti-tumor agent.

20. The method according to claim 19, wherein the anti-tumor agent is an antimetabolite.

21. The method according to claim 19, wherein the anti-tumor agent is any of 5-fluorouracil (5-FU), tegafur/gimeracil/oteracil potassium (TS-1), tegafur/uracil (UFT), capecitabine, 5-fluoro-2'-deoxy-uridine (FdUrd) and pemetrexed.

In the formula (I), the "saturated heterocyclic group" represented by R^3 preferably indicates a monocyclic or bicyclic saturated heterocyclic group preferably having any one or two atoms selected from oxygen, nitrogen, and sulfur atom(s). Examples thereof include a pyrrolidinyl group, a piperidinyl group, a piperazinyl group, a hexamethyleneimino group, a morpholino group, a thiomorpholino group, a homopiperidinyl group, a tetrahydrofuryl group, and a tetrahydropyranyl group. Of these, a tetrahydrofuryl group and a tetrahydropyranyl group are preferable.

The group represented by R^3 is preferably an isobutyl group, a 2-methylbutyl group, an allyl group, a cyclopentyl group, a cyclopropylmethyl group, a 2,2-difluoroethyl group, a 2,2,2-trifluoroethyl group, a tetrahydrofuryl group, or a tetrahydropyryl group.

[0017]

It is more preferable that, in the formula (I), X represents an ethylene group or an $-O-C_{1-4}$ alkylene group; R^1 represents a hydrogen atom or a C_{1-3} alkyl group; R^2 represents a hydrogen atom or a fluorine atom; and R^3 represents a C_{1-6} alkyl group, a C_{2-6} alkenyl group, a C_{3-6} cycloalkyl group, a (C_{3-6} cycloalkyl) C_{1-6} alkyl group, a halogeno-C_{1-6} alkyl group or a saturated heterocyclic group.

[0018]

In addition, it is further preferable that, in the formula (I), X represents an ethylene group or an $-O-C_{1-4}$ alkylene group; R^1 represents a hydrogen atom or a C_{1-3} alkyl group; R^2 represents a hydrogen atom or a fluorine atom; and R^3 represents a C_{1-6} alkyl group, a C_{2-6} alkenyl group, a C_{3-6} cycloalkyl group, a (C_{3-6} cycloalkyl) C_{1-6} alkyl group, a halogeno-C_{1-6} alkyl group, or a tetrahydrofuryl or tetrahydropyranyl group.

[0019]

Moreover, it is particularly preferable that, in the formula (I), X represents an ethylene group or $-O-CH_2CH_2CH_2-$; R^1 represents a hydrogen atom, a methyl group or an ethyl group; R^2 represents a hydrogen atom or a fluorine atom; and R^3 represents an isobutyl group, a 2-methylbutyl group, an allyl group, a cyclopentyl group, a cyclopropylmethyl group, a 2,2-difluoroethyl group, a 2,2,2-trifluoroethyl group, a tetrahydrofuryl group or a tetrahydropyranyl group.

[0020]

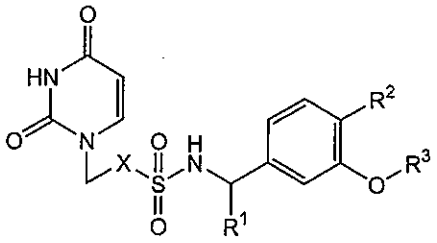
Examples of a pharmaceutically acceptable salt of the compound represented by the formula (I) include: acid addition salts with inorganic acids such as hydrochloric acid, hydrobromic acid, hydroiodic acid, sulfuric acid, nitric acid or phosphoric acid, or with organic acids such as formic acid, acetic acid, propionic acid, oxalic acid, malonic acid, succinic acid, fumaric acid, maleic acid, lactic acid, malic acid, citric acid, tartaric acid, carbonic acid, picric acid, methanesulfonic acid, paratoluenesulfonic acid or glutamic acid; salts with inorganic bases such as sodium, potassium, magnesium, calcium or aluminum, or with organic bases such as methylamine, ethylamine, meglumine or ethanolamine, or with basic amino acids such as lysine, arginine or ornithine; and ammonium salts. Moreover, the compound of the present invention includes an optical isomer and hydrate(s).

[0021]

The uracil compound of the present invention can be produced according to the following reaction steps.

Claims

1. An anti-tumor effect potentiator comprising, as an active ingredient, a uracil compound represented by the general formula (I) or a pharmaceutically acceptable salt thereof:



(I)

wherein X represents a C_{1-5} alkylene group and one of methylene groups constituting the alkylene group is optionally substituted with an oxygen atom;
R^1 represents a hydrogen atom or a C_{1-6} alkyl group; R^2 represents a hydrogen atom or a halogen atom; and R^3 represents a C_{1-6} alkyl group, a C_{2-6} alkenyl group, a C_{3-6} cycloalkyl group, a (C_{3-6} cycloalkyl) C_{1-6} alkyl group, a halogeno-C_{1-6} alkyl group or a saturated heterocyclic group.

2. The anti-tumor effect potentiator according to claim 1 comprising, as an active ingredient, a uracil compound or a pharmaceutically acceptable salt thereof, wherein, in the general formula (I), X represents an ethylene group or an -O-C_{1-4} alkylene group;
R^1 represents a hydrogen atom or a C_{1-3} alkyl group; and R^2 represents a hydrogen atom or a fluorine atom.

3. The anti-tumor effect potentiator according to claim 1 or 2 comprising, as an active ingredient, a uracil compound or a

pharmaceutically acceptable salt thereof, wherein, in the general formula (I), X represents an ethylene group or an $-O-CH_2CH_2CH_2-$ group;

R^1 represents a hydrogen atom, a methyl group or an ethyl group; R^2 represents a hydrogen atom or a fluorine atom;

and R^3 represents an isobutyl group, a 2-methylbutyl group, an allyl group, a cyclopentyl group, a cyclopropylmethyl group, a 2,2-difluoroethyl group, a 2,2,2-trifluoroethyl group, a tetrahydrofuryl group or a tetrahydropyranyl group.

4. The anti-tumor effect potentiator according to claim 1 comprising, as an active ingredient, a uracil compound or a pharmaceutically acceptable salt thereof, which is selected from the following group:

- N-(3-(cyclopropylmethoxy)benzyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(cyclopentyloxy)phenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- 3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-((R)-1-(3-((R)-tetrahydrofuran-3-yloxy)phenyl)ethyl)propane-1-sulfonamide
- N-(3-(cyclopropylmethoxy)-4-fluorobenzyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(cyclopropylmethoxy)-4-fluorophenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- N-(1-(3-(cyclopropylmethoxy)phenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- N-(3-(cyclopentyloxy)benzyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide

- (R)-N-(1-(3-(cyclopropylmethoxy)-4-fluorophenyl)propyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(cyclopentyloxy)-4-fluorophenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-(1-(3-(2,2,2-trifluoroethoxy)phenyl)ethyl)propane-1-sulfonamide
- (R)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-(1-(3-isobutoxyphenyl)ethyl)propane-1-sulfonamide
- 3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-((R)-1-(3-((S)-2-methylbutoxy)phenyl)ethyl)propane-1-sulfonamide
- (R)-N-(1-(3-(2,2-difluoroethoxy)phenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-(1-(3-(tetrahydro-2H-pyran-4-yloxy)phenyl)ethyl)propane-1-sulfonamide
- (R)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)-N-(1-(4-fluoro-3-(2,2,2-trifluoroethoxy)phenyl)ethyl)propane-1-sulfonamide
- (R)-N-(1-(3-(2,2-difluoroethoxy)-4-fluorophenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(allyloxy)phenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(cyclopropylmethoxy)phenyl)ethyl)-3-((2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)methoxy)propane-1-sulfonamide
- (R)-N-(1-(3-(cyclopropylmethoxy)phenyl)propyl)-3-(2,4-dioxo-3,4-dihydropyrimidin-1(2H)-yl)propane-1-sulfonamide.

5. An anti-tumor drug comprising a combination of a uracil compound according to any of claims 1 to 4 or a pharmaceutically acceptable salt thereof and an anti-tumor agent.

6. The anti-tumor drug according to claim 5, wherein the anti-tumor agent is an antimetabolite.

7. The anti-tumor drug according to claim 5, wherein the anti-tumor agent is any of 5-fluorouracil (5-FU), tegafur/gimeracil/oteracil potassium (TS-1), tegafur/uracil (UFT), capecitabine, 5-fluoro-2'-deoxy-uridine (FdUrd) and pemetrexed.

8. A combination of a uracil compound according to any of claims 1 to 4 or a pharmaceutically acceptable salt thereof and an anti-tumor agent for use in treating tumors.

9. The combination according to claim 8, wherein the anti-tumor agent is an antimetabolite.

10. The combination according to claim 8, wherein the anti-tumor agent is any of 5-fluorouracil (5-FU), tegafur/gimeracil/oteracil potassium (TS-1), tegafur/uracil (UFT), capecitabine, 5-fluoro-2'-deoxy-uridine (FdUrd) and pemetrexed.