# CLAIMS

[Claim 1]

An isolated polypeptide wherein an N-terminal portion of DCTN1 protein is fused to a C-terminal portion of RET protein.

[Claim 2]

The isolated polypeptide according to claim 1, which is selected from the following (a) to (c):

(a) a polypeptide comprising the amino acid sequence represented by SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 18, SEQ ID NO: 20, SEQ ID NO: 22, or SEQ ID NO: 24;

(b) a polypeptide comprising an amino acid sequence wherein 1 to 10 amino acids are substituted, deleted, or added in the amino acid sequence represented by SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 18, SEQ ID NO: 20, SEQ ID NO: 22, or SEQ ID NO: 24; and

(c) a polypeptide comprising an amino acid sequence that has at least 90% identity with the amino acid sequence represented by SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 18, SEQ ID NO: 20, SEQ ID NO: 22, or SEQ ID NO: 24.

[Claim 3]

An expression vector comprising a polynucleotide, wherein the polynucleotide is selected from the following (d) to (i):

(d) a polynucleotide encoding a polypeptide comprising the amino acid sequence represented by SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 18, SEQ ID NO: 20, SEQ ID NO: 22, or SEQ ID NO: 24;

(e) a polynucleotide encoding a polypeptide comprising an amino acid sequence wherein 1 to 10 amino acids are substituted, deleted, or added in the amino acid sequence represented by SEQ ID

NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 18, SEQ ID NO: 20, SEQ ID NO: 22, or SEQ ID NO: 24;

(f) a polynucleotide encoding a polypeptide comprising an amino acid sequence that has at least 90% identity with the amino acid sequence represented by SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 18, SEQ ID NO: 20, SEQ ID NO: 22, or SEQ ID NO: 24;

(g) a polynucleotide comprising the base sequence represented by SEQ ID NO: 1, SEQ ID NO: 3, SEQ ID NO: 5, SEQ ID NO: 7, SEQ ID NO: 9, SEQ ID NO: 11, SEQ ID NO: 13, SEQ ID NO: 15, SEQ ID NO: 17, SEQ ID NO: 19, SEQ ID NO: 21, or SEQ ID NO: 23;

(h) a polynucleotide hybridizing under stringent conditions with a polynucleotide comprising a base sequence complementary to the base sequence represented by SEQ ID NO: 1, SEQ ID NO: 3, SEQ ID NO: 5, SEQ ID NO: 7, SEQ ID NO: 9, SEQ ID NO: 11, SEQ ID NO: 13, SEQ ID NO: 15, SEQ ID NO: 17, SEQ ID NO: 19, SEQ ID NO: 21, or SEQ ID NO: 23; and

(i) a polynucleotide having at least 90% identity with the base sequence represented by SEQ ID NO: 1, SEQ ID NO: 3, SEQ ID NO: 5, SEQ ID NO: 7, SEQ ID NO: 9, SEQ ID NO: 11, SEQ ID NO: 13, SEQ ID NO: 15, SEQ ID NO: 17, SEQ ID NO: 19, SEQ ID NO: 21, or SEQ ID NO: 23.

[Claim 4]

A cell transfected with a polynucleotide, wherein the polynucleotide is selected from the following (d) to (i):

(d) a polynucleotide encoding a polypeptide comprising the amino acid sequence represented by SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 18, SEQ ID NO: 20, SEQ ID NO: 22, or SEQ ID NO: 24;

(e) a polynucleotide encoding a polypeptide comprising an amino acid sequence wherein 1 to 10 amino acids are substituted, deleted, or added in the amino acid sequence represented by SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ

ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 18, SEQ ID NO: 20, SEQ ID NO: 22, or SEQ ID NO: 24;

(f) a polynucleotide encoding a polypeptide comprising an amino acid sequence that has at least 90% identity with the amino acid sequence represented by SEQ ID NO: 2, SEQ ID NO: 4, SEQ ID NO: 6, SEQ ID NO: 8, SEQ ID NO: 10, SEQ ID NO: 12, SEQ ID NO: 14, SEQ ID NO: 16, SEQ ID NO: 18, SEQ ID NO: 20, SEQ ID NO: 22, or SEQ ID NO: 24;

(g) a polynucleotide comprising the base sequence represented by SEQ ID NO: 1, SEQ ID NO: 3, SEQ ID NO: 5, SEQ ID NO: 7, SEQ ID NO: 9, SEQ ID NO: 11, SEQ ID NO: 13, SEQ ID NO: 15, SEQ ID NO: 17, SEQ ID NO: 19, SEQ ID NO: 21, or SEQ ID NO: 23;

(h) a polynucleotide hybridizing under stringent conditions with a polynucleotide comprising a base sequence complementary to the base sequence represented by SEQ ID NO: 1, SEQ ID NO: 3, SEQ ID NO: 5, SEQ ID NO: 7, SEQ ID NO: 9, SEQ ID NO: 11, SEQ ID NO: 13, SEQ ID NO: 15, SEQ ID NO: 17, SEQ ID NO: 19, SEQ ID NO: 21, or SEQ ID NO: 23; and

(i) a polynucleotide having at least 90% identity with the base sequence represented by SEQ ID NO: 1, SEQ ID NO: 3, SEQ ID NO: 5, SEQ ID NO: 7, SEQ ID NO: 9, SEQ ID NO: 11, SEQ ID NO: 13, SEQ ID NO: 15, SEQ ID NO: 17, SEQ ID NO: 19, SEQ ID NO: 21, or SEQ ID NO: 23.

[Claim 5]

An isolated antibody that specifically binds to the sequence of amino acids containing fused point which is the point of fusion of the N-terminal portion of DCTN1 protein and the C-terminal portion of RET protein in the isolated polypeptide according to claim 1 or 2.

[Claim 6]

The isolated antibody according to claim 5 wherein the point of fusion of the N-terminal portion of DCTN1 protein and the C-terminal portion of RET protein is selected below:

(1) the point at which a polypeptide having the amino acid sequence of positions 1-1233 of SEQ ID NO: 2, which is derived from the N-terminal portion of DCTN1, is fused to a polypeptide having the

amino acid sequence of positions 1234-1635 of SEQ ID NO: 2, which is derived from the C- terminal portion of RET;

(2) the point at which a polypeptide having the amino acid sequence of positions 1-1233 of SEQ ID NO: 4, which is derived from the N-terminal portion of DCTN 1, is fused to a polypeptide having the amino acid sequence of positions 1234-1593 of SEQ ID NO: 4, which is derived from the C-terminal portion of RET;

(3) the point at which a polypeptide having the amino acid sequence of positions 1-1099 of SEQ ID NO: 6, which is derived from the N-terminal portion of DCTN1, is fused to a polypeptide having the amino acid sequence of positions 1100-1501 of SEQ ID NO: 6, which is derived from the C-terminal portion of RET;

(4) the point at which a polypeptide having the amino acid sequence of positions 1-1099 of SEQ ID NO: 8, which is derived from the N-terminal portion of DCTN1, is fused to a polypeptide having the amino acid sequence of positions 1100-1459 of SEQ ID NO: 8, which is derived from the C-terminal portion of RET;

(5) the point at which a polypeptide having the amino acid sequence of positions 1-1208 of SEQ ID NO: 10, which is derived from the N-terminal portion of DCTN1, is fused to a polypeptide having the amino acid sequence of positions 1209-1610 of SEQ ID NO: 10, which is derived from the C-terminal portion of RET;

(6) the point at which a polypeptide having the amino acid sequence of positions 1-1208 of SEQ ID NO: 12, which is derived from the N-terminal portion of DCTN1, is fused to a polypeptide having the amino acid sequence of positions 1209-1568 of SEQ ID NO: 12, which is derived from the C-terminal portion of RET;

(7) the point at which a polypeptide having the amino acid sequence of positions 1-1094 of SEQ ID NO: 14, which is derived from the N-terminal portion of DCTN1, is fused to a polypeptide having the amino acid sequence of positions 1095-1496 of SEQ ID NO: 14, which is derived from the C-terminal portion of RET;

(8) the point at which a polypeptide having the amino acid sequence of positions 1-1094 of SEQ ID NO: 16, which is derived from the N-terminal portion of DCTN1, is fused to a polypeptide having the

amino acid sequence of positions 1095-1454 of SEQ ID NO: 16, which is derived from the C-terminal portion of RET;

(9) the point at which a polypeptide having the amino acid sequence of positions 1-1191 of SEQ ID NO: 18, which is derived from the N-terminal portion of DCTN1, is fused to a polypeptide having the amino acid sequence of positions 1192-1593 of SEQ ID NO: 18, which is derived from the C-terminal portion of RET;

(10) the point at which a polypeptide having the amino acid sequence of positions 1-1191 of SEQ ID NO: 20, which is derived from the N-terminal portion of DCTN1, is fused to a polypeptide having the amino acid sequence of positions 1192-1551 of SEQ ID NO: 20, which is derived from the C-terminal portion of RET;

(11) the point at which a polypeptide having the amino acid sequence of positions 1-1226 of SEQ ID NO: 22, which is derived from the N-terminal portion of DCTN1, is fused to a polypeptide having the amino acid sequence of positions 1227-1628 of SEQ ID NO: 22, which is derived from the C-terminal portion of RET; or

(12) the point at which a polypeptide having the amino acid sequence of positions 1-1226 of SEQ ID NO: 24, which is derived from the N-terminal portion of DCTN1, is fused to a polypeptide having the amino acid sequence of positions 1227-1586 of SEQ ID NO: 24, which is derived from the C-terminal portion of RET.

[Claim 7]

A method for detecting the presence of a fusion polypeptide in a sample, the fusion polypeptide comprising an N-terminal portion of DCTN1 protein is fused to a C-terminal portion of RET protein, comprising the following steps:

(1) contacting a sample with the isolated antibody according to claim 5 or 6; and

(2) detecting the isolated antibody fused with the sample.

[Claim 8]

A primer or probe for detecting the presence of the polynucleotide encoding a fusion polypeptide comprising an N-terminal portion of DCTN1 protein is fused to a C-terminal portion of RET

protein in a sample, the primer or probe being a polynucleotide selected from the following:

(i) a polynucleotide comprising the base sequence represented by SEQ ID NO: 69

(ii) a polynucleotide comprising the base sequence represented by SEQ ID NO: 70

(iii) a polynucleotide comprising the base sequence represented by SEQ ID NO: 71.

[Claim 9]

A method for detecting the presence of a polynucleotide encoding a fusion polypeptide in a sample, the fusion polypeptide comprising an N-terminal portion of DCTN1 protein is fused to a C-terminal portion of RET protein, comprising the following steps:

1) contacting a sample with a primer or probe according to Claim 8; and

2) detecting the primer or probe hybridized with the sample.

[Claim 10]

A method for diagnosing cancer in a patient when the presence of a fusion polypeptide in which an N-terminal portion of DCTN1 protein is fused to a C-terminal portion of RET protein or a polynucleotide encoding the fusion polypeptide is detected in a sample derived from the patient by the detection method according to claims 7 or 9.

[Claim 11]

A pharmaceutical composition when used for treating a patient having a cancer that is positive for a fusion gene of DCTN1 gene and RET gene and/or positive for a fusion protein of DCTN1 protein and RET protein, the composition comprising a compound that inhibits RET as an active ingredient.

[Claim 12]

A method of screening for a compound that inhibits expression and/or activity of a fusion polypeptide in which an N-terminal portion

of DCTN1 protein is fused to a C-terminal portion of RET protein or expression of a polynucleotide encoding the fusion polypeptide, the method comprising the following steps (1) and (2):

(1) the step of bringing the fusion polypeptide, a cell expressing the fusion polypeptide or the polynucleotide encoding the fusion polypeptide, or the cell according to claim 4 into contact with a test compound; and

(2) the step of measuring whether expression and/or activity of the fusion polypeptide or expression of the polynucleotide encoding the fusion polypeptide is inhibited in step (1), or the step of measuring whether growth of the cell in step (1) is inhibited.

[Claim 13]

A method using a fusion polypeptide in which an N-terminal portion of DCTN1 protein is fused to a C-terminal portion of RET protein or a polynucleotide encoding the fusion polypeptide as an indicator for determining whether a chemotherapy using a compound that inhibits RET is effective,

the method comprising determining that the chemotherapy using the compound that inhibits RET is effective when the fusion polypeptide is detected in a sample by a detection method according to claim 7, and/or when the presence of the polynucleotide encoding the fusion polypeptide is detected in a sample by the detection method according to claim 9.

[Claim 14]

A biomarker for detecting cancer, the biomarker comprising at least one member selected from the group consisting of fusion polypeptides wherein an N-terminal portion of DCTN1 protein is fused to a C-terminal portion of RET protein.

[Claim 15]

A method for treating cancer,

the method comprising

giving a chemotherapy using a compound that inhibits RET to a cancer patient who is positive for a fusion gene of DCTN1 gene and

RET gene, and/or positive for a fusion protein of DCTN1 protein and RET protein.

[Claim 16]

A method for treating cancer,

the method comprising

detecting the presence of a fusion polypeptide in which an N-terminal portion of DCTN1 protein is fused to a C-terminal portion of RET protein, and/or the presence of a polynucleotide encoding the fusion polypeptide, in a sample derived from a test subject, and

giving a chemotherapy using a compound that inhibits RET to the test subject when the presence of the fusion polypeptide has been detected, and/or the presence of the polynucleotide encoding the fusion polypeptide has been detected.

[Claim 17]

A compound that inhibits RET when used for the treatment of a cancer patient who is positive for a fusion gene of DCTN1 gene and RET gene, and/or positive for a fusion protein of DCTN1 protein and RET protein.

[Claim 18]

Use of a compound that inhibits RET in the production of a pharmaceutical composition for treating a cancer patient who is positive for a fusion gene of DCTN1 gene and RET gene, and/or positive for a fusion protein of DCTN1 protein and RET protein.

[Claim 19]

A method for producing a reagent for determining whether a chemotherapy using a compound that inhibits RET is effective, using a means to detect the presence of a fusion polypeptide in which an N-terminal portion of DCTN1 protein is fused to a C-terminal portion of RET protein in a sample and/or a means to detect the presence of a polynucleotide encoding the fusion polypeptide in a sample.

[Claim 20]

A combination of an anti-DCTN1 antibody and an anti-RET antibody when used for detecting the presence of a fusion polypeptide in which an N-terminal portion of DCTN1 protein is fused to a C-terminal portion of RET protein and/or detecting the presence of a polynucleotide encoding the fusion polypeptide.

[Claim 21]

Use of the antibody according to claim 5, the combination of the antibodies according to claim 20, or the primer or probe according to claim 8 in the production of a detection reagent for detecting the presence of a fusion polypeptide in which an N-terminal portion of DCTN1 protein is fused to a C-terminal portion of RET protein, and/or the presence of a polynucleotide encoding the fusion polypeptide.

[Claim 22]

Use of a compound that inhibits RET in the manufacture of a medicament for treatment of cancer,

wherein the treatment is implemented by a method comprising

giving a chemotherapy using a compound that inhibits RET to a cancer patient who is positive for a fusion gene of DCTN1 gene and RET gene, and/or positive for a fusion protein of DCTN1 protein and RET protein.

[Claim 23]

Use of a compound that inhibits RET in the manufacture of a medicament for treatment of cancer,

wherein the treatment is implemented by a method comprising

detecting the presence of a fusion polypeptide in which an N-terminal portion of DCTN1 protein is fused to a C-terminal portion of RET protein and/or the presence of a polynucleotide that encodes the fusion polypeptide, in a sample derived from a test subject, and

giving a chemotherapy using a compound that inhibits RET to the test subject when the presence of the fusion polypeptide, or polynucleotide encoding the fusion polypeptide, has been detected.