CLAIMS

1.Use of a compound having FGFR inhibitory activity or a pharmaceutically acceptable salt thereof in the manufacture of a pharmaceutical composition for cancer treatment to be administered to a patient who has been identified to express a fusion polypeptide comprising an FGFR3 polypeptide and a BAIAP2L1 polypeptide or carrying a polynucleotide encoding the fusion polypeptide,

wherein the FGFR3 polypeptide is the whole or a part of a wild-type polypeptide consisting of the amino acid sequence of SEQ ID NO: 6 or 7,

wherein the BAIAP2L1 polypeptide is the whole or a part of a wild-type polypeptide consisting of the amino acid sequence of SEQ ID NO: 8, and

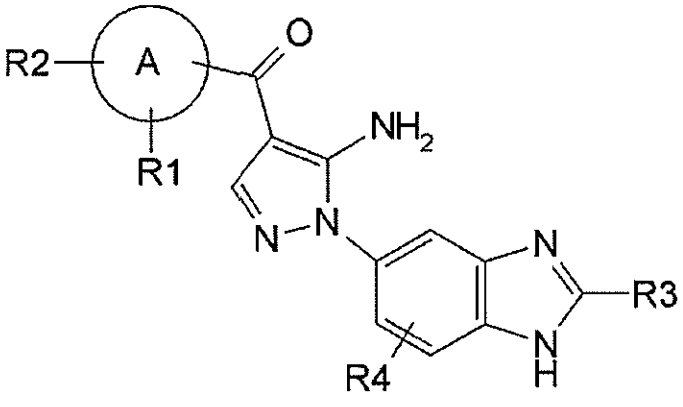
wherein the compound or pharmaceutically acceptable salt thereof is capable of inhibiting a growth of a cancer cell expressing the fusion polypeptide or having a nucleotide encoding the fusion polypeptide.

2.The use of claim 1, wherein the cancer is bladder cancer, brain tumor, head and neck squamous cell carcinoma, lung cancer, lung adenocarcinoma, lung squamous cell carcinoma, skin melanoma, esophageal cancer, gastric cancer, or liver cancer.

3.The use of claim 2, wherein the cancer is bladder cancer.

4.The use of any one of claims 1 to 3, wherein the compound having FGFR inhibitory activity or a pharmaceutically acceptable salt thereof is any one of the compounds or a pharmaceutically acceptable salt thereof represented by:

[Compound 1]



(I)

wherein R_1, R_2, R_3, and R_4 each independently represents the group listed below:

R_1 represents hydrogen, hydroxy, halogen, cyano, nitro, C_{1-4} haloalkyl, C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{3-7} cycloalkyl, C_{6-10} aryl C_{1-4} alkyl, $-OR_5$, $-NR_6R_7$, $-(CR_8R_9)_nZ_1$, $-C(O)NR_{12}R_{13}$, $-SR_{14}$, $-SOR_{15}$, $-SO_2R_{16}$, $-NR_{17}SO_2R_{18}$, COOH, C_{6-10} aryl which is optionally substituted by one

or more groups independently selected from group P, 5- to 10-membered heteroaryl or 3- to 10-membered heterocyclyl which is optionally substituted by one or more groups independently selected from group Q, $-COR_{19}$, $-COOR_{20}$, $-OC(O)R_{21}$, $-NR_{22}C(O)R_{23}$, $-NR_{24}C(S)R_{25}$, $-C(S)NR_{26}R_{27}$, $-SO_2NR_{28}R_{29}$, $-OSO_2R_{30}$, $-SO_3R_{31}$, or $-Si(R_{32})_3$;

R_2 represents hydrogen, hydroxy, halogen, cyano, nitro, C_{1-4} haloalkyl, C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{3-7} cycloalkyl, C_{6-10} aryl C_{1-4} alkyl, $-OR_5$, $-NR_6R_7$, $-(CR_8R_9)_nZ_1$, $-C(O)NR_{12}R_{13}$, $-SR_{14}$, $-SOR_{15}$, $-SO_2R_{16}$, $-NR_{17}SO_2R_{18}$, COOH, C_{6-10} aryl which is optionally substituted by one or more groups independently selected from group P, 5- to 10-membered heteroaryl or 3- to 10-membered heterocyclyl which is optionally substituted by one or more groups independently selected from group Q, $-COR_{19}$, $-COOR_{20}$, $-OC(O)R_{21}$, $-NR_{22}C(O)R_{23}$, $-NR_{24}C(S)R_{25}$, $-C(S)NR_{26}R_{27}$, $-SO_2NR_{28}R_{29}$, $-OSO_2R_{30}$, $-SO_3R_{31}$, or $-Si(R_{32})_3$; or

R_1 and R_2, together with an atom linked thereto, form 3- to 10-membered heterocyclyl or 5- to 10-membered heteroaryl, wherein the heterocyclyl or heteroaryl is optionally substituted by halogen;

R_3 represents hydrogen, C_{1-5} alkyl, C_{6-10} aryl C_{1-6} alkyl, or C_{1-4} haloalkyl;

R_4 represents hydrogen, halogen, C_{1-3} alkyl, C_{1-4} haloalkyl, hydroxy, cyano, nitro, C_{1-4} alkoxy, $-(CH_2)_nZ_1$, $-NR_6R_7$, $-OR_5$, $-C(O)NR_{12}R_{13}$, $-SR_{14}$, $-SOR_{15}$, $-SO_2R_{16}$, $NR_{17}SO_2R_{18}$, COOH, $-COR_{19}$, $-COOR_{20}$, $-OC(O)R_{21}$, $-NR_{22}C(O)R_{23}$, $-NR_{24}C(S)R_{25}$, $-C(S)NR_{26}R_{27}$, $-SO_2NR_{28}R_{29}$, $-OSO_2R_{30}$, $-SO_3R_{31}$, or $-Si(R_{32})_3$;

A represents a 5- to 10-membered heteroaryl ring or C_{6-10} aryl ring;

R_5 represents C_{1-5} alkyl, C_{3-7} cycloalkyl, C_{3-7} cycloalkyl C_{1-3} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{1-3} alkoxy C_{1-4} alkyl, C_{1-3} alkoxy C_{1-4} alkoxy C_{1-4} alkyl, C_{1-4} aminoalkyl, C_{1-4} alkylamino C_{1-4} alkyl, di(C_{1-4} alkyl)amino C_{1-4} alkyl, C_{6-10} aryl, C_{6-10} aryl C_{1-3} alkyl, or 3- to 10-membered heterocyclyl C_{1-3} alkyl, 3- to 10-membered heterocyclyl, 5- to 10-membered heteroaryl, 5- to 10-membered heteroaryl C_{1-3} alkyl, C_{1-6} monohydroxy alkyl, C_{1-6} dihydroxy alkyl, or C_{1-6} trihydroxy alkyl which is optionally substituted by one or more groups independently selected from group Q;

R_6 and R_7, which can be the same or different, each represents hydrogen, C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{1-3} alkoxy C_{1-4} alkyl, C_{6-10} aryl C_{1-3} alkyl, 3- to 10-membered heterocyclyl C_{1-3} alkyl, 5- to 10-membered heteroaryl C_{1-3} alkyl, C_{1-6} monohydroxy alkyl, C_{1-6} dihydroxy alkyl, C_{1-6} trihydroxy alkyl, 3- to 10-membered heterocyclyl, C_{1-4} aminoalkyl, C_{1-4} alkylamino C_{1-4} alkyl, di(C_{1-4} alkyl)amino C_{1-4} alkyl, or cyano(C_{1-3} alkyl); or alternatively R_6 and R_7, together with a nitrogen atom linked thereto, form 3- to 10-membered heterocyclyl or 5- to 10-membered heteroaryl;

n represents 1 to 3;

R_8 and R_9, which can be the same or different, each represents hydrogen, C_{1-4} alkyl, or halogen; or alternatively R_8 and R_9, together with a carbon atom linked thereto, form a cycloaliphatic ring;

Z_1 represents hydrogen, $NR_{10}R_{11}$, -OH, or 3- to 10-membered heterocyclyl or 5- to 10-membered heteroaryl which is optionally substituted by one or more groups independently selected from group Q;

R_{10} and R_{11}, which can be the same or different, each represents C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{1-3} alkoxy C_{1-4} alkyl, cyano(C_{1-3} alkyl), or C_{1-3} alkylsulfonyl C_{1-4} alkyl; or alternatively R_{10} and R_{11}, together with a nitrogen atom linked thereto, form 3- to 10-membered heterocyclyl or 5- to 10-membered heteroaryl;

R_{12} and R_{13}, which can be the same or different, each represents hydrogen, C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{1-3} alkoxy C_{1-4} alkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, 3- to 10-membered heterocyclyl, C_{6-10} aryl C_{1-4} alkyl, 3- to 10-membered heterocyclyl C_{1-3} alkyl, 5- to 10-membered heteroaryl C_{1-3} alkyl, cyano(C_{1-3} alkyl), C_{1-3} alkylsulfonyl C_{1-4} alkyl, 3- to 10-membered cycloaliphatic ring, 5- to 10-membered heteroaryl, or 3- to 10-membered heterocyclyl; or alternatively R_{12} and R_{13}, together with a nitrogen atom linked thereto, form 3- to 10-membered heterocyclyl or 5- to 10-membered heteroaryl which is optionally substituted by one or more groups independently selected from group Q;

R_{14} represents C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{6-10} aryl which is optionally substituted by one or more groups independently selected from group P, or 5- to 10-membered heteroaryl or 3- to 10-membered heterocyclyl which is optionally substituted by one or more groups independently selected from group Q;

R_{15} represents C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{6-10} aryl which is optionally substituted by one or more groups independently selected from group P, or 5- to 10-membered heteroaryl or 3- to 10-membered heterocyclyl which is optionally substituted by one or more groups independently selected from group Q;

R_{16} represents C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{6-10} aryl which is optionally substituted by one or more groups independently selected from group P, or 5- to 10-membered heteroaryl or 3- to 10-membered heterocyclyl which is optionally substituted by one or more groups independently selected from group Q;

R_{17} represents hydrogen or C_{1-4} alkyl;

R_{18} represents C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{6-10} aryl which is optionally substituted by one or more groups independently selected from group P, or 5- to 10-membered heteroaryl or 3- to 10-membered heterocyclyl which is optionally substituted by one or more groups independently selected from group Q;

R_{19} represents hydrogen, C_{1-4} alkyl, C_{3-7} cycloalkyl, C_{1-4} haloalkyl, C_{6-10} aryl, or 5- to 10-membered heteroaryl or 3- to 10-membered heterocyclyl which is optionally substituted by one or more groups independently selected from group Q;

R_{20} represents C_{1-4} alkyl, C_{3-7} cycloalkyl, C_{1-4} haloalkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, or 3- to 10-membered heterocyclyl;

R_{21} represents C_{1-4} alkyl, C_{3-7} cycloalkyl, C_{1-4} haloalkyl, C_{6-10} aryl, 5- to 10-membered

heteroaryl, or 3- to 10-membered heterocyclyl;

R_{22} represents hydrogen, C_{1-4} alkyl, or C_{1-4} haloalkyl;

R_{23} represents hydrogen, C_{1-4} alkyl, C_{3-7} cycloalkyl, C_{1-4} haloalkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, or 3- to 10-membered heterocyclyl;

R_{24} represents hydrogen, C_{1-4} alkyl, or C_{1-4} haloalkyl;

R_{25} represents C_{1-4} alkyl, C_{3-7} cycloalkyl, C_{1-4} haloalkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, or 3- to 10-membered heterocyclyl;

R_{26} and R_{27}, which can be the same or different, each represents hydrogen, C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{1-3} alkoxyl C_{1-4} alkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, 3- to 10-membered heterocyclyl, C_{6-10} aryl C_{1-4} alkyl, 3- to 10-membered heterocyclyl C_{1-3} alkyl, 5- to 10-membered heteroaryl C_{1-3} alkyl, cyano(C_{1-3} alkyl), C_{1-3} alkylsulfonyl C_{1-4} alkyl, or 3- to 10-membered cycloaliphatic ring; or alternatively R_{26} and R_{27}, together with a nitrogen atom linked thereto, form 3- to 10-membered heterocyclyl or 5- to 10-membered heteroaryl;

R_{28} and R_{29}, which can be the same or different, each represents hydrogen, C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{1-3} alkoxyl C_{1-4} alkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, 3- to 10-membered heterocyclyl, C_{6-10} aryl C_{1-4} alkyl, 3- to 10-membered heterocyclyl C_{1-3} alkyl, 5- to 10-membered heteroaryl C_{1-3} alkyl, cyano(C_{1-3} alkyl), C_{1-3} alkylsulfonyl C_{1-4} alkyl, or 3- to 10-membered cycloaliphatic ring; or alternatively R_{28} and R_{29}, together with a nitrogen atom linked thereto, form 3- to 10-membered heterocyclyl or 5- to 10-membered heteroaryl;

R_{30} represents C_{1-4} alkyl, C_{3-7} cycloalkyl, C_{1-4} haloalkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, or 3- to 10-membered heterocyclyl;

R_{31} represents C_{1-4} alkyl, C_{3-7} cycloalkyl, C_{1-4} haloalkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, or 3- to 10-membered heterocyclyl;

R_{32} represents C_{1-4} alkyl or C_{6-10} aryl;

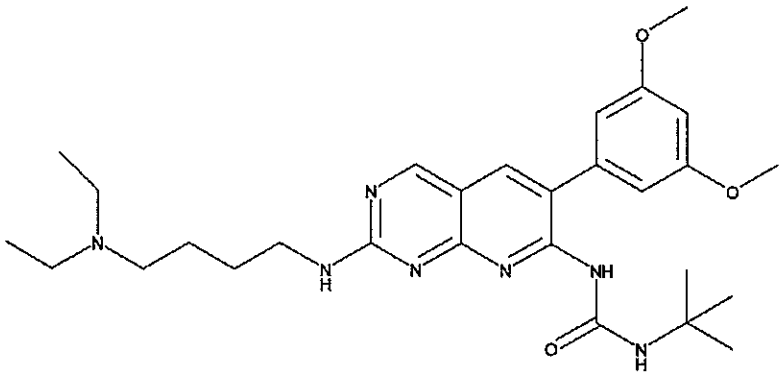
<group P>

halogen, C_{1-4} alkyl, C_{1-4} haloalkyl, -OH, C_{1-3} alkoxy, C_{1-3} haloalkoxy, 3- to 10-membered heterocyclylamino, $-SO_2R_{16}$, -CN, $-NO_2$, and 3- to 10-membered heterocyclyl;

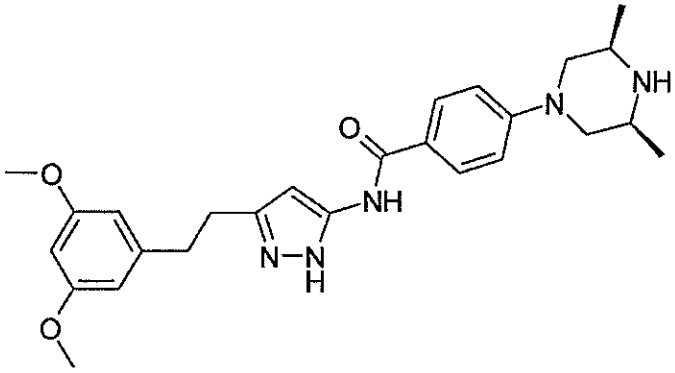
<group Q>

halogen, C_{1-4} alkyl, C_{1-4} haloalkyl, -OH, C_{1-3} alkoxy, C_{1-6} monohydroxy alkyl, C_{1-6} dihydroxy alkyl, C_{1-6} trihydroxy alkyl, 3- to 10-membered heterocyclyl amine, $-SO_2R_{16}$, -CN, $-NO_2$, C_{3-7} cycloalkyl, $-COR_{19}$, and 3- to 10-membered heterocyclyl which is optionally substituted by C_{1-4} alkyl.

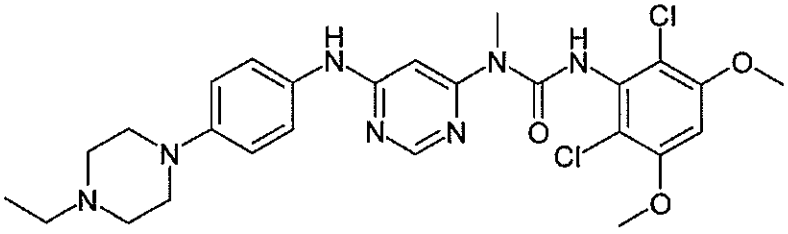
[Compound 2]



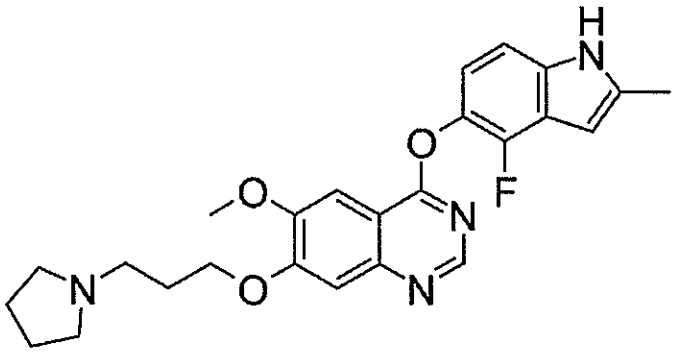
[Compound 3]



[Compound 4]

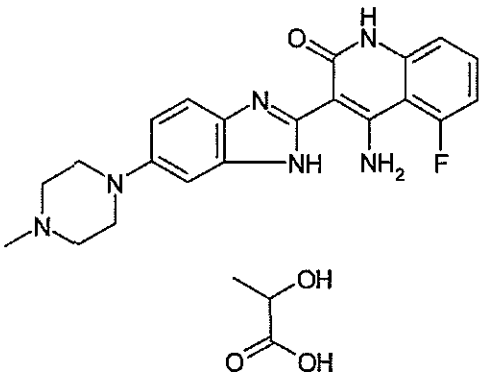


[Compound 5]



, or

[Compound 6]



5. Use of a compound having FGFR inhibitory activity or a pharmaceutically acceptable salt thereof in the manufacture of a pharmaceutical composition for cancer treatment to be administered to a patient who has been identified to express a fusion polypeptide comprising an FGFR3 polypeptide and a BAIAP2L1 polypeptide or carrying a polynucleotide encoding the fusion polypeptide,

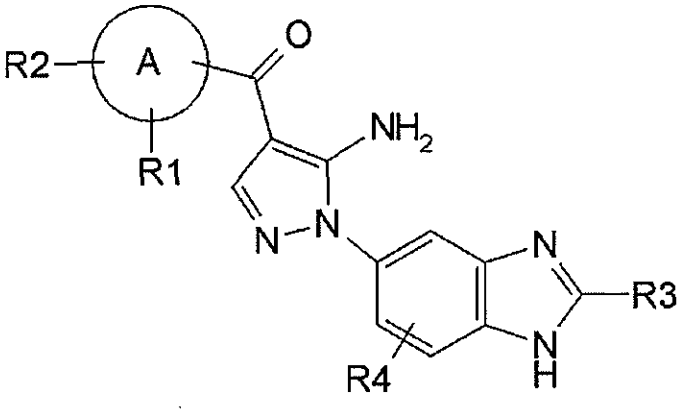
wherein the FGFR3 polypeptide is the whole or a part of a wild-type polypeptide consisting of the amino acid sequence of SEQ ID NO: 6 or 7,

wherein the BAIAP2L1 polypeptide is the whole or a part of a wild-type polypeptide consisting of the amino acid sequence of SEQ ID NO: 8,

wherein the compound or pharmaceutically acceptable salt thereof is capable of inhibiting a growth of a cancer cell expressing the fusion polypeptide or having a nucleotide encoding the fusion polypeptide; and

wherein the compound having FGFR inhibitory activity or a pharmaceutically acceptable salt thereof is any one of the compounds or a pharmaceutically acceptable salt thereof represented by:

[Compound 1]



(I)

wherein R_1, R_2, R_3, and R_4 each independently represents the group listed below:

R_1 represents hydrogen, hydroxy, halogen, cyano, nitro, C_{1-4} haloalkyl, C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{3-7} cycloalkyl, C_{6-10} aryl C_{1-4} alkyl, $-OR_5$, $-NR_6R_7$, $-(CR_8R_9)_nZ_1$, $-C(O)NR_{12}R_{13}$, $-SR_{14}$, $-SOR_{15}$, $-SO_2R_{16}$, $-NR_{17}SO_2R_{18}$, COOH, C_{6-10} aryl which is optionally substituted by one

or more groups independently selected from group P, 5- to 10-membered heteroaryl or 3- to 10-membered heterocyclyl which is optionally substituted by one or more groups independently selected from group Q, $-COR_{19}$, $-COOR_{20}$, $-OC(O)R_{21}$, $-NR_{22}C(O)R_{23}$, $-NR_{24}C(S)R_{25}$, $-C(S)NR_{26}R_{27}$, $-SO_2NR_{28}R_{29}$, $-OSO_2R_{30}$, $-SO_3R_{31}$, or $-Si(R_{32})_3$;

R_2 represents hydrogen, hydroxy, halogen, cyano, nitro, C_{1-4} haloalkyl, C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{3-7} cycloalkyl, C_{6-10} aryl C_{1-4} alkyl, $-OR_5$, $-NR_6R_7$, $-(CR_8R_9)_nZ_1$, $-C(O)NR_{12}R_{13}$, $-SR_{14}$, $-SOR_{15}$, $-SO_2R_{16}$, $-NR_{17}SO_2R_{18}$, COOH, C_{6-10} aryl which is optionally substituted by one or more groups independently selected from group P, 5- to 10-membered heteroaryl or 3- to 10-membered heterocyclyl which is optionally substituted by one or more groups independently selected from group Q, $-COR_{19}$, $-COOR_{20}$, $-OC(O)R_{21}$, $-NR_{22}C(O)R_{23}$, $-NR_{24}C(S)R_{25}$, $-C(S)NR_{26}R_{27}$, $-SO_2NR_{28}R_{29}$, $-OSO_2R_{30}$, $-SO_3R_{31}$, or $-Si(R_{32})_3$; or

R_1 and R_2, together with an atom linked thereto, form 3- to 10-membered heterocyclyl or 5- to 10-membered heteroaryl, wherein the heterocyclyl or heteroaryl is optionally substituted by halogen;

R_3 represents hydrogen, C_{1-5} alkyl, C_{6-10} aryl C_{1-6} alkyl, or C_{1-4} haloalkyl;

R_4 represents hydrogen, halogen, C_{1-3} alkyl, C_{1-4} haloalkyl, hydroxy, cyano, nitro, C_{1-4} alkoxy, $-(CH_2)_nZ_1$, $-NR_6R_7$, $-OR_5$, $-C(O)NR_{12}R_{13}$, $-SR_{14}$, $-SOR_{15}$, $-SO_2R_{16}$, $NR_{17}SO_2R_{18}$, COOH, $-COR_{19}$, $-COOR_{20}$, $-OC(O)R_{21}$, $-NR_{22}C(O)R_{23}$, $-NR_{24}C(S)R_{25}$, $-C(S)NR_{26}R_{27}$, $-SO_2NR_{28}R_{29}$, $-OSO_2R_{30}$, $-SO_3R_{31}$, or $-Si(R_{32})_3$;

A represents a 5- to 10-membered heteroaryl ring or C_{6-10} aryl ring;

R_5 represents C_{1-5} alkyl, C_{3-7} cycloalkyl, C_{3-7} cycloalkyl C_{1-3} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{1-3} alkoxy C_{1-4} alkyl, C_{1-3} alkoxy C_{1-4} alkoxy C_{1-4} alkyl, C_{1-4} aminoalkyl, C_{1-4} alkylamino C_{1-4} alkyl, di(C_{1-4} alkyl)amino C_{1-4} alkyl, C_{6-10} aryl, C_{6-10} aryl C_{1-3} alkyl, or 3- to 10-membered heterocyclyl C_{1-3} alkyl, 3- to 10-membered heterocyclyl, 5- to 10-membered heteroaryl, 5- to 10-membered heteroaryl C_{1-3} alkyl, C_{1-6} monohydroxy alkyl, C_{1-6} dihydroxy alkyl, or C_{1-6} trihydroxy alkyl which is optionally substituted by one or more groups independently selected from group Q;

R_6 and R_7, which can be the same or different, each represents hydrogen, C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{1-3} alkoxy C_{1-4} alkyl, C_{6-10} aryl C_{1-3} alkyl, 3- to 10-membered heterocyclyl C_{1-3} alkyl, 5- to 10-membered heteroaryl C_{1-3} alkyl, C_{1-6} monohydroxy alkyl, C_{1-6} dihydroxy alkyl, C_{1-6} trihydroxy alkyl, 3- to 10-membered heterocyclyl, C_{1-4} aminoalkyl, C_{1-4} alkylamino C_{1-4} alkyl, di(C_{1-4} alkyl)amino C_{1-4} alkyl, or cyano(C_{1-3} alkyl); or alternatively R_6 and R_7, together with a nitrogen atom linked thereto, form 3- to 10-membered heterocyclyl or 5- to 10-membered heteroaryl;

n represents 1 to 3;

R_8 and R_9, which can be the same or different, each represents hydrogen, C_{1-4} alkyl, or halogen; or alternatively R_8 and R_9, together with a carbon atom linked thereto, form a cycloaliphatic ring;

Z_1 represents hydrogen, $NR_{10}R_{11}$, -OH, or 3- to 10-membered heterocyclyl or 5- to 10-membered heteroaryl which is optionally substituted by one or more groups independently selected from group Q;

R_{10} and R_{11}, which can be the same or different, each represents C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{1-3} alkoxy C_{1-4} alkyl, cyano(C_{1-3} alkyl), or C_{1-3} alkylsulfonyl C_{1-4} alkyl; or alternatively R_{10} and R_{11}, together with a nitrogen atom linked thereto, form 3- to 10-membered heterocyclyl or 5- to 10-membered heteroaryl;

R_{12} and R_{13}, which can be the same or different, each represents hydrogen, C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{1-3} alkoxy C_{1-4} alkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, 3- to 10-membered heterocyclyl, C_{6-10} aryl C_{1-4} alkyl, 3- to 10-membered heterocyclyl C_{1-3} alkyl, 5- to 10-membered heteroaryl C_{1-3} alkyl, cyano(C_{1-3} alkyl), C_{1-3} alkylsulfonyl C_{1-4} alkyl, 3- to 10-membered cycloaliphatic ring, 5- to 10-membered heteroaryl, or 3- to 10-membered heterocyclyl; or alternatively R_{12} and R_{13}, together with a nitrogen atom linked thereto, form 3- to 10-membered heterocyclyl or 5- to 10-membered heteroaryl which is optionally substituted by one or more groups independently selected from group Q;

R_{14} represents C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{6-10} aryl which is optionally substituted by one or more groups independently selected from group P, or 5- to 10-membered heteroaryl or 3- to 10-membered heterocyclyl which is optionally substituted by one or more groups independently selected from group Q;

R_{15} represents C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{6-10} aryl which is optionally substituted by one or more groups independently selected from group P, or 5- to 10-membered heteroaryl or 3- to 10-membered heterocyclyl which is optionally substituted by one or more groups independently selected from group Q;

R_{16} represents C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{6-10} aryl which is optionally substituted by one or more groups independently selected from group P, or 5- to 10-membered heteroaryl or 3- to 10-membered heterocyclyl which is optionally substituted by one or more groups independently selected from group Q;

R_{17} represents hydrogen or C_{1-4} alkyl;

R_{18} represents C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{6-10} aryl which is optionally substituted by one or more groups independently selected from group P, or 5- to 10-membered heteroaryl or 3- to 10-membered heterocyclyl which is optionally substituted by one or more groups independently selected from group Q;

R_{19} represents hydrogen, C_{1-4} alkyl, C_{3-7} cycloalkyl, C_{1-4} haloalkyl, C_{6-10} aryl, or 5- to 10-membered heteroaryl or 3- to 10-membered heterocyclyl which is optionally substituted by one or more groups independently selected from group Q;

R_{20} represents C_{1-4} alkyl, C_{3-7} cycloalkyl, C_{1-4} haloalkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, or 3- to 10-membered heterocyclyl;

R_{21} represents C_{1-4} alkyl, C_{3-7} cycloalkyl, C_{1-4} haloalkyl, C_{6-10} aryl, 5- to 10-membered

heteroaryl, or 3- to 10-membered heterocyclyl;

R_{22} represents hydrogen, C_{1-4} alkyl, or C_{1-4} haloalkyl;

R_{23} represents hydrogen, C_{1-4} alkyl, C_{3-7} cycloalkyl, C_{1-4} haloalkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, or 3- to 10-membered heterocyclyl;

R_{24} represents hydrogen, C_{1-4} alkyl, or C_{1-4} haloalkyl;

R_{25} represents C_{1-4} alkyl, C_{3-7} cycloalkyl, C_{1-4} haloalkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, or 3- to 10-membered heterocyclyl;

R_{26} and R_{27}, which can be the same or different, each represents hydrogen, C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{1-3} alkoxyl C_{1-4} alkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, 3- to 10-membered heterocyclyl, C_{6-10} aryl C_{1-4} alkyl, 3- to 10-membered heterocyclyl C_{1-3} alkyl, 5- to 10-membered heteroaryl C_{1-3} alkyl, cyano(C_{1-3} alkyl), C_{1-3} alkylsulfonyl C_{1-4} alkyl, or 3- to 10-membered cycloaliphatic ring; or alternatively R_{26} and R_{27}, together with a nitrogen atom linked thereto, form 3- to 10-membered heterocyclyl or 5- to 10-membered heteroaryl;

R_{28} and R_{29}, which can be the same or different, each represents hydrogen, C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{1-3} alkoxyl C_{1-4} alkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, 3- to 10-membered heterocyclyl, C_{6-10} aryl C_{1-4} alkyl, 3- to 10-membered heterocyclyl C_{1-3} alkyl, 5- to 10-membered heteroaryl C_{1-3} alkyl, cyano(C_{1-3} alkyl), C_{1-3} alkylsulfonyl C_{1-4} alkyl, or 3- to 10-membered cycloaliphatic ring; or alternatively R_{28} and R_{29}, together with a nitrogen atom linked thereto, form 3- to 10-membered heterocyclyl or 5- to 10-membered heteroaryl;

R_{30} represents C_{1-4} alkyl, C_{3-7} cycloalkyl, C_{1-4} haloalkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, or 3- to 10-membered heterocyclyl;

R_{31} represents C_{1-4} alkyl, C_{3-7} cycloalkyl, C_{1-4} haloalkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, or 3- to 10-membered heterocyclyl;

R_{32} represents C_{1-4} alkyl or C_{6-10} aryl;

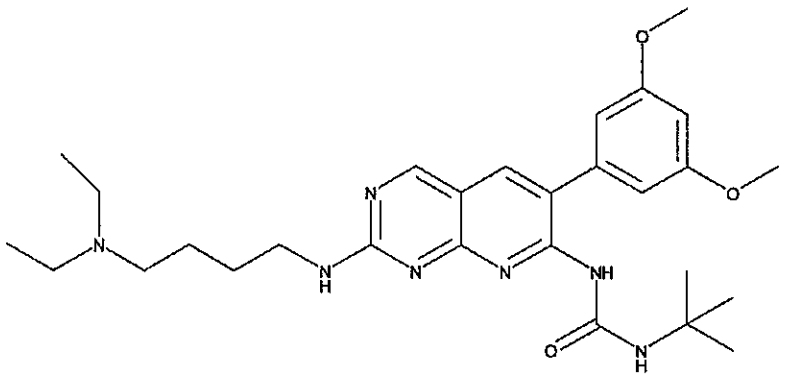
<group P>

halogen, C_{1-4} alkyl, C_{1-4} haloalkyl, -OH, C_{1-3} alkoxy, C_{1-3} haloalkoxy, 3- to 10-membered heterocyclylamino, $-SO_2R_{16}$, -CN, $-NO_2$, and 3- to 10-membered heterocyclyl;

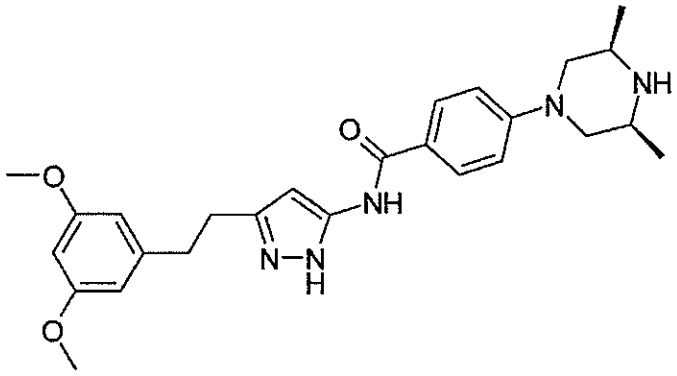
<group Q>

halogen, C_{1-4} alkyl, C_{1-4} haloalkyl, -OH, C_{1-3} alkoxy, C_{1-6} monohydroxy alkyl, C_{1-6} dihydroxy alkyl, C_{1-6} trihydroxy alkyl, 3- to 10-membered heterocyclyl amine, $-SO_2R_{16}$, -CN, $-NO_2$, C_{3-7} cycloalkyl, $-COR_{19}$, and 3- to 10-membered heterocyclyl which is optionally substituted by C_{1-4} alkyl.

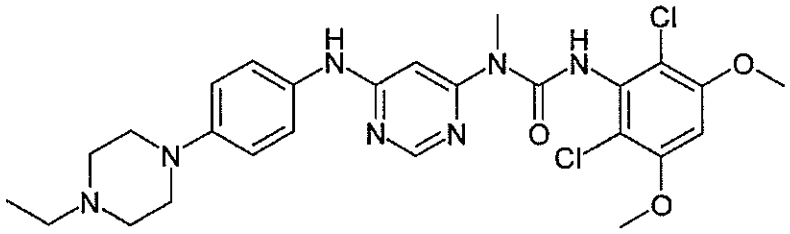
[Compound 2]



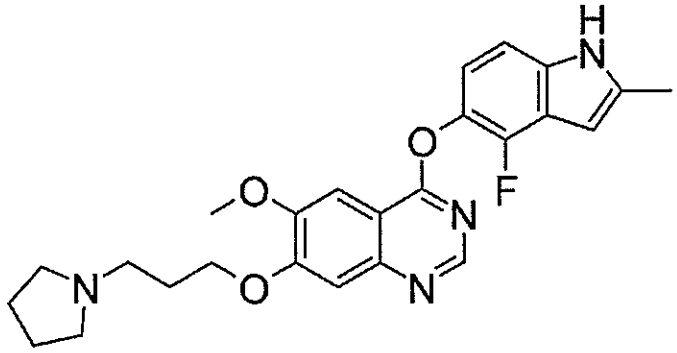
[Compound 3]



[Compound 4]

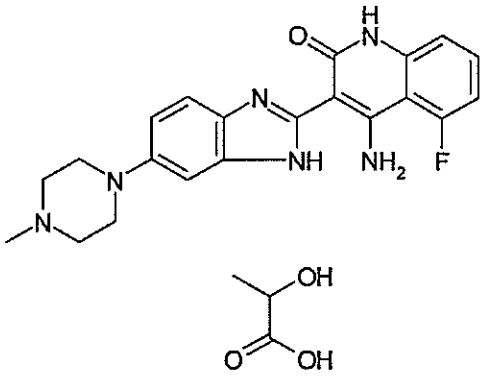


[Compound 5]



, or

[Compound 6]



6.A method for selecting a patient to which an anticancer agent comprising a compound having FGFR inhibitory activity or a pharmaceutically acceptable salt thereof is applicable, which comprises the steps of:

(a) determining the presence or absence of a fusion polypeptide comprising an FGFR3 polypeptide and a BAIAP2L1 polypeptide or a polynucleotide encoding an FGFR3 polypeptide and a BAIAP2L1 polypeptide in a sample isolated from a subject,

wherein the FGFR3 polypeptide is the whole or a part of a wild-type polypeptide consisting of the amino acid sequence of SEQ ID NO: 6 or 7, and

wherein the BAIAP2L1 polypeptide is the whole or a part of a wild-type polypeptide consisting of the amino acid sequence of SEQ ID NO: 8, and

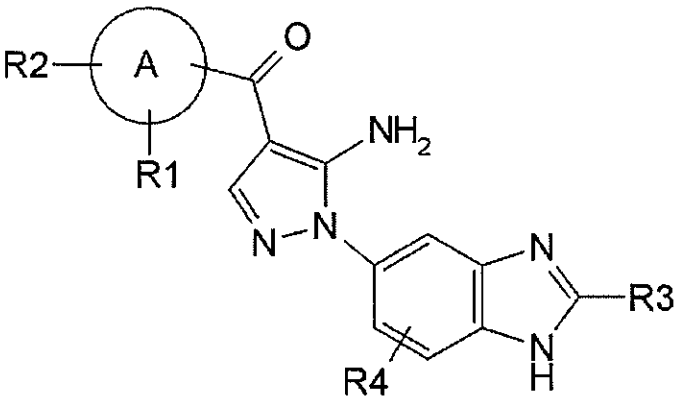
(b) selecting a patient confirmed to have the fusion polypeptide or the polynucleotide as a patient to which the anticancer agent is applicable,

wherein the compound or pharmaceutically acceptable salt thereof is capable of inhibiting a growth of a cancer cell expressing the fusion polypeptide or having a nucleotide encoding the fusion polypeptide.

7.The method of claim 6, wherein the cancer is bladder cancer, brain tumor, head and neck squamous cell carcinoma, lung cancer, lung adenocarcinoma, lung squamous cell carcinoma, skin melanoma, esophageal cancer, gastric cancer, or liver cancer.

8.The method of claim 6 or claim 7, wherein the compound having FGFR inhibitory activity or a pharmaceutically acceptable salt thereof is any one of the compounds or a pharmaceutically acceptable salt thereof represented by:

[Compound 1]



(I)

wherein R_1, R_2, R_3, and R_4 each independently represents the group listed below:

R_1 represents hydrogen, hydroxy, halogen, cyano, nitro, C_{1-4} haloalkyl, C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{3-7} cycloalkyl, C_{6-10} aryl C_{1-4} alkyl, $-OR_5$, $-NR_6R_7$, $-(CR_8R_9)_nZ_1$, $-C(O)NR_{12}R_{13}$, $-SR_{14}$, $-SOR_{15}$, $-SO_2R_{16}$, $-NR_{17}SO_2R_{18}$, COOH, C_{6-10} aryl which is optionally substituted by one or more groups independently selected from group P, 5- to 10-membered heteroaryl or 3- to 10-membered heterocyclyl which is optionally substituted by one or more groups independently selected from group Q, $-COR_{19}$, $-COOR_{20}$, $-OC(O)R_{21}$, $-NR_{22}C(O)R_{23}$, $-NR_{24}C(S)R_{25}$, $-C(S)NR_{26}R_{27}$, $-SO_2NR_{28}R_{29}$, $-OSO_2R_{30}$, $-SO_3R_{31}$, or $-Si(R_{32})_3$;

R_2 represents hydrogen, hydroxy, halogen, cyano, nitro, C_{1-4} haloalkyl, C_{1-6} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{3-7} cycloalkyl, C_{6-10} aryl C_{1-4} alkyl, $-OR_5$, $-NR_6R_7$, $-(CR_8R_9)_nZ_1$, $-C(O)NR_{12}R_{13}$, $-SR_{14}$, $-SOR_{15}$, $-SO_2R_{16}$, $-NR_{17}SO_2R_{18}$, COOH, C_{6-10} aryl which is optionally substituted by one or more groups independently selected from group P, 5- to 10-membered heteroaryl or 3- to 10-membered heterocyclyl which is optionally substituted by one or more groups independently selected from group Q, $-COR_{19}$, $-COOR_{20}$, $-OC(O)R_{21}$, $-NR_{22}C(O)R_{23}$, $-NR_{24}C(S)R_{25}$, $-C(S)NR_{26}R_{27}$, $-SO_2NR_{28}R_{29}$, $-OSO_2R_{30}$, $-SO_3R_{31}$, or $-Si(R_{32})_3$; or

R_1 and R_2, together with an atom linked thereto, form 3- to 10-membered heterocyclyl or 5- to 10-membered heteroaryl, wherein the heterocyclyl or heteroaryl is optionally substituted by halogen;

R_3 represents hydrogen, C_{1-5} alkyl, C_{6-10} aryl C_{1-6} alkyl, or C_{1-4} haloalkyl;

R_4 represents hydrogen, halogen, C_{1-3} alkyl, C_{1-4} haloalkyl, hydroxy, cyano, nitro, C_{1-4} alkoxy, $-(CH_2)_nZ_1$, $-NR_6R_7$, $-OR_5$, $-C(O)NR_{12}R_{13}$, $-SR_{14}$, $-SOR_{15}$, $-SO_2R_{16}$, $NR_{17}SO_2R_{18}$, COOH, $-COR_{19}$, $-COOR_{20}$, $-OC(O)R_{21}$, $-NR_{22}C(O)R_{23}$, $-NR_{24}C(S)R_{25}$, $-C(S)NR_{26}R_{27}$, $-SO_2NR_{28}R_{29}$, $-OSO_2R_{30}$, $-SO_3R_{31}$, or $-Si(R_{32})_3$;

A represents a 5- to 10-membered heteroaryl ring or C_{6-10} aryl ring;

R_5 represents C_{1-5} alkyl, C_{3-7} cycloalkyl, C_{3-7} cycloalkyl C_{1-3} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{1-3} alkoxy C_{1-4} alkyl, C_{1-3} alkoxy C_{1-4} alkoxy C_{1-4} alkyl, C_{1-4} aminoalkyl, C_{1-4} alkylamino C_{1-4} alkyl, di(C_{1-4} alkyl)amino C_{1-4} alkyl, C_{6-10} aryl, C_{6-10} aryl C_{1-3} alkyl, or 3- to 10-membered heterocyclyl C_{1-3} alkyl, 3- to 10-membered heterocyclyl, 5- to 10-membered heteroaryl, 5- to 10-membered heteroaryl C_{1-3} alkyl, C_{1-6} monohydroxy alkyl, C_{1-6} dihydroxy

alkyl, or C_{1-6} trihydroxy alkyl which is optionally substituted by one or more groups independently selected from group Q;

R_6 and R_7, which can be the same or different, each represents hydrogen, C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{1-3} alkoxy C_{1-4} alkyl, C_{6-10} aryl C_{1-3} alkyl, 3- to 10-membered heterocyclyl C_{1-3} alkyl, 5- to 10-membered heteroaryl C_{1-3} alkyl, C_{1-6} monohydroxy alkyl, C_{1-6} dihydroxy alkyl, C_{1-6} trihydroxy alkyl, 3- to 10-membered heterocyclyl, C_{1-4} aminoalkyl, C_{1-4} alkylamino C_{1-4} alkyl, di(C_{1-4} alkyl)amino C_{1-4} alkyl, or cyano(C_{1-3} alkyl); or alternatively R_6 and R_7, together with a nitrogen atom linked thereto, form 3- to 10-membered heterocyclyl or 5- to 10-membered heteroaryl;

n represents 1 to 3;

R_8 and R_9, which can be the same or different, each represents hydrogen, C_{1-4} alkyl, or halogen; or alternatively R_8 and R_9, together with a carbon atom linked thereto, form a cycloaliphatic ring;

Z_1 represents hydrogen, $NR_{10}R_{11}$, -OH, or 3- to 10-membered heterocyclyl or 5- to 10-membered heteroaryl which is optionally substituted by one or more groups independently selected from group Q;

R_{10} and R_{11}, which can be the same or different, each represents C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{1-3} alkoxy C_{1-4} alkyl, cyano(C_{1-3} alkyl), or C_{1-3} alkylsulfonyl C_{1-4} alkyl; or alternatively R_{10} and R_{11}, together with a nitrogen atom linked thereto, form 3- to 10-membered heterocyclyl or 5- to 10-membered heteroaryl;

R_{12} and R_{13}, which can be the same or different, each represents hydrogen, C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{1-3} alkoxy C_{1-4} alkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, 3- to 10-membered heterocyclyl, C_{6-10} aryl C_{1-4} alkyl, 3- to 10-membered heterocyclyl C_{1-3} alkyl, 5- to 10-membered heteroaryl C_{1-3} alkyl, cyano(C_{1-3} alkyl), C_{1-3} alkylsulfonyl C_{1-4} alkyl, 3- to 10-membered cycloaliphatic ring, 5- to 10-membered heteroaryl, or 3- to 10-membered heterocyclyl; or alternatively R_{12} and R_{13}, together with a nitrogen atom linked thereto, form 3- to 10-membered heterocyclyl or 5- to 10-membered heteroaryl which is optionally substituted by one or more groups independently selected from group Q;

R_{14} represents C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{6-10} aryl which is optionally substituted by one or more groups independently selected from group P, or 5- to 10-membered heteroaryl or 3- to 10-membered heterocyclyl which is optionally substituted by one or more groups independently selected from group Q;

R_{15} represents C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{6-10} aryl which is optionally substituted by one or more groups independently selected from group P, or 5- to 10-membered heteroaryl or 3- to 10-membered heterocyclyl which is optionally substituted by one or more groups independently selected from group Q;

R_{16} represents C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{6-10} aryl which is optionally substituted by one or more groups independently selected from group P, or 5- to

10-membered heteroaryl or 3- to 10-membered heterocyclyl which is optionally substituted by one or more groups independently selected from group Q;

R_{17} represents hydrogen or C_{1-4} alkyl;

R_{18} represents C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{6-10} aryl which is optionally substituted by one or more groups independently selected from group P, or 5- to 10-membered heteroaryl or 3- to 10-membered heterocyclyl which is optionally substituted by one or more groups independently selected from group Q;

R_{19} represents hydrogen, C_{1-4} alkyl, C_{3-7} cycloalkyl, C_{1-4} haloalkyl, C_{6-10} aryl, or 5- to 10-membered heteroaryl or 3- to 10-membered heterocyclyl which is optionally substituted by one or more groups independently selected from group Q;

R_{20} represents C_{1-4} alkyl, C_{3-7} cycloalkyl, C_{1-4} haloalkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, or 3- to 10-membered heterocyclyl;

R_{21} represents C_{1-4} alkyl, C_{3-7} cycloalkyl, C_{1-4} haloalkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, or 3- to 10-membered heterocyclyl;

R_{22} represents hydrogen, C_{1-4} alkyl, or C_{1-4} haloalkyl;

R_{23} represents hydrogen, C_{1-4} alkyl, C_{3-7} cycloalkyl, C_{1-4} haloalkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, or 3- to 10-membered heterocyclyl;

R_{24} represents hydrogen, C_{1-4} alkyl, or C_{1-4} haloalkyl;

R_{25} represents C_{1-4} alkyl, C_{3-7} cycloalkyl, C_{1-4} haloalkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, or 3- to 10-membered heterocyclyl;

R_{26} and R_{27}, which can be the same or different, each represents hydrogen, C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{1-3} alkoxyl C_{1-4} alkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, 3- to 10-membered heterocyclyl, C_{6-10} aryl C_{1-4} alkyl, 3- to 10-membered heterocyclyl C_{1-3} alkyl, 5- to 10-membered heteroaryl C_{1-3} alkyl, cyano(C_{1-3} alkyl), C_{1-3} alkylsulfonyl C_{1-4} alkyl, or 3- to 10-membered cycloaliphatic ring; or alternatively R_{26} and R_{27}, together with a nitrogen atom linked thereto, form 3- to 10-membered heterocyclyl or 5- to 10-membered heteroaryl;

R_{28} and R_{29}, which can be the same or different, each represents hydrogen, C_{1-4} alkyl, C_{2-6} alkenyl, C_{2-6} alkynyl, C_{1-4} haloalkyl, C_{1-3} alkoxyl C_{1-4} alkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, 3- to 10-membered heterocyclyl, C_{6-10} aryl C_{1-4} alkyl, 3- to 10-membered heterocyclyl C_{1-3} alkyl, 5- to 10-membered heteroaryl C_{1-3} alkyl, cyano(C_{1-3} alkyl), C_{1-3} alkylsulfonyl C_{1-4} alkyl, or 3- to 10-membered cycloaliphatic ring; or alternatively R_{28} and R_{29}, together with a nitrogen atom linked thereto, form 3- to 10-membered heterocyclyl or 5- to 10-membered heteroaryl;

R_{30} represents C_{1-4} alkyl, C_{3-7} cycloalkyl, C_{1-4} haloalkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, or 3- to 10-membered heterocyclyl;

R_{31} represents C_{1-4} alkyl, C_{3-7} cycloalkyl, C_{1-4} haloalkyl, C_{6-10} aryl, 5- to 10-membered heteroaryl, or 3- to 10-membered heterocyclyl;

R_{32} represents C_{1-4} alkyl or C_{6-10} aryl;

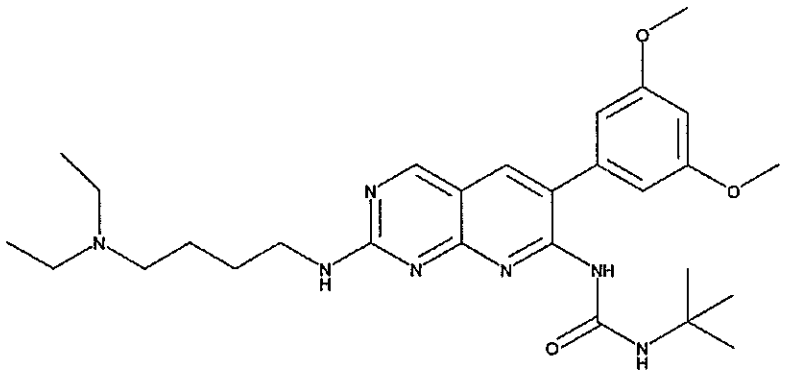
<group P>

halogen, C_{1-4} alkyl, C_{1-4} haloalkyl, -OH, C_{1-3} alkoxy, C_{1-3} haloalkoxy, 3- to 10-membered heterocyclylamino, $-SO_2R_{16}$, -CN, $-NO_2$, and 3- to 10-membered heterocyclyl;

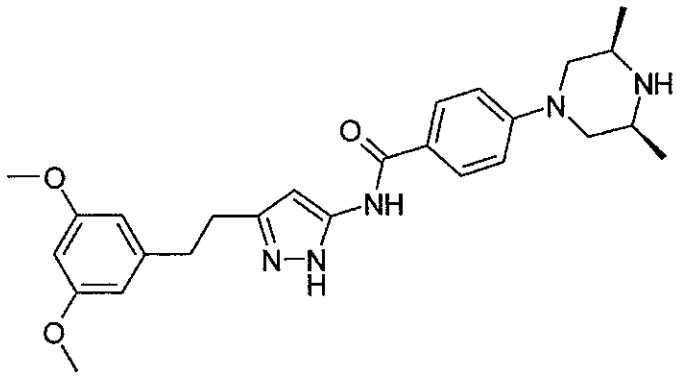
<group Q>

halogen, C_{1-4} alkyl, C_{1-4} haloalkyl, -OH, C_{1-3} alkoxy, C_{1-6} monohydroxy alkyl, C_{1-6} dihydroxy alkyl, C_{1-6} trihydroxy alkyl, 3- to 10-membered heterocyclyl amine, $-SO_2R_{16}$, -CN, $-NO_2$, C_{3-7} cycloalkyl, $-COR_{19}$, and 3- to 10-membered heterocyclyl which is optionally substituted by C_{1-4} alkyl.

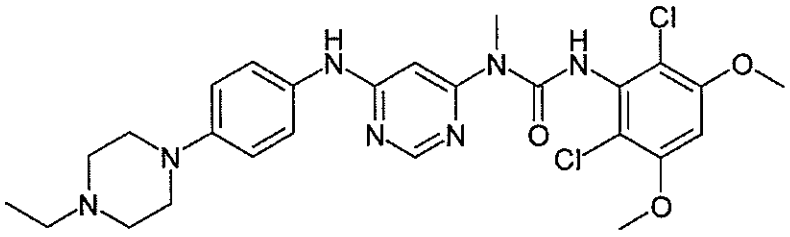
[Compound 2]



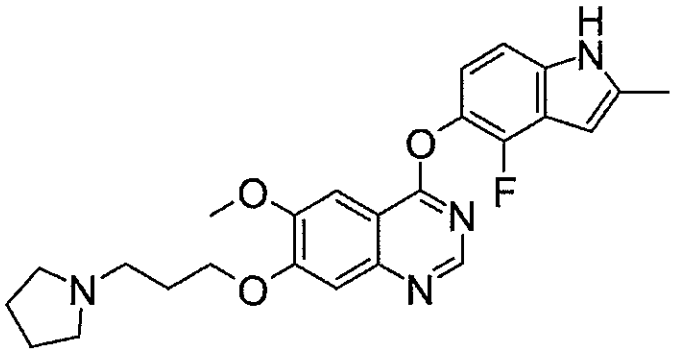
[Compound 3]



[Compound 4]

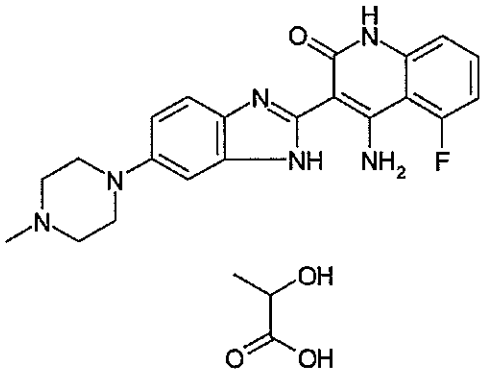


[Compound 5]



, or

[Compound 6]



9.A method for testing cancer susceptibility of a subject, whether a subject is affected with cancer or whether cancer has progressed in a subject, by determining the presence or absence of a fusion polypeptide comprising an FGFR3 polypeptide and a BAIAP2L1 polypeptide or a polynucleotide encoding an FGFR3 polypeptide and a BAIAP2L1 polypeptide in a sample isolated from the subject,

wherein the FGFR3 polypeptide is the whole or a part of a wild-type polypeptide consisting of the amino acid sequence of SEQ ID NO: 6 or 7,

wherein the BAIAP2L1 polypeptide is the whole or a part of a wild-type polypeptide consisting of the amino acid sequence of SEQ ID NO: 8, and

wherein the method is based on the criterion that a subject is more likely to develop cancer, is affected with cancer, or has progressed cancer when the fusion polypeptide or polynucleotide encoding the fusion polypeptide is detected.

10. The method of claim 9, wherein the cancer is bladder cancer, brain tumor, head and neck squamous cell carcinoma, lung cancer, lung adenocarcinoma, lung squamous cell carcinoma, skin melanoma, esophageal cancer, gastric cancer, or liver cancer.

11. A fusion polypeptide comprising an FGFR3 polypeptide and a BAIAP2L1 polypeptide:

wherein the FGFR3 polypeptide is the whole or a part of a wild-type polypeptide consisting of the amino acid sequence of SEQ ID NO: 6 or 7, and

wherein the BAIAP2L1 polypeptide is the whole or a part of a wild-type polypeptide consisting of the amino acid sequence of SEQ ID NO: 8.

12. The fusion polypeptide of claim 11, wherein the fusion polypeptide consists of the amino acid sequence of SEQ ID NO: 32 or 38.

13. The fusion polypeptide of claim 11 or claim 12, wherein the fusion polypeptide is derived from bladder cancer or lung cancer.

14. A polynucleotide encoding the fusion polypeptide of any one of claims 11 to 13.

15. The polynucleotide of claim 14, which comprises the nucleotide sequence of SEQ ID NO: 16.

16. The polynucleotide of claim 15, which comprises the nucleotide sequence of SEQ ID NO: 31 or 37.

17. A vector comprising the polynucleotide of any one of claims 14 to 16.

18. A recombinant cell comprising the vector of claim 17.

19. A method for detecting a fusion polypeptide that comprises an FGFR3 polypeptide and a BAIAP2L1 polypeptide, which comprises the step of detecting the fusion polypeptide in a sample isolated from a subject by using an antibody or antigen-binding fragment thereof that binds to the fusion polypeptide of any one of claims 11 to 13.

20. A method for detecting a polynucleotide encoding a fusion polypeptide that comprises an FGFR3 polypeptide and a BAIAP2L1 polypeptide, which comprises the step of detecting a polynucleotide encoding the fusion polypeptide in a sample isolated from a subject by using a pair of oligonucleotide primers consisting of sense and antisense primers each hybridizing to a polynucleotide encoding the fusion polypeptide of any one of claims 11 to 13 for detecting or amplifying the polynucleotide.