ID NOs: 3, 4, 7, 18 and 23,
[28] The isolated peptide of any one of [1], [3], [5], [7], [9], and [10], wherein the peptide consists of the amino acid sequence selected from the group consisting of SEQ ID NOs: 26, 27, 30, 31, 32, 35, 37, 38 and 43,
[29] An exosome that presents a complex comprising any of the peptides of [1] to [10] and an HLA antigen, and
[30] A host cell transformed or transfected with an expression vector according to [25].
[0016a] In one aspect, there is provided an isolated peptide of less than 15 amino acids selected from the group consisting of:
(a) an isolated peptide comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 38, 3, 4, 7, 18, 23, 26, 27, 30, 31, 32, 35, 37 and 43, and
(b) an isolated peptide comprising an amino acid sequence modified by substituting, deleting, inserting or adding 1 or 2 amino acid residues to an amino acid sequence selected from the group consisting of SEQ ID NOs: 38, 3, 4, 7, 18, 23, 26, 27, 30, 31, 32, 35, 37 and 43, provided said modified peptide has the CTL inducibility.
[0016b] In another aspect, there is provided an isolated polynucleotide encoding the peptide as described herein.
[0016c] In another aspect, there is provided a composition comprising one or more peptide(s) as described herein, or one or more polynucleotide(s) as described herein.
[0016d] In another aspect, there is provided use of a composition as described herein in the manufacture of a medicament for the treatment of cancer overexpressing HJURP.
[0016e] In another aspect, there is provided a method for inducing an antigen-presenting cell (APC) having CTL inducibility, the method comprising a step selected from the group consisting of: (a) contacting an APC with the peptide as described herein in vitro or ex vivo, and (b) introducing a polynucleotide encoding the peptide as described herein into an APC in vitro or ex vivo.
[0016f] In another aspect, there is provided an in vitro method for inducing a CTL, the method comprising a step selected from the group consisting of: (a) co-culturing CD8 positive T cells with APCs that present on the surface a complex of an HLA antigen and the peptide as described herein; (b) co-culturing CD8 positive T cells with exosomes that presents on the surface a complex of an HLA antigen and the peptide as described herein; and (c) introducing a gene that comprises a polynucleotide encoding a T cell receptor (TCR) subunit polypeptide binding to the peptide as described herein into a T cell.
[0016g] In another aspect, there is provided an isolated APC that presents on its surface a complex of an HLA antigen and the peptide as described herein.
[0016h] In another aspect, there is provided an isolated CTL that targets the peptide as described herein.

Claims

1. An isolated peptide of less than 15 amino acids selected from the group consisting of:

(a) an isolated peptide comprising an amino acid sequence selected from the group consisting of SEQ ID NOs: 38, 3, 4, 7, 18, 23, 26, 27, 30, 31, 32, 35, 37 and 43, and

(b) an isolated peptide comprising an amino acid sequence modified by substituting, deleting, inserting or adding 1 or 2 amino acid residues to an amino acid sequence selected from the group consisting of SEQ ID NOs: 38, 3, 4, 7, 18, 23, 26, 27, 30, 31, 32, 35, 37 and 43, provided said modified peptide has the CTL inducibility.

2. The isolated peptide of claim 1, wherein the peptide has one or both of the following characteristics:

(a) the second amino acid from the N-terminus of the amino acid sequence of SEQ ID NO: 38, 26, 27, 30, 31, 32, 35, 37 or 43 is substituted with an amino acid selected from the group consisting of leucine and methionine; and

(b) the C-terminal amino acid of the amino acid sequence of SEQ ID NO: 38, 26, 27, 30, 31, 32, 35, 37 or 43 is substituted with an amino acid selected from the group consisting of valine and leucine.

3. The isolated peptide of claim 1, wherein the peptide has one or both of the following characteristics:

(a) the second amino acid from N-terminus of the amino acid sequence of SEQ ID NO: 3, 4, 7, 18 or 23 is substituted with an amino acid selected from the group consisting of phenylalanine, tyrosine, methionine and tryptophan; and

(b) the C-terminal amino acid of the amino acid sequence of SEQ ID NO: 3, 4, 7, 18 or 23 is substituted with an amino acid selected from the group consisting of phenylalanine, leucine, isoleucine, tryptophan and methionine.

4. The isolated peptide of any one of claims 1 to 3, wherein said peptide is a nonapeptide or decapeptide.

5. The isolated peptide of claim 4, wherein said peptide consists of the amino acid sequences

selected from the group consisting of SEQ ID NOs: 38, 26, 27, 30, 31, 32, 35, 37, 43, 3, 4, 7, 18 and 23.

6. An isolated polynucleotide encoding the peptide of any one of claims 1 to 5.

7. A composition comprising one or more peptide(s) of any one of claims 1 to 5, or one or more polynucleotide(s) of claim 6.

8. Use of a composition of claim 7 in the manufacture of a medicament for the treatment of cancer overexpressing HJURP.

9. The use according to claim 8, wherein said pharmaceutical composition is formulated for the administration to a subject whose HLA antigen is HLA-A2 or HLA-A24.

10. A method for inducing an antigen-presenting cell (APC) having CTL inducibility, the method comprising a step selected from the group consisting of:

(a) contacting an APC with the peptide of any one of claims 1 to 5 in vitro or ex vivo, and

(b) introducing a polynucleotide encoding the peptide of any one of claims 1 to 5 into an APC in vitro or ex vivo.

11. An in vitro method for inducing a CTL, the method comprising a step selected from the group consisting of:

(a) co-culturing CD8 positive T cells with APCs that present on the surface a complex of an HLA antigen and the peptide of any one of claims 1 to 5;

(b) co-culturing CD8 positive T cells with exosomes that presents on the surface a complex of an HLA antigen and the peptide of any one of claims 1 to 5; and

(c) introducing a gene that comprises a polynucleotide encoding a T cell receptor (TCR) subunit polypeptide binding to the peptide of any one of claims 1 to 5 into a T cell.

12. An isolated APC that presents on its surface a complex of an HLA antigen and the peptide of any one of claims 1 to 5.

13. The APC of claim 12, which is induced by the method of claim 10.

14. An isolated CTL that targets the peptide of any one of claims 1 to 5.

15. The CTL of claim 14, which is induced by the method of claim 11.

16. Use of a composition of claim 7 in the manufacture of a medicament for inducing an immune response against cancer overexpressing HJURP in a subject in need thereof.

17. An antibody or immunologically active fragment thereof against the peptide of any one of claims 1 to 5.

18. A vector comprising a polynucleotide encoding the peptide of any one of claims 1 to 5.

19. A diagnostic kit comprising the peptide of any one of claims 1 to 5, the polynucleotide of claim 6 or the antibody of claim 17.

20. An exosome that presents a complex comprising the peptide of any one of claims 1 to 5 and an HLA antigen.