CLAIMS

1. A peptide consisting of the following amino acid sequence (i) or (ii):

(i) Thr Gly Val Lys Pro Phe Gln Cys Lys (SEQ ID No: 7),

(ii) an amino acid sequence of SEQ ID NO: 7 in which glycine is substituted by isoleucine or valine,

wherein said peptide has an ability to bind to an HLA-A*1101 molecule and an ability to induce a CTL.

2. A peptide dimer in which the peptides of claim 1 are bound to each other through a disulfide bond,

wherein said peptide dimer has an ability to bind to an HLA-A*1101 molecule and an ability to induce a CTL.

3. A pharmaceutical composition for the treatment or prevention of a cancer in an HLA-A*1101-positive subject, which comprises a peptide consisting of the following amino acid sequence (i) or (ii):

(i) an amino acid sequence selected from the group consisting of:

Pro Ile Leu Cys Gly Ala Gln Tyr Arg (SEQ ID No: 3),

Ser Ala Ser Glu Thr Ser Glu Lys Arg (SEQ ID No: 5),

Ser His Leu Gln Met His Ser Arg Lys (SEQ ID No: 6),

Thr Gly Val Lys Pro Phe Gln Cys Lys (SEQ ID No: 7),

(ii) an amino acid sequence of SEQ ID NO: 7 in which glycine is substituted by isoleucine or valine,

and/or the peptide dimer of claim 2,

wherein said peptide has an ability to bind to an HLA-A*1101 molecule and an ability to induce a CTL.

4. A polynucleotide encoding the peptide according to claim 1.

5. An expression vector comprising the polynucleotide according to claim 4.

6. A pharmaceutical composition for the treatment or prevention of a cancer in an HLA-A*1101-positive subject, which comprises a polynucleotide encoding a peptide consisting of the following amino acid sequence:

(i) an amino acid sequence selected from the group consisting of:

Pro Ile Leu Cys Gly Ala Gln Tyr Arg (SEQ ID No: 3),

Ser Ala Ser Glu Thr Ser Glu Lys Arg (SEQ ID No: 5),

Ser His Leu Gln Met His Ser Arg Lys (SEQ ID No: 6),

Thr Gly Val Lys Pro Phe Gln Cys Lys (SEQ ID No: 7),

(ii) an amino acid sequence of SEQ ID NO: 7 in which

glycine is substituted by isoleucine or valine,

wherein said peptide has an ability to bind to an HLA-A*1101 molecule and an ability to induce a CTL.

7. A CTL recognizing a complex of a WT1 peptide and an HLA-A*1101 molecule, which is induced by a peptide consisting of the following amino acid sequence (i) or (ii):

(i) an amino acid sequence selected from the group consisting of:

Pro Ile Leu Cys Gly Ala Gln Tyr Arg (SEQ ID No: 3),

Ser Ala Ser Glu Thr Ser Glu Lys Arg (SEQ ID No: 5),

Ser His Leu Gln Met His Ser Arg Lys (SEQ ID No: 6),

Thr Gly Val Lys Pro Phe Gln Cys Lys (SEQ ID No: 7),

(ii) an amino acid sequence of SEQ ID NO: 7 in which glycine is substituted by isoleucine or valine,

and/or the peptide dimer of claim 2,

wherein said peptide has an ability to bind to an HLA-A*1101 molecule and an ability to induce a CTL.

8. A method for the induction of a CTL recognizing a complex of a WT1 peptide and an HLA-A*1101 molecule, which comprises culturing a peripheral blood mononuclear cell in the presence of a peptide consisting of the following amino acid sequence (i) or (ii):

(i) an amino acid sequence selected from the group

consisting of:

Pro Ile Leu Cys Gly Ala Gln Tyr Arg (SEQ ID No: 3),

Ser Ala Ser Glu Thr Ser Glu Lys Arg (SEQ ID No: 5),

Ser His Leu Gln Met His Ser Arg Lys (SEQ ID No: 6),

Thr Gly Val Lys Pro Phe Gln Cys Lys (SEQ ID No: 7),

(ii) an amino acid sequence of SEQ ID NO: 7 in which glycine is substituted by isoleucine or valine,

and/or the peptide dimer of claim 2,

to induce the CTL from the peripheral blood mononuclear cell,

wherein said peptide has an ability to bind to an HLA-A*1101 molecule and an ability to induce a CTL.

9. A kit for the induction of a CTL recognizing a complex of a WT1 peptide and an HLA-A*1101 molecule, which comprises as an essential component a peptide consisting of the following amino acid sequence (i) or (ii):

(i) an amino acid sequence selected from the group consisting of:

Pro Ile Leu Cys Gly Ala Gln Tyr Arg (SEQ ID No: 3),

Ser Ala Ser Glu Thr Ser Glu Lys Arg (SEQ ID No: 5),

Ser His Leu Gln Met His Ser Arg Lys (SEQ ID No: 6),

Thr Gly Val Lys Pro Phe Gln Cys Lys (SEQ ID No: 7),

(ii) an amino acid sequence of SEQ ID NO: 7 in which glycine is substituted by isoleucine or valine,

and/or the peptide dimer of claim 2,

wherein said peptide has an ability to bind to an HLA-A*1101 molecule and an ability to induce a CTL.

10. An antigen-presenting cell presenting a WT1 peptide through an HLA-A*1101 molecule, which is induced by a peptide consisting of the following amino acid sequence (i) or (ii):

(i) an amino acid sequence selected from the group consisting of:

Pro Ile Leu Cys Gly Ala Gln Tyr Arg (SEQ ID No: 3),

Ser Ala Ser Glu Thr Ser Glu Lys Arg (SEQ ID No: 5),

Ser His Leu Gln Met His Ser Arg Lys (SEQ ID No: 6),

Thr Gly Val Lys Pro Phe Gln Cys Lys (SEQ ID No: 7),

(ii) an amino acid sequence of SEQ ID NO: 7 in which glycine is substituted by isoleucine or valine,

and/or the peptide dimer of claim 2,

wherein said peptide has an ability to bind to an HLA-A*1101 molecule and an ability to induce a CTL.

11. A method for the induction of an antigen-presenting cell presenting a WT1 peptide through an HLA-A*1101 molecule, which comprises culturing an immature antigen-presenting cell in the presence of a peptide consisting of the following amino acid sequence (i) or (ii):

(i) an amino acid sequence selected from the group consisting of:

Pro Ile Leu Cys Gly Ala Gln Tyr Arg (SEQ ID No: 3),

Ser Ala Ser Glu Thr Ser Glu Lys Arg (SEQ ID No: 5),

Ser His Leu Gln Met His Ser Arg Lys (SEQ ID No: 6),

Thr Gly Val Lys Pro Phe Gln Cys Lys (SEQ ID No: 7),

(ii) an amino acid sequence of SEQ ID NO: 7 in which glycine is substituted by isoleucine or valine,

and/or the peptide dimer of claim 2,

to induce the antigen-presenting cell from the immature antigen-presenting cell,

wherein said peptide has an ability to bind to an HLA-A*1101 molecule and an ability to induce a CTL.

12. A kit for the induction of an antigen-presenting cell presenting a WT1 peptide through an HLA-A*1101 molecule, which comprises as an essential component a peptide consisting of the following amino acid sequence (i) or (ii):

(i) an amino acid sequence selected from the group consisting of:

Pro Ile Leu Cys Gly Ala Gln Tyr Arg (SEQ ID No: 3),

Ser Ala Ser Glu Thr Ser Glu Lys Arg (SEQ ID No: 5),

Ser His Leu Gln Met His Ser Arg Lys (SEQ ID No: 6),

Thr Gly Val Lys Pro Phe Gln Cys Lys (SEQ ID No: 7),

(ii) an amino acid sequence of SEQ ID NO: 7 in which glycine is substituted by isoleucine or valine,

and/or the peptide dimer of claim 2,

wherein said peptide has an ability to bind to an HLA-A*1101 molecule and an ability to induce a CTL.

13. A method for helping the diagnosis of a cancer, which comprises incubating the CTL of claim 7 or the antigen-presenting cell of claim 10 with a sample from an HLA-A*1101-positive subject, and determining the amount of the CTL or the antigen-presenting cell.

CLAIMS

1. A peptide comprising an amino acid sequence consisting of 9 contiguous amino acids from a WT1 protein, wherein the peptide has an ability to bind to an HLA-A*1101 molecule, and has an ability to induce a CTL.

2. The peptide according to claim 1, wherein the amino acid at position 9 of the amino acid sequence is Lys or Arg.

3. The peptide according to claim 1, wherein the amino acid sequence is selected from the group consisting of:

Ala Ala Gly Ser Ser Ser Ser Val Lys (SEQ ID No: 2),

Pro Ile Leu Cys Gly Ala Gln Tyr Arg (SEQ ID No: 3),

Arg Ser Ala Ser Glu Thr Ser Glu Lys (SEQ ID No: 4),

Ser Ala Ser Glu Thr Ser Glu Lys Arg (SEQ ID No: 5),

Ser His Leu Gln Met His Ser Arg Lys (SEQ ID No: 6),

Thr Gly Val Lys Pro Phe Gln Cys Lys (SEQ ID No: 7),

Lys Thr Cys Gln Arg Lys Phe Ser Arg (SEQ ID No: 8),

Ser Cys Arg Trp Pro Ser Cys Gln Lys (SEQ ID No: 9), and

Asn Met His Gln Arg Asn Met Thr Lys (SEQ ID No: 10).

4. The peptide according to claim 3, wherein the amino acid sequence is Ala Ala Gly Ser Ser Ser Ser Val Lys (SEQ ID No: 2).

5. A peptide dimer having an ability to bind to

an HLA-A*1101 molecule and having an ability to induce a CTL, in which two peptide monomers each comprising an amino acid sequence consisting of 9 contiguous amino acids from a WT1 protein and comprising at least one cysteine residue are bound to each other through a disulfide bond.

6. The peptide dimer according to claim 5, wherein the amino acid sequence of the peptide monomer is selected from the group consisting of:

Pro Ile Leu Cys Gly Ala Gln Tyr Arg (SEQ ID No: 3),

Thr Gly Val Lys Pro Phe Gln Cys Lys (SEQ ID No: 7),

Lys Thr Cys Gln Arg Lys Phe Ser Arg (SEQ ID No: 8), and

Ser Cys Arg Trp Pro Ser Cys Gln Lys (SEQ ID No: 9).

7. A pharmaceutical composition for the treatment or prevention of a cancer, comprising the peptide according to claim 1 and/or the peptide dimer according to claim 5.

8. A method for the treatment or prevention of a cancer, comprising administering an effective amount of the peptide according to claim 1 and/or the peptide dimer according to claim 5 to an HLA-A*1101-positive subject.

9. A polynucleotide encoding the peptide according to claim 1.

10. An expression vector comprising the polynucleotide according to claim 9.

11. A pharmaceutical composition for the

treatment or prevention of a cancer, comprising the polynucleotide according to claim 9 or the vector according to claim 10.

12. A method for the treatment or prevention of a cancer, comprising administering an effective amount of the polynucleotide according to claim 9 or the vector according to claim 10 to an HLA-A*1101-positive subject.

13. A WT1-specific CTL, which is induced by the peptide according to claim 1 and/or the peptide dimer according to claim 5.

14. A method for the induction of a WT1-specific CTL, comprising culturing a peripheral blood mononuclear cell in the presence of the peptide according to claim 1 and/or the peptide dimer according to claim 5 to induce the WT1-specific CTL from the peripheral blood mononuclear cell.

15. A kit for the induction of a WT1-specific CTL, comprising the peptide according to claim 1 and/or the peptide dimer according to claim 5 as an essential component.

16. An antigen-presenting cell presenting a WT1 peptide, which is induced by the peptide according to claim 1 and/or the peptide dimer according to claim 5.

17. A method for the induction of an antigen-presenting cell presenting a WT1 peptide, comprising culturing an immature antigen-presenting cell in the

presence of the peptide according to claim 1 and/or the peptide dimer according to claim 5 to induce the antigen-presenting cell presenting a WT1 peptide from the immature antigen-presenting cell.

18. A kit for the induction of an antigen-presenting cell presenting a WT1 peptide, comprising the peptide according to claim 1 and/or the peptide dimer according to claim 5 as an essential component.

19. A method for the diagnosis of a cancer, comprising using the CTL according to claim 13 or the antigen-presenting cell according to claim 16.