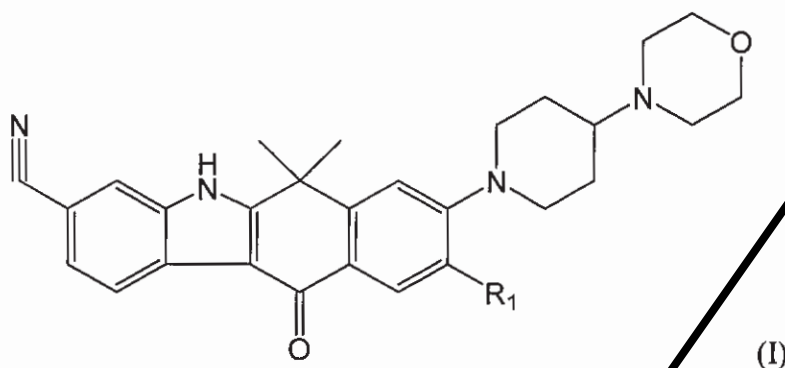


CLAIMS

1 A therapeutic and/or prophylactic agent for a tumor with a mutation in RET and for metastasis of the tumor, which comprises a compound represented by formula (I), a salt thereof or a solvate thereof as an active ingredient:



wherein R₁ is a C₁₋₆ alkyl group.

2 The therapeutic and/or prophylactic agent according to claim 1, wherein the tumor is selected from the group consisting of acute myelogenous leukemia, chronic myelogenous leukemia, acute lymphocytic leukemia, chronic lymphocytic leukemia, Hodgkin's lymphoma, non-Hodgkin's lymphoma, brain tumor, neuroblastoma, glioma, thyroid cancer, myelodysplastic syndrome, head and neck cancer, esophageal cancer, gastric cancer, colorectal cancer, breast cancer, ovarian cancer, lung cancer, pancreatic cancer, liver cancer, gallbladder cancer, skin cancer, malignant melanoma, kidney cancer, renal pelvis and ureteral cancer, bladder cancer, uterine cancer, testicular cancer, prostate cancer, and tumors metastasized from these tumors.

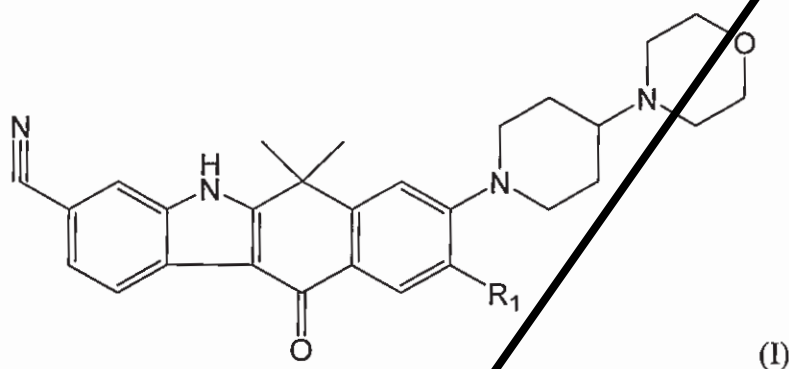
3 The therapeutic and/or prophylactic agent according to claim 1, wherein the tumor is thyroid cancer or lung cancer.

4 The therapeutic and/or prophylactic agent according to claim 1, wherein the tumor is thyroid medullary cancer or non-small cell lung cancer.

5 The therapeutic and/or prophylactic agent according to any one of claims 1 to 4, wherein the tumor is a tumor with a fusion gene between RET gene and another gene and/or a fusion protein between RET protein and another protein.

6 The therapeutic and/or prophylactic agent according to any one of claims 1 to 4, wherein the tumor is a tumor with a point mutation in RET gene and/or protein.

7 A therapeutic and/or prophylactic agent for a tumor used for a patient with a mutation in RET and for metastasis of the tumor, which comprises a compound represented by formula (I), a salt thereof or a solvate thereof as an active ingredient:



wherein R₁ is a C₁₋₆ alkyl group.

8 The therapeutic and/or prophylactic agent according to claim 7, wherein the tumor is thyroid cancer or lung cancer.

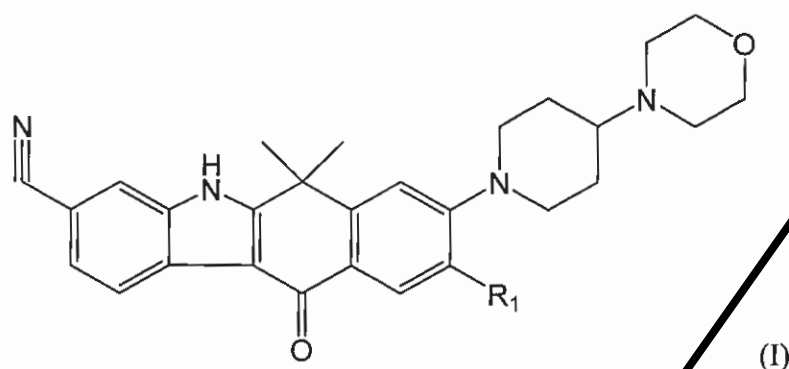
9 The therapeutic and/or prophylactic agent according to claim 7 or 8, wherein the patient is a patient with a fusion gene between RET gene and another gene and/or a fusion protein between RET protein and another protein.

10 The therapeutic and/or prophylactic agent according to claim 7 or 8, wherein the patient is a patient with a point mutation in RET gene and/or protein.

11 The therapeutic and/or prophylactic agent according to any one of claims 1 to 9, wherein R¹ is ethyl.

12 The therapeutic and/or prophylactic agent according to any one of claims 1 to 11, wherein the compound is a hydrochloride.

13 A RET inhibitor, which comprises a compound of formula (I), a salt thereof or a solvate thereof as an active ingredient:

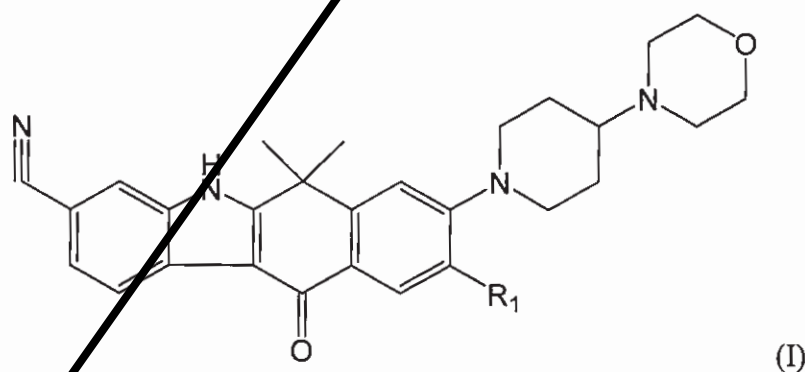


wherein R₁ is a C₁₋₆ alkyl group.

14 A method for identifying a patient sensitive to a compound represented by formula (I), a salt thereof or a solvate thereof, which comprises the steps of:

detecting the presence of a mutation in RET in a sample obtained from the patient; and

determining or preliminarily determining that the patient has sensitivity to the compound, the salt thereof or the solvate thereof, on the basis of the presence of a mutation in RET in the sample:



wherein R¹ is a C₁₋₆ alkyl group.

15 The method according to claim 14, wherein the mutation in RET is a mutation which induces activation of RET tyrosine kinase.

16 The method according to claim 14 or 15, wherein the mutation in RET is (a) a mutation in the cysteine-rich domain of RET tyrosine kinase, (b) a mutation in the tyrosine kinase domain of RET tyrosine kinase, or (c) the formation of a fusion gene of RET and/or a fusion protein of RET.

17 The method according to any one of claims 14 to 16, wherein the tumor is a tumor with a fusion gene of RET and/or a fusion protein of RET.

18 The method according to claim 14 or 15 wherein the mutation in RET is (a) a mutation in the cysteine-rich domain of RET tyrosine kinase, (b) a mutation in the tyrosine kinase domain of RET tyrosine kinase, or (c) the formation of a fusion gene between RET gene and another gene and/or a fusion protein between RET protein and another protein.

19 The method according to claim 14, 15 or 18, wherein the mutation in RET results in the formation of a fusion gene between RET gene and another gene and/or a fusion protein between RET protein and another protein.

20 The method according to claim 19, wherein the another gene and protein is KIF5B, CCDC6, NCOA4 or TRIM33.

21 The method according to any one of claims 18 to 20, wherein the fusion gene between RET gene and another gene and the fusion protein between RET protein and another protein comprise the tyrosine kinase domain of RET gene or protein and the coiled-coil domain of another gene or protein.

22 The method according to claim 14 or 15, wherein the mutation in RET is a point mutation.

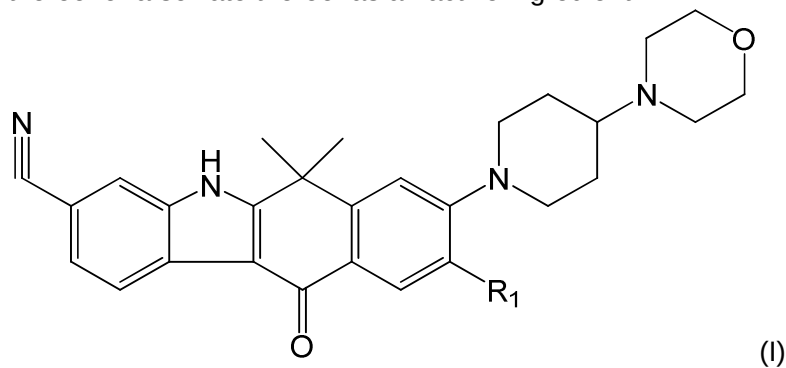
23 The method according to claim 22, wherein the point mutation is a point mutation in the cysteine-rich domain or in the tyrosine kinase domain of RET tyrosine kinase.

24 The method according to any one of claims 14 to 23, wherein the patient is a patient with thyroid cancer or lung cancer.

25 The method according to any one of claims 14 to 24, wherein the patient is a patient with thyroid medullary cancer or non-small cell lung cancer.

Claims

1. A therapeutic and/or prophylactic agent for a tumor with a mutation in RET and for metastasis of the tumor, which comprises a compound represented by formula (I), a salt thereof or a solvate thereof as an active ingredient:



wherein R_1 is a C_{1-6} alkyl group.

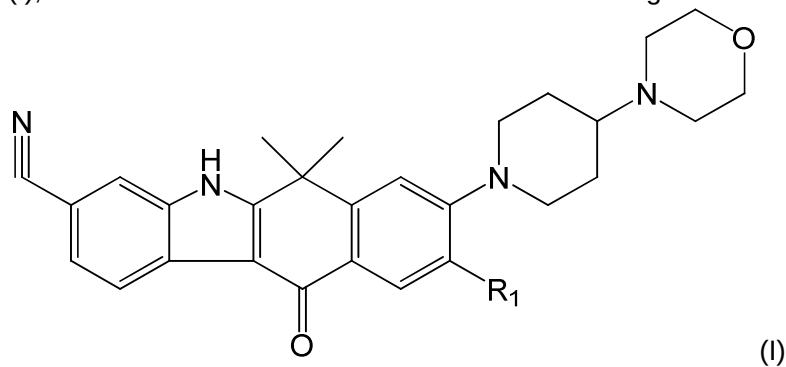
2. The therapeutic and/or prophylactic agent according to claim 1, wherein the tumor is selected from the group consisting of acute myelogenous leukemia, chronic myelogenous leukemia, acute lymphocytic leukemia, chronic lymphocytic leukemia, Hodgkin's lymphoma, non-Hodgkin's lymphoma, brain tumor, neuroblastoma, glioma, thyroid cancer, myelodysplastic syndrome, head and neck cancer, esophageal cancer, gastric cancer, bowel cancer, colorectal cancer, breast cancer, ovarian cancer, lung cancer, pancreatic cancer, liver cancer, gallbladder cancer, skin cancer, malignant melanoma, kidney cancer, renal pelvic and ureteral cancer, bladder cancer, uterine cancer, testicular cancer, prostate cancer, and tumors metastasized from these tumors.

3. The therapeutic and/or prophylactic agent according to claim 1, wherein the tumor is thyroid cancer or lung cancer.

4. The therapeutic and/or prophylactic agent according to claim 1, wherein the tumor is thyroid medullary cancer or non-small cell lung cancer.

5. The therapeutic and/or prophylactic agent according to any one of claims 1- 4, wherein the tumor is a tumor with a point mutation in RET gene and/or protein.

6. A therapeutic and/or prophylactic agent for a tumor used for a patient with a mutation in RET and for metastasis of the tumor, which comprises a compound represented by formula (I), a salt thereof or a solvate thereof as an active ingredient:



wherein R_1 is a C_{1-6} alkyl group.

7. The therapeutic and/or prophylactic agent according to claim 6, wherein the tumor is

thyroid cancer or lung cancer.

8. The therapeutic and/or prophylactic agent according to claim 6 or 7, wherein the patient is a patient with a point mutation in RET gene and/or protein.

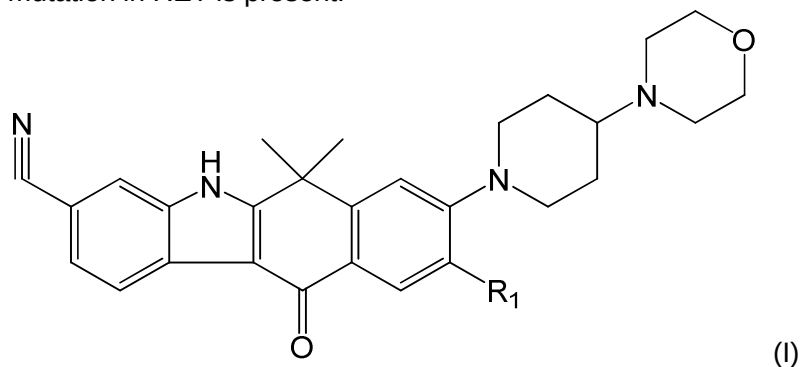
9. The therapeutic and/or prophylactic agent according to any one of claims 1-8, wherein R¹ is ethyl.

10. The therapeutic and/or prophylactic agent according to any one of claims 1-9, wherein the compound is a hydrochloride.

11. A method for predicting the sensitivity of a sample to a compound of formula (I), a salt thereof or a solvate thereof, which comprises the steps of;

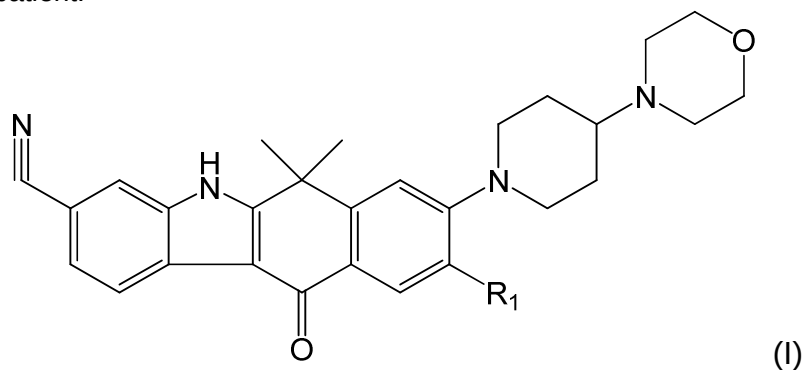
(1) confirming the presence or absence of a mutation in RET in the sample obtained from the patient; and

(2) determining or preliminarily determining that the sample from the patient has sensitivity to the compound of formula (I), the salt thereof or the solvate thereof, provided that the mutation in RET is present:



wherein R¹ is a C₁₋₆ alkyl group.

12. A method for providing information for determining or preliminarily determining a patient sensitive to a compound represented by formula (I), a salt thereof or a solvate thereof, comprising detecting the presence of a mutation in RET in a sample obtained from the patient:



wherein R¹ is a C₁₋₆ alkyl group.

13. The method according to claim 11 or 12, wherein the mutation in RET is a mutation which induces activation of RET tyrosine kinase.

14. The method according to any one of claims 11-13, wherein the mutation in RET is (a) a mutation in the cysteine-rich domain of RET tyrosine kinase, or (b) a mutation in the tyrosine

kinase domain of RET tyrosine kinase.

15. The method according to any one of claims 11-13, wherein the mutation in RET is (a) a mutation in the cysteine-rich domain of RET tyrosine kinase, or (b) a mutation in the tyrosine kinase domain of RET tyrosine kinase.

16. The method according to any one of claims 11-13, wherein the mutation in RET is a point mutation.

17. The method according to claim 16, wherein the point mutation is a point mutation in the cysteine-rich domain or in the tyrosine kinase domain of RET tyrosine kinase.

18. The method according to any one of claims 11-17, wherein the patient is a patient with thyroid cancer or lung cancer.

19. The method according to any one of claims 11-18, wherein the patient is a patient with thyroid medullary cancer or non-small cell lung cancer.