**CLAIMS:**

1. A tumor antigen peptide (TAP) comprising or consisting of any one of the amino acid sequences set forth in SEQ ID NOs: 4, 1-3 and 5-35.

2. The TAP of claim 1, wherein the TAP binds to (i) an HLA-A*02:01 molecule and comprises or consists of the sequence of SEQ ID NO: 22; (ii) an HLA-A*03:01 molecule and comprises or consists of the sequence of SEQ ID NO: 19; (iii) an HLA-A*11:01 molecule and comprises or consists of the sequence of SEQ ID NO: 1, 17 or 28; (iv) an HLA-A*24:02 molecule and comprises or consists of the sequence of SEQ ID NO: 6 or 30; (v) an HLA-A*25:01 molecule and comprises or consists of the sequence of SEQ ID NO: 10; (vi) an HLA-A*26:01 molecule and comprises or consists of the sequence of SEQ ID NO: 15; (vii) an HLA-A*31:01 molecule and comprises or consists of the sequence of SEQ ID NO: 8, 9 or 29; (viii) an HLA-A*33:01 molecule and comprises or consists of the sequence of SEQ ID NO: 2 or 3; (ix) an HLA-B*15:01 molecule and comprises or consists of the sequence of SEQ ID NO: 26; (x) an HLA-B*18:01 molecule and comprises or consists of the sequence of SEQ ID NO: 13, 14 or 33; (xi) an HLA-B*27:05 molecule and comprises or consists of the sequence of SEQ ID NO: 27; (xii) an HLA-B*35:01 molecule and comprises or consists of the sequence of SEQ ID NO: 4, 12 or 23; (xiii) an HLA-B*35:03 molecule and comprises or consists of the sequence of SEQ ID NO: 38; (xiv) an HLA-B*38:01 molecule and comprises or consists of the sequence of SEQ ID NO: 34; (xv) an HLA-B*40:01 molecule and comprises or consists of the sequence of SEQ ID NO: 20; (xvi) an HLA-B*49:01 molecule and comprises or consists of the sequence of SEQ ID NO: 11 or 24; (xvii) an HLA-B*50:01 molecule and comprises or consists of the sequence of SEQ ID NO: 5 or 7; (xviii) an HLA-B*51:01 molecule and comprises or consists of the sequence of SEQ ID NO: 35 or 37; (xix) an HLA-B*52:01 molecule and comprises or consists of the sequence of SEQ ID NO: 18; (xx) an HLA-B*58:01 molecule and comprises or consists of the sequence of SEQ ID NO: 36; (xxi) an HLA-C*01:02 molecule and comprises or consists of the sequence of SEQ ID NO: 25; or (xxii) an HLA-C*12:03 molecule and comprises or consists of the sequence of SEQ ID NO: 16 or 21.

3. The TAP of any one of claims 1-2, which is encoded by a sequence located a non-protein coding region of the genome.

4. The TAP of claim 3, wherein said non-protein coding region of the genome is an intergenic region or a long non-coding RNAs.

5. A combination comprising at least two of the TAPs defined in any one of claims 1-4.

6. A synthetic long peptide (SLP) comprising at least one of the amino acid sequences defined in claim 1.

7. The SLP of claim 6, wherein the SLP comprises at least 5, 10, 15 or 20 of the amino acid sequences defined in claim 1.

8. A nucleic acid encoding the TAP defined in any one of claims 1-4, the combination of claim 5, or the SLP of claim 6 or 7.

9. The nucleic of claim 8, which is an mRNA.

10. A vesicle or particle comprising the TAP defined in any one of claims 1-4, the combination of claim 5, the SLP of claim 6 or 7, or the nucleic acid of claim 8 or 9.

11. The vesicle or particle of claim 10, which is a lipid nanoparticle (LNP).

12. The vesicle or particle of claim 10 or 11, which comprises a cationic lipid.

13. A composition comprising the TAP defined in any one of claims 1-4, the combination of claim 5, the SLP of claim 6 or 7, the nucleic acid of claim 8 or 9, or the vesicle or particle of any one of claims 10-12, and a pharmaceutically acceptable carrier.

14. A vaccine comprising the TAP defined in any one of claims 1-4, the combination of claim 5, the SLP of claim 6 or 7, the nucleic acid of claim 8 or 9, the vesicle or particle of any one of claims 10-12, or the composition of claim 13, and an adjuvant.

15. An isolated cell expressing at its surface major histocompatibility complex (MHC) class I molecules comprising the TAP of any one of claims 1 to 4 or the combination of claim 5 in their peptide binding groove.

16. The cell of claim 15, which is an antigen-presenting cell (APC).

17. The cell of claim 16, wherein said APC is a dendritic cell.

18. A T-cell receptor (TCR) that specifically recognizes MHC class I molecules expressed at the surface of the cell of any one of claims 15-17.

19. The TCR of claim 18, which is a soluble TCR.

20. An antibody or an antigen-binding fragment thereof that specifically binds to MHC class I molecules expressed at the surface of the cell of any one of claims 15-17.

21. The TCR of claim 18 or 19, or the antibody or antigen-binding fragment thereof according to claim 20, which is a bispecific TCR or a bispecific antibody or antigen-binding fragment thereof.

22. The TCR, antibody or antigen-binding fragment thereof according to claim 21, wherein the bispecific antibody or antigen-binding fragment thereof is a single-chain diabody (scDb).

23. The TCR, antibody or antigen-binding fragment thereof according to claim 21 or 22, wherein the bispecific TCR, antibody or antigen-binding fragment thereof also specifically binds to a T cell signaling molecule.

24. The TCR, antibody or antigen-binding fragment thereof according to claim 23, wherein the T cell signaling molecule is a CD3 chain.

25. A chimeric antigen receptor (CAR) comprising the antibody or an antigen-binding fragment thereof of claim 20, or a nucleic acid encoding said CAR.

26. An isolated cell expressing at its cell surface the TCR of claim 18 or the CAR of claim 25.

27. The isolated cell of claim 26, which is a $CD8^+$ T lymphocyte.

28. A cell population comprising at least 0.5% or 1% of the isolated cell as defined in claim 26 or 27.

29. Use of:

    (a) a TAP comprising or consisting of any one of the sequences set forth in SEQ ID NOs: 4, 1-3 and 5-61 or any combination thereof, or a synthetic long peptide (SLP) comprising at least one of the sequences set forth in SEQ ID NOs: 4, 1-3, and 5-61;

(b) at least one nucleic acid encoding the TAP, combination thereof or SLP defined in (a);

(c) a vesicle or particle comprising the TAP, combination thereof or SLP defined in (a) or the at least one nucleic acid defined in (b);

(d) a composition comprising the TAP, combination thereof or SLP defined in (a), the at least one nucleic acid defined in (b), or the vesicle or particle defined in (c), and a pharmaceutically acceptable carrier;

(e) a vaccine comprising the TAP, combination thereof or SLP defined in (a), the at least one nucleic acid defined in (b), the vesicle or particle defined in (c), or the composition defined in (d), and an adjuvant;

(f) a cell expressing at its surface major histocompatibility complex (MHC) class I molecules comprising the TAP or combination thereof defined in (a) in their peptide binding groove;

(g) a cell expressing at its cell surface a T-cell receptor (TCR) that specifically recognizes MHC class I molecules expressed at the surface of the cell defined in (f); or

(h) a soluble TCR, an antibody or an antigen-binding fragment thereof that specifically binds to the MHC class I molecules expressed at the surface of the cell defined in (f);

in the manufacture of a medicament for treating breast cancer in a subject.

30. The use of claim 29, wherein the breast cancer is hormone-receptor-positive breast cancer ($HR^+$) or triple-negative breast cancer (TNBC).

31. The use of claim 29 or 30, further comprising the use at least one additional antitumor agent or therapy to the subject.

32. The use of claim 31, wherein said at least one additional antitumor agent or therapy is a chemotherapeutic agent, immunotherapy, an immune checkpoint inhibitor, radiotherapy or surgery.

33. An agent for use in treating breast cancer in a subject, wherein the agent is:

(a) a TAP comprising or consisting of any one of the sequences set forth in SEQ ID NOs: 4, 1-3 and 5-61 or any combination thereof, or a synthetic long peptide (SLP) comprising at least one of the sequences set forth in SEQ ID NOs: 4, 1-3 and 5-61;

(b) at least one nucleic acid encoding the TAP, combination thereof or SLP defined in (a);

(c) a vesicle or particle comprising the TAP, combination thereof or SLP defined in (a) or the at least one nucleic acid defined in (b);

(d) a composition comprising the TAP, combination thereof or SLP defined in (a), the at least one nucleic acid defined in (b), or the vesicle or particle defined in (c), and a pharmaceutically acceptable carrier;

(e) a vaccine comprising the TAP, combination thereof or SLP defined in (a), the at least one nucleic acid defined in (b), the vesicle or particle defined in (c), or the composition defined in (d), and an adjuvant;

(f) a cell expressing at its surface major histocompatibility complex (MHC) class I molecules comprising the TAP or combination thereof defined in (a) in their peptide binding groove;

(g) a cell expressing at its cell surface a T-cell receptor (TCR) that specifically recognizes MHC class I molecules expressed at the surface of the cell defined in (f); or

(h) a soluble TCR, an antibody or an antigen-binding fragment thereof that specifically binds to the MHC class I molecules expressed at the surface of the cell defined in (f).