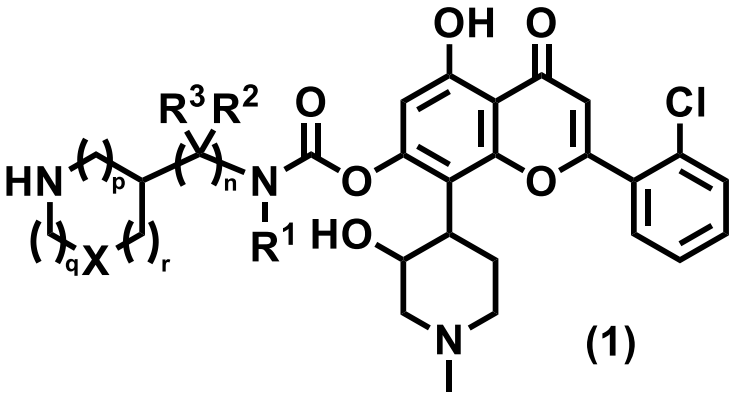
[CLAIMS]

[Claim 1]

A compound represented by formula (1):



(1)

or a pharmaceutically acceptable salt thereof,

wherein

R^1 is an optionally substituted C_{1-6} alkyl group,

R^2 and R^3 are the same or different, each independently a hydrogen atom or an optionally substituted C_{1-6} alkyl group,

X is CH_2 or an oxygen atom,

n is 1 or 2,

p is 0, 1 or 2,

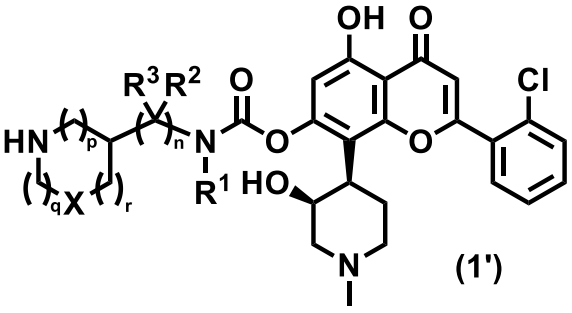
q is 1 or 2, and

r is 0, 1 or 2,

wherein, if X is an oxygen atom, q is 2.

[Claim 2]

The compound or the pharmaceutically acceptable salt thereof of claim 1, wherein formula (1) is the following structure represented by formula (1'):



(1')

.

[Claim 3]

The compound or the pharmaceutically acceptable salt thereof of claim 1 or 2, wherein the optionally substituted C_{1-6}

alkyl groups in R^1, R^2, and R^3 are each independently a C_{1-6} alkyl group optionally substituted with 1 to 5 of the same or different substituents independently selected from the group consisting of:

(1) a halogen atom,

(2) a hydroxyl group,

(3) a carboxyl group,

(4) a sulfinic acid group,

(5) a sulfonic acid group,

(6) a phosphoric acid group,

(7) an optionally substituted C_{3-8} cycloalkyl group,

(8) an optionally substituted C_{6-10} aryl group,

(9) an optionally substituted 5- to 10-membered heteroaryl group,

(10) an optionally substituted C_{1-6} alkoxy group,

(11) an optionally substituted C_{3-10} cycloalkoxy group,

(12) an optionally substituted C_{1-6} alkoxycarbonyl group,

(13) an optionally substituted C_{1-6} alkylcarbonyl group,

(14) an optionally substituted 3- to 10-membered saturated heterocyclic group,

(15) $-NR^4R^5$,

(16) $-CO_2R^4$,

(17) a guanidine group,

(18) $-CONR^4R^5$,

(19) $-SO_2R^4$,

(20) $-SO_2NR^4R^5$, and

(21) cyano,

wherein the substituents in (7), (8), (9), (10), (11), (12), (13), and (14) are groups which are optionally substituted with 1 to 5 of the same or different substituents selected from the group consisting of:

(a) a halogen atom,

(b) a hydroxyl group,

(c) a C_{1-6} alkyl group,

(d) a C_{1-6} alkoxy group,

(e) a cyano group,

(f) a carboxyl group,

(g) a sulfinic acid group,

(h) a sulfonic acid group,

(i) a phosphoric acid group,

(j) a C_{1-6} alkoxycarbonyl group,

(k) a C_{1-6} alkylcarbonyl group,

(l) $-NR^4R^5$,

(m) $-CO_2R^4$,

(n) a guanidine group,

(o) $-CONR^4R^5$,

(p) $-SO_2R^4$, and

(q) $-SO_2NR^4R^5$, and

R^4 and R^5 are the same or different hydrogen atoms or C_{1-6} alkyl groups.

[Claim 4]

The compound or the pharmaceutically acceptable salt thereof of any one of claim 1 to 3, wherein p is 0.

[Claim 5]

The compound or the pharmaceutically acceptable salt thereof of any one of clai 1to 4, wherein r is 2.

[Claim 6]

The compound or the pharmaceutically acceptable salt thereof of any one of claims 1 to 5, wherein R^2 and R^3 are the same or different, each independently

(1) a hydrogen atom, or

(2) a C_{1-6} alkyl group, which is optionally substituted with 1 to 3 of the same or different, each substituent is independently selected from the group consisting of a fluorine atom and C_{1-6} alkoxy. [Claim 7]

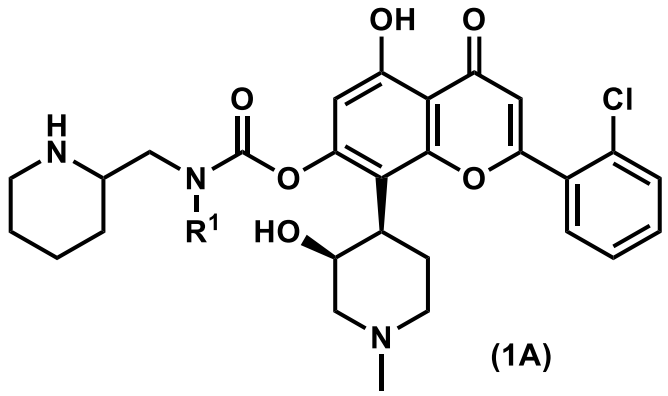
The compound or the pharmaceutically acceptable salt thereof of any one of claims 1 to 6, wherein R^2 and R^3 are hydrogen atoms.

[Claim 8]

The compound or the pharmaceutically acceptable salt thereof of any one of claims 1 to 7, wherein X is CH_2.

[Claim 9]

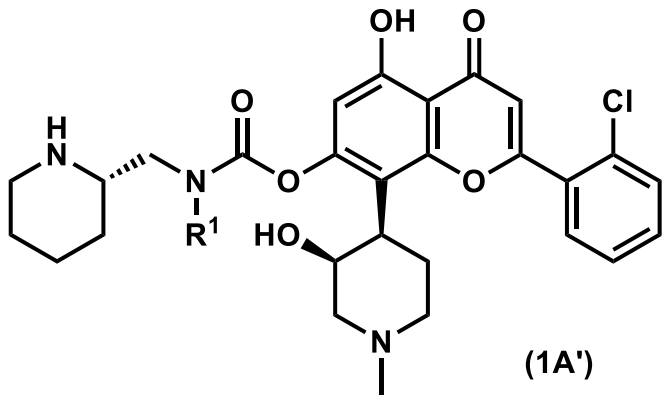
The compound or the pharmaceutically acceptable salt thereof of claim 8, wherein formula (1) is the following structure represented by formula (1A):



.

[Claim 10]

The compound or the pharmaceutically acceptable salt thereof of claim 9, wherein formula (1A) is the following structure represented by formula (1A'):



.

[Claim 11]

The compound or the pharmaceutically acceptable salt thereof of any one of claims 1 to 10, wherein R^1 is a C_{1-6} alkyl group, which is optionally substituted with 1 to 3 of the same or different, each substituent is independently selected from the group consisting of a halogen atom, a C_{6-10} aryl group, a hydroxyl group, a carboxyl group, a sulfinic acid group, a sulfonic acid group, a phosphoric acid group, C_{1-6} alkoxy, $-NR^4R^5$, $-CO_2R^4$, $-CONR^4R^5$, $-SO_2R^4$, and $-SO_2NR^4R^5$.

[Claim 12]

The compound or the pharmaceutically acceptable salt thereof of any one of claims 1 to 11, wherein R^1 is an ethyl group.

[Claim 13]

The compound or the pharmaceutically acceptable salt thereof of claim 1, which is selected from the following compounds:

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl ethyl{[(2S)-piperidin-2-yl]methyl}carbamate,

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl ethyl{[(2R)-piperidin-2-yl]methyl}carbamate,

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl methyl{[(2S)-piperidin-2-yl]methyl}carbamate,

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl methyl{[(2R)-piperidin-2-yl]methyl}carbamate,

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl {[(2S)-piperidin-2-yl]methyl}propylcarbamate,

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl {[(2R)-piperidin-2-yl]methyl}propylcarbamate,

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl ethyl[(piperidin-2-yl)methyl]carbamate,

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl methyl[(piperidin-2-yl)methyl]carbamate,

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl [(piperidin-2-yl)methyl]propylcarbamate,

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl [(piperidin-2-yl)methyl]propan-2-ylcarbamate,

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl (2-fluoroethyl)[(piperidin-2-yl)methyl]carbamate,

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl (2-methoxyethyl)[(piperidin-2-yl)methyl]carbamate,

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl [(piperidin-2-yl)methyl](3,3,3-trifluoropropyl)carbamate,

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl [(piperidin-2-yl)methyl](4,4,4-trifluorobutyl)carbamate,

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl benzyl[(piperidin-2-yl)methyl]carbamate,

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl ethyl[2-(piperidin-2-yl)ethyl]carbamate,

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl methyl{[(3R)-morpholin-3-yl]methyl}carbamate,

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl ethyl[(pyrrolidin-2-yl)methyl]carbamate,

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl methyl{1-[(2R)-piperidin-2-yl]ethyl}carbamate,

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl methyl{1-[(2S)-piperidin-2-yl]ethyl}carbamate,

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl ethyl[(piperidin-3-yl)methyl]carbamate, and

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl ethyl[(pyrrolidin-3-yl)methyl]carbamate.

[Claim 14]

The compound or the pharmaceutically acceptable salt thereof of any one of claim 1, 9, and 10, selected from the following compound:

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl ethyl{[(2S)-piperidin-2-yl]methyl}carbamate.

[Claim 15]

The compound or the pharmaceutically acceptable salt thereof of claim 1, selected from the following compound:

2-(2-chlorophenyl)-5-hydroxy-8-[(3S,4R)-3-hydroxy-1-methylpiperidin-4-yl]-4-oxo-4H-1-benzopyran-7-yl ethyl{[(2S)-piperidin-2-yl]methyl}carbamate ditrifluoroacetate.

[Claim 16]

A pharmaceutical composition comprising the compound or the pharmaceutically acceptable salt thereof of any one of claims 1 to 15.

[Claim 17]

A liposome comprising the compound or the pharmaceutically acceptable salt thereof of any one of claims 1 to 15.

[Claim 18]

A pharmaceutical composition comprising a liposome encapsulating the compound or the pharmaceutically acceptable salt thereof of any one of claims 1 to 15 or the liposome of claim 17.

[Claim 19]

The pharmaceutical composition of claim 18, wherein the liposome comprises

(1) the compound or the pharmaceutically acceptable salt thereof of any one of claims 1 to 15, and

(2) a phospholipid.

[Claim 20]

The pharmaceutical composition of claim 19, wherein the phospholipid is one phospholipid selected from the group consisting of phosphatidylcholine, phosphatidylglycerol, phosphatidic acid, phosphatidylethanolamine, phosphatidylserine, phosphatidylinositol, sphingomyelin, soybean lecithin, egg yolk lecithin, hydrogenated egg yolk lecithin, and hydrogenated soybean lecithin, or a combination of two or more thereof.

[Claim 21]

The pharmaceutical composition of any one of claims 18 to 20, wherein the liposome further comprises a sterol.

[Claim 22]

The pharmaceutical composition of claim 21, wherein the sterol is a cholesterol.

[Claim 23]

The pharmaceutical composition of any one of claims 18 to 22, wherein the liposome further comprises a polymer-modified lipid.

[Claim 24]

The pharmaceutical composition of claim 23, wherein a polymer moiety of the polymer-modified lipid is polyethylene glycol, polypropylene glycol, polyvinyl alcohol, polyvinylpyrrolidone, methoxypolyethylene glycol, methoxypolypropylene glycol, methoxypolyvinyl alcohol, methoxypolyvinylpyrrolidone, ethoxypolyethylene glycol, ethoxypolypropylene glycol, ethoxypolyvinyl alcohol, ethoxypolyvinylpyrrolidone, propoxypolyethylene glycol, propoxypolypropylene glycol, propoxypolyvinyl alcohol, or propoxypolyvinylpyrrolidone.

[Claim 25]

The pharmaceutical composition of claim 23 or 24, wherein a lipid moiety of the polymer-modified lipid is phosphatidylethanolamine or diacylglycerol.

[Claim 26]

The pharmaceutical composition of any one of claims 18 to 25, wherein the liposome further comprises an additive selected from the group consisting of an inorganic acid, an inorganic acid salt, an organic acid, an organic acid salt, a saccharide, buffer, an antioxidant, and a polymer.

[Claim 27]

Use of the compound or the pharmaceutically acceptable salt thereof of any one of claims 1 to 15, or the pharmaceutical composition of any one of claims 16 and 18 to 26, or the liposome

of claim 17, in manufacturing a medicament for treating and/or preventing cancer .

[Claim 28]

The use of claim 27, wherein the cancer is at least one type of cancer selected from the group consisting of acute leukemia, chronic lymphocytic leukemia, chronic myelogenous leukemia, polycythemia vera, malignant lymphoma, plasma cell tumor, multiple myeloma, myelodysplastic syndrome, brain tumor, head and neck cancer, esophageal cancer, thyroid cancer, small cell lung cancer, non-small cell lung cancer, thymoma/thymic carcinoma, breast cancer, gastric cancer, gallbladder/bile duct cancer, liver cancer, hepatocellular carcinoma, pancreatic cancer, colon cancer, rectal cancer, anal cancer, gastrointestinal stromal tumor, choriocarcinoma, endometrial cancer, cervical cancer, ovarian cancer, bladder cancer, prostate cancer, urothelial cancer, renal cancer, renal cell cancer, testicular tumor, testicular germ cell tumor, ovarian germ cell tumor, Wilms tumor, skin cancer, malignant melanoma, neuroblastoma, osteosarcoma, Ewing sarcoma, and soft tissue sarcoma.

[Claim 29]

A combination of the compound or the pharmaceutically acceptable salt thereof of any one of claims 1 to 15, or the liposome of claim 17, or the pharmaceutical composition of any one of claims 16 and 18 to 26 with a concomitantly used medicament or a pharmaceutically acceptable salt thereof, wherein the concomitantly used medicament is at least one selected from the group consisting of a hormonal therapy agent, a chemotherapeutic agent, an immunotherapeutic agent, and an agent that inhibits a cell growth factor and its receptor action.

[Claim 30]

The compound or the pharmaceutically acceptable salt thereof of any one of claims 1 to 15, or the liposome of claim 17, or the pharmaceutical composition of any one of claims 16 and 18 to 26, wherein the compound or the pharmaceutically

acceptable salt thereof, or the pharmaceutical composition, or the liposome, or the therapeutic agent and/or prophylactic agent is to be administered in combination with a concomitantly used medicament or a pharmaceutically acceptable salt thereof, and wherein the concomitantly used medicament is at least one selected from the group consisting of a hormonal therapy agent, a chemotherapeutic agent, an immunotherapeutic agent, and an agent that inhibits a cell growth factor and its receptor action.