CLAIMS

1. A pharmaceutical composition comprising an adjuvant and:

(a) three or more of the peptides set forth in Table 3 or nucleic acids encoding three or more of the peptides set forth in Table 3;

(b) three or more of the peptides set forth in Table 7 or nucleic acids encoding three or more of the peptides set forth in Table 7;

(c) three or more of the peptides set forth in Table 9 or nucleic acids encoding three or more of the peptides set forth in Table 9;

(d) three or more of the peptides set forth in Table 11 or nucleic acids encoding three or more of the peptides set forth in Table 11;

(e) three or more of the peptides set forth in Table 13 or nucleic acids encoding three or more of the peptides set forth in Table 13;

(f) three or more of the peptides set forth in Table 15 or nucleic acids encoding three or more of the peptides set forth in Table 15; or

(g) three or more of the peptides set forth in Table 21 or nucleic acids encoding three or more of the peptides set forth in Table 21.

2. The pharmaceutical composition of claim 1, wherein the pharmaceutical composition comprises:

(a) four or more of the peptides set forth in Table 3 or nucleic acids encoding four or more of the peptides set forth in Table 3;

(b) four or more of the peptides set forth in Table 7 or nucleic acids encoding four or more of the peptides set forth in Table 7;

(c) four or more of the peptides set forth in Table 9 or nucleic acids encoding four or more of the peptides set forth in Table 9;

(d) four or more of the peptides set forth in Table 11 or nucleic acids encoding four or more of the peptides set forth in Table 11;

(e) four or more of the peptides set forth in Table 13 or nucleic acids encoding four or more of the peptides set forth in Table 13;

(f) four or more of the peptides set forth in Table 15 or nucleic acids encoding four or more of the peptides set forth in Table 15; or

(g) four or more of the peptides set forth in Table 21 or nucleic acids encoding four or more of the peptides set forth in Table 21.

3. The pharmaceutical composition of claim 1, wherein the pharmaceutical composition comprises:

(a) five or more of the peptides set forth in Table 3 or nucleic acids encoding five or more of the peptides set forth in Table 3;

(b) five or more of the peptides set forth in Table 7 or nucleic acids encoding five or more of the peptides set forth in Table 7;

(c) five or more of the peptides set forth in Table 9 or nucleic acids encoding five or more of the peptides set forth in Table 9;

(d) five or more of the peptides set forth in Table 11 or nucleic acids encoding five or more of the peptides set forth in Table 11;

(e) five or more of the peptides set forth in Table 13 or nucleic acids encoding five or more of the peptides set forth in Table 13;

(f) five or more of the peptides set forth in Table 15 or nucleic acids encoding five or more of the peptides set forth in Table 15; or

(g) five or more of the peptides set forth in Table 21 or nucleic acids encoding five or more of the peptides set forth in Table 21.

4. The pharmaceutical composition of claim 1, wherein the pharmaceutical composition comprises:

(a) six or more of the peptides set forth in Table 3 or nucleic acids encoding six or more of the peptides set forth in Table 3;

(b) six or more of the peptides set forth in Table 7 or nucleic acids encoding six or more of the peptides set forth in Table 7;

(c) six or more of the peptides set forth in Table 9 or nucleic acids encoding six or more of the peptides set forth in Table 9;

(d) six or more of the peptides set forth in Table 11 or nucleic acids encoding six or more of the peptides set forth in Table 11;

(e) six or more of the peptides set forth in Table 13 or nucleic acids encoding six or more of the peptides set forth in Table 13;

(f) six or more of the peptides set forth in Table 15 or nucleic acids encoding six or more of the peptides set forth in Table 15; or

(g) six or more of the peptides set forth in Table 21 or nucleic acids encoding six or more of the peptides set forth in Table 21.

5. The pharmaceutical composition of claim 1, wherein the pharmaceutical composition comprises:

(a) seven or more of the peptides set forth in Table 3 or nucleic acids encoding seven or more of the peptides set forth in Table 3;

(b) seven or more of the peptides set forth in Table 7 or nucleic acids encoding seven or more of the peptides set forth in Table 7;

(c) seven or more of the peptides set forth in Table 9 or nucleic acids encoding seven or more of the peptides set forth in Table 9;

(d) seven or more of the peptides set forth in Table 11 or nucleic acids encoding seven or more of the peptides set forth in Table 11;

(e) seven or more of the peptides set forth in Table 13 or nucleic acids encoding seven or more of the peptides set forth in Table 13;

(f) seven or more of the peptides set forth in Table 15 or nucleic acids encoding seven or more of the peptides set forth in Table 15; or

(g) seven or more of the peptides set forth in Table 21 or nucleic acids encoding seven or more of the peptides set forth in Table 21.

6. The pharmaceutical composition of claim 1, wherein the pharmaceutical composition comprises:

(a) eight or more of the peptides set forth in Table 3 or nucleic acids encoding eight or more of the peptides set forth in Table 3;

(b) eight or more of the peptides set forth in Table 7 or nucleic acids encoding eight or more of the peptides set forth in Table 7;

(c) eight or more of the peptides set forth in Table 9 or nucleic acids encoding eight or more of the peptides set forth in Table 9;

(d) eight or more of the peptides set forth in Table 11 or nucleic acids encoding eight or more of the peptides set forth in Table 11;

(e) eight or more of the peptides set forth in Table 13 or nucleic acids encoding eight or more of the peptides set forth in Table 13;

(f) eight or more of the peptides set forth in Table 15 or nucleic acids encoding eight or more of the peptides set forth in Table 15; or

(g) eight or more of the peptides set forth in Table 21 or nucleic acids encoding eight or more of the peptides set forth in Table 21.

7. The pharmaceutical composition of claim 1, wherein the pharmaceutical composition comprises:

(a) nine or more of the peptides set forth in Table 3 or nucleic acids encoding nine or more of the peptides set forth in Table 3;

(b) nine or more of the peptides set forth in Table 7 or nucleic acids encoding nine or more of the peptides set forth in Table 7;

(c) nine or more of the peptides set forth in Table 9 or nucleic acids encoding nine or more of the peptides set forth in Table 9;

(d) nine or more of the peptides set forth in Table 11 or nucleic acids encoding nine or more of the peptides set forth in Table 11;

(e) nine or more of the peptides set forth in Table 13 or nucleic acids encoding nine or more of the peptides set forth in Table 13;

(f) nine or more of the peptides set forth in Table 15 or nucleic acids encoding nine or more of the peptides set forth in Table 15; or

(g) nine or more of the peptides set forth in Table 21 or nucleic acids encoding nine or more of the peptides set forth in Table 21.

8. The pharmaceutical composition of claim 1, wherein the pharmaceutical composition comprises:

(a) ten or more of the peptides set forth in Table 3 or nucleic acids encoding ten or more of the peptides set forth in Table 3;

(b) ten or more of the peptides set forth in Table 7 or nucleic acids encoding ten or more of the peptides set forth in Table 7;

(c) ten or more of the peptides set forth in Table 9 or nucleic acids encoding ten or more of the peptides set forth in Table 9;

(d) ten or more of the peptides set forth in Table 11 or nucleic acids encoding ten or more of the peptides set forth in Table 11;

(e) ten or more of the peptides set forth in Table 13 or nucleic acids encoding ten or more of the peptides set forth in Table 13;

(f) ten or more of the peptides set forth in Table 15 or nucleic acids encoding ten or more of the peptides set forth in Table 15; or

(g) ten or more of the peptides set forth in Table 21 or nucleic acids encoding ten or more of the peptides set forth in Table 21.

9. The pharmaceutical composition of any one of claims 1-8, wherein the adjuvant comprises a detoxified listeriolysin O (dtLLO), a granulocyte/macrophage colony-stimulating factor (GM-CSF) protein, a nucleotide molecule encoding a GM-CSF protein, saponin QS21, monophosphoryl lipid A, an unmethylated CpG-containing oligonucleotide, or Montanide ISA 51.

10. The pharmaceutical composition of any one of claims 1-9, wherein the pharmaceutical composition comprises peptides or nucleic acids encoding peptides that bind to one or more of the following HLA types: HLA-A*02:01, HLA-A*03:01, HLA-A*24:02, and HLA-B*07:02.

11. The pharmaceutical composition of any one of claims 1-10, wherein the pharmaceutical composition comprises peptides or nucleic acids encoding peptides that bind to each of the following HLA types: HLA-A*02:01, HLA-A*03:01, HLA-A*24:02, and HLA-B*07:02.

12. The pharmaceutical composition of any one of claims 1-11, wherein the pharmaceutical composition comprises:

(a) all of the peptides set forth in Table 3 or nucleic acids encoding all of the peptides set forth in Table 3;

(b) all of the peptides set forth in Table 7 or nucleic acids encoding all of the peptides set forth in Table 7;

(c) all of the peptides set forth in Table 9 or nucleic acids encoding all of the peptides set forth in Table 9;

(d) all of the peptides set forth in Table 11 or nucleic acids encoding all of the peptides set forth in Table 11;

(e) all of the peptides set forth in Table 13 or nucleic acids encoding all of the peptides set forth in Table 13;

(f) all of the peptides set forth in Table 15 or nucleic acids encoding all of the peptides set forth in Table 15; or

(g) all of the peptides set forth in Table 21 or nucleic acids encoding all of the peptides set forth in Table 21.

13. The pharmaceutical composition of any one of claims 1-12, wherein the nucleic acids are codon optimized for expression in humans.

14. The pharmaceutical composition of any one of claims 1-12, wherein the nucleic acids are codon optimized for expression in *Listeria monocytogenes*.

15. The pharmaceutical composition of any one of claims 1-14, wherein the nucleic acids comprise DNA.

16. The pharmaceutical composition of any one of claims 1-14, wherein the nucleic acids comprise RNA.

17. A recombinant bacteria comprising a nucleic acid encoding peptides comprising:

(a) three or more of the peptides set forth in Table 3 or nucleic acids encoding three or more of the peptides set forth in Table 3;

(b) three or more of the peptides set forth in Table 7 or nucleic acids encoding three or more of the peptides set forth in Table 7;

(c) three or more of the peptides set forth in Table 9 or nucleic acids encoding three or more of the peptides set forth in Table 9;

(d) three or more of the peptides set forth in Table 11 or nucleic acids encoding three or more of the peptides set forth in Table 11;

(e) three or more of the peptides set forth in Table 13 or nucleic acids encoding three or more of the peptides set forth in Table 13;

(f) three or more of the peptides set forth in Table 15 or nucleic acids encoding three or more of the peptides set forth in Table 15; or

(g) three or more of the peptides set forth in Table 21 or nucleic acids encoding three or more of the peptides set forth in Table 21.

18. The recombinant bacteria strain of claim 17, wherein the peptides comprise:

(a) four or more of the peptides set forth in Table 3 or nucleic acids encoding four or more of the peptides set forth in Table 3;

(b) four or more of the peptides set forth in Table 7 or nucleic acids encoding four or more of the peptides set forth in Table 7;

(c) four or more of the peptides set forth in Table 9 or nucleic acids encoding four or more of the peptides set forth in Table 9;

(d) four or more of the peptides set forth in Table 11 or nucleic acids encoding four or more of the peptides set forth in Table 11;

(e) four or more of the peptides set forth in Table 13 or nucleic acids encoding four or more of the peptides set forth in Table 13;

(f) four or more of the peptides set forth in Table 15 or nucleic acids encoding four or more of the peptides set forth in Table 15; or

(g) four or more of the peptides set forth in Table 21 or nucleic acids encoding four or more of the peptides set forth in Table 21.

19. The recombinant bacteria strain of claim 17, wherein the peptides comprise:

(a) five or more of the peptides set forth in Table 3 or nucleic acids encoding five or more of the peptides set forth in Table 3;

(b) five or more of the peptides set forth in Table 7 or nucleic acids encoding five or more of the peptides set forth in Table 7;

(c) five or more of the peptides set forth in Table 9 or nucleic acids encoding five or more of the peptides set forth in Table 9;

(d) five or more of the peptides set forth in Table 11 or nucleic acids encoding five or more of the peptides set forth in Table 11;

(e) five or more of the peptides set forth in Table 13 or nucleic acids encoding five or more of the peptides set forth in Table 13;

(f) five or more of the peptides set forth in Table 15 or nucleic acids encoding five or more of the peptides set forth in Table 15; or

(g) five or more of the peptides set forth in Table 21 or nucleic acids encoding five or more of the peptides set forth in Table 21.

20. The recombinant bacteria strain of claim 17, wherein the peptides comprise:

(a) six or more of the peptides set forth in Table 3 or nucleic acids encoding six or more of the peptides set forth in Table 3;

(b) six or more of the peptides set forth in Table 7 or nucleic acids encoding six or more of the peptides set forth in Table 7;

(c) six or more of the peptides set forth in Table 9 or nucleic acids encoding six or more of the peptides set forth in Table 9;

(d) six or more of the peptides set forth in Table 11 or nucleic acids encoding six or more of the peptides set forth in Table 11;

(e) six or more of the peptides set forth in Table 13 or nucleic acids encoding six or more of the peptides set forth in Table 13;

(f) six or more of the peptides set forth in Table 15 or nucleic acids encoding six or more of the peptides set forth in Table 15; or

(g) six or more of the peptides set forth in Table 21 or nucleic acids encoding six or more of the peptides set forth in Table 21.

21. The recombinant bacteria strain of claim 17, wherein the peptides comprise:

(a) seven or more of the peptides set forth in Table 3 or nucleic acids encoding seven or more of the peptides set forth in Table 3;

(b) seven or more of the peptides set forth in Table 7 or nucleic acids encoding seven or more of the peptides set forth in Table 7;

(c) seven or more of the peptides set forth in Table 9 or nucleic acids encoding seven or more of the peptides set forth in Table 9;

(d) seven or more of the peptides set forth in Table 11 or nucleic acids encoding seven or more of the peptides set forth in Table 11;

(e) seven or more of the peptides set forth in Table 13 or nucleic acids encoding seven or more of the peptides set forth in Table 13;

(f) seven or more of the peptides set forth in Table 15 or nucleic acids encoding seven or more of the peptides set forth in Table 15; or

(g) seven or more of the peptides set forth in Table 21 or nucleic acids encoding seven or more of the peptides set forth in Table 21.

22. The recombinant bacteria strain of claim 17, wherein the peptides comprise:

(a) eight or more of the peptides set forth in Table 3 or nucleic acids encoding eight or more of the peptides set forth in Table 3;

(b) eight or more of the peptides set forth in Table 7 or nucleic acids encoding eight or more of the peptides set forth in Table 7;

(c) eight or more of the peptides set forth in Table 9 or nucleic acids encoding eight or more of the peptides set forth in Table 9;

(d) eight or more of the peptides set forth in Table 11 or nucleic acids encoding eight or more of the peptides set forth in Table 11;

(e) eight or more of the peptides set forth in Table 13 or nucleic acids encoding eight or more of the peptides set forth in Table 13;

(f) eight or more of the peptides set forth in Table 15 or nucleic acids encoding eight or more of the peptides set forth in Table 15; or

(g) eight or more of the peptides set forth in Table 21 or nucleic acids encoding eight or more of the peptides set forth in Table 21.

23. The recombinant bacteria strain of claim 17, wherein the peptides comprise:

(a) nine or more of the peptides set forth in Table 3 or nucleic acids encoding nine or more of the peptides set forth in Table 3;

(b) nine or more of the peptides set forth in Table 7 or nucleic acids encoding nine or more of the peptides set forth in Table 7;

(c) nine or more of the peptides set forth in Table 9 or nucleic acids encoding nine or more of the peptides set forth in Table 9;

(d) nine or more of the peptides set forth in Table 11 or nucleic acids encoding nine or more of the peptides set forth in Table 11;

(e) nine or more of the peptides set forth in Table 13 or nucleic acids encoding nine or more of the peptides set forth in Table 13;

(f) nine or more of the peptides set forth in Table 15 or nucleic acids encoding nine or more of the peptides set forth in Table 15; or

(g) nine or more of the peptides set forth in Table 21 or nucleic acids encoding nine or more of the peptides set forth in Table 21.

24. The recombinant bacteria strain of claim 17, wherein the peptides comprise:

(a) ten or more of the peptides set forth in Table 3 or nucleic acids encoding ten or more of the peptides set forth in Table 3;

(b) ten or more of the peptides set forth in Table 7 or nucleic acids encoding ten or more of the peptides set forth in Table 7;

(c) ten or more of the peptides set forth in Table 9 or nucleic acids encoding ten or more of the peptides set forth in Table 9;

(d) ten or more of the peptides set forth in Table 11 or nucleic acids encoding ten or more of the peptides set forth in Table 11;

(e) ten or more of the peptides set forth in Table 13 or nucleic acids encoding ten or more of the peptides set forth in Table 13;

(f) ten or more of the peptides set forth in Table 15 or nucleic acids encoding ten or more of the peptides set forth in Table 15; or

(g) ten or more of the peptides set forth in Table 21 or nucleic acids encoding ten or more of the peptides set forth in Table 21.

25. The recombinant bacteria strain of any one of claims 17-24, wherein the combination of peptides binds to one or more of the following HLA types: HLA-A*02:01, HLA-A*03:01, HLA-A*24:02, and HLA-B*07:02.

26. The recombinant bacteria strain of any one of claims 17-25, wherein the combination of peptides binds to each of the following HLA types: HLA-A*02:01, HLA-A*03:01, HLA-A*24:02, and HLA-B*07:02.

27. The recombinant bacteria strain of any one of claims 17-26, wherein the peptides comprise:

(a) all of the peptides set forth in Table 3 or nucleic acids encoding all of the peptides set forth in Table 3;

(b) all of the peptides set forth in Table 7 or nucleic acids encoding all of the peptides set forth in Table 7;

(c) all of the peptides set forth in Table 9 or nucleic acids encoding all of the peptides set forth in Table 9;

(d) all of the peptides set forth in Table 11 or nucleic acids encoding all of the peptides set forth in Table 11;

(e) all of the peptides set forth in Table 13 or nucleic acids encoding all of the peptides set forth in Table 13;

(f) all of the peptides set forth in Table 15 or nucleic acids encoding all of the peptides set forth in Table 15; or

(g) all of the peptides set forth in Table 21 or nucleic acids encoding all of the peptides set forth in Table 21.

28. The recombinant bacteria strain of any one of claims 17-27, wherein the bacteria strain is a *Salmonella*, *Listeria*, *Yersinia*, *Shigella*, or *Mycobacterium* strain.

29. The recombinant bacteria strain of claim 28, wherein the bacteria strain is a *Listeria* strain, optionally wherein the *Listeria* strain is a *Listeria monocytogenes* strain.

30. A recombinant *Listeria* strain comprising a nucleic acid comprising a first open reading frame encoding a fusion polypeptide, wherein the fusion polypeptide comprises a PEST-containing peptide fused to immunogenic fragments comprising:

(a) three or more of the peptides set forth in Table 3;

(b) three or more of the peptides set forth in Table 7;

(c) three or more of the peptides set forth in Table 9;

(d) three or more of the peptides set forth in Table 11;

(e) three or more of the peptides set forth in Table 13;

(f) three or more of the peptides set forth in Table 15; or

(g) three or more of the peptides set forth in Table 21.

31. The recombinant *Listeria* strain of claim 30, wherein the immunogenic fragments comprise:

(a) four or more of the peptides set forth in Table 3 or nucleic acids encoding four or more of the peptides set forth in Table 3;

(b) four or more of the peptides set forth in Table 7 or nucleic acids encoding four or more of the peptides set forth in Table 7;

(c) four or more of the peptides set forth in Table 9 or nucleic acids encoding four or more of the peptides set forth in Table 9;

(d) four or more of the peptides set forth in Table 11 or nucleic acids encoding four or more of the peptides set forth in Table 11;

(e) four or more of the peptides set forth in Table 13 or nucleic acids encoding four or more of the peptides set forth in Table 13;

(f) four or more of the peptides set forth in Table 15 or nucleic acids encoding four or more of the peptides set forth in Table 15; or

(g) four or more of the peptides set forth in Table 21 or nucleic acids encoding four or more of the peptides set forth in Table 21.

32. The recombinant *Listeria* strain of claim 30, wherein the immunogenic fragments comprise:

(a) five or more of the peptides set forth in Table 3 or nucleic acids encoding five or more of the peptides set forth in Table 3;

(b) five or more of the peptides set forth in Table 7 or nucleic acids encoding five or more of the peptides set forth in Table 7;

(c) five or more of the peptides set forth in Table 9 or nucleic acids encoding five or more of the peptides set forth in Table 9;

(d) five or more of the peptides set forth in Table 11 or nucleic acids encoding five or more of the peptides set forth in Table 11;

(e) five or more of the peptides set forth in Table 13 or nucleic acids encoding five or more of the peptides set forth in Table 13;

(f) five or more of the peptides set forth in Table 15 or nucleic acids encoding five or more of the peptides set forth in Table 15; or

(g) five or more of the peptides set forth in Table 21 or nucleic acids encoding five or more of the peptides set forth in Table 21.

33. The recombinant *Listeria* strain of claim 30, wherein the immunogenic fragments comprise:

(a) six or more of the peptides set forth in Table 3 or nucleic acids encoding six or more of the peptides set forth in Table 3;

(b) six or more of the peptides set forth in Table 7 or nucleic acids encoding six or more of the peptides set forth in Table 7;

(c) six or more of the peptides set forth in Table 9 or nucleic acids encoding six or more of the peptides set forth in Table 9;

(d) six or more of the peptides set forth in Table 11 or nucleic acids encoding six or more of the peptides set forth in Table 11;

(e) six or more of the peptides set forth in Table 13 or nucleic acids encoding six or more of the peptides set forth in Table 13;

(f) six or more of the peptides set forth in Table 15 or nucleic acids encoding six or more of the peptides set forth in Table 15; or

(g) six or more of the peptides set forth in Table 21 or nucleic acids encoding six or more of the peptides set forth in Table 21.

34. The recombinant *Listeria* strain of claim 30, wherein the immunogenic fragments comprise:

(a) seven or more of the peptides set forth in Table 3 or nucleic acids encoding seven or more of the peptides set forth in Table 3;

(b) seven or more of the peptides set forth in Table 7 or nucleic acids encoding seven or more of the peptides set forth in Table 7;

(c) seven or more of the peptides set forth in Table 9 or nucleic acids encoding seven or more of the peptides set forth in Table 9;

(d) seven or more of the peptides set forth in Table 11 or nucleic acids encoding seven or more of the peptides set forth in Table 11;

(e) seven or more of the peptides set forth in Table 13 or nucleic acids encoding seven or more of the peptides set forth in Table 13;

(f) seven or more of the peptides set forth in Table 15 or nucleic acids encoding seven or more of the peptides set forth in Table 15; or

(g) seven or more of the peptides set forth in Table 21 or nucleic acids encoding seven or more of the peptides set forth in Table 21.

35. The recombinant *Listeria* strain of claim 30, wherein the immunogenic fragments comprise:

(a) eight or more of the peptides set forth in Table 3 or nucleic acids encoding eight or more of the peptides set forth in Table 3;

(b) eight or more of the peptides set forth in Table 7 or nucleic acids encoding eight or more of the peptides set forth in Table 7;

(c) eight or more of the peptides set forth in Table 9 or nucleic acids encoding eight or more of the peptides set forth in Table 9;

(d) eight or more of the peptides set forth in Table 11 or nucleic acids encoding eight or more of the peptides set forth in Table 11;

(e) eight or more of the peptides set forth in Table 13 or nucleic acids encoding eight or more of the peptides set forth in Table 13;

(f) eight or more of the peptides set forth in Table 15 or nucleic acids encoding eight or more of the peptides set forth in Table 15; or

(g) eight or more of the peptides set forth in Table 21 or nucleic acids encoding eight or more of the peptides set forth in Table 21.

36. The recombinant *Listeria* strain of claim 30, wherein the immunogenic fragments comprise:

(a) nine or more of the peptides set forth in Table 3 or nucleic acids encoding nine or more of the peptides set forth in Table 3;

(b) nine or more of the peptides set forth in Table 7 or nucleic acids encoding nine or more of the peptides set forth in Table 7;

(c) nine or more of the peptides set forth in Table 9 or nucleic acids encoding nine or more of the peptides set forth in Table 9;

(d) nine or more of the peptides set forth in Table 11 or nucleic acids encoding nine or more of the peptides set forth in Table 11;

(e) nine or more of the peptides set forth in Table 13 or nucleic acids encoding nine or more of the peptides set forth in Table 13;

(f) nine or more of the peptides set forth in Table 15 or nucleic acids encoding nine or more of the peptides set forth in Table 15; or

(g) nine or more of the peptides set forth in Table 21 or nucleic acids encoding nine or more of the peptides set forth in Table 21.

37. The recombinant *Listeria* strain of claim 30, wherein the immunogenic fragments comprise:

(a) ten or more of the peptides set forth in Table 3 or nucleic acids encoding ten or more of the peptides set forth in Table 3;

(b) ten or more of the peptides set forth in Table 7 or nucleic acids encoding ten or more of the peptides set forth in Table 7;

(c) ten or more of the peptides set forth in Table 9 or nucleic acids encoding ten or more of the peptides set forth in Table 9;

(d) ten or more of the peptides set forth in Table 11 or nucleic acids encoding ten or more of the peptides set forth in Table 11;

(e) ten or more of the peptides set forth in Table 13 or nucleic acids encoding ten or more of the peptides set forth in Table 13;

(f) ten or more of the peptides set forth in Table 15 or nucleic acids encoding ten or more of the peptides set forth in Table 15; or

(g) ten or more of the peptides set forth in Table 21 or nucleic acids encoding ten or more of the peptides set forth in Table 21.

38. The recombinant *Listeria* strain of any one of claims 30-37, wherein the combination of immunogenic fragments binds to one or more of the following HLA types: HLA-A*02:01, HLA-A*03:01, HLA-A*24:02, and HLA-B*07:02.

39. The recombinant *Listeria* strain of any one of claims 30-38, wherein the combination of immunogenic fragments binds to each of the following HLA types: HLA-A*02:01, HLA-A*03:01, HLA-A*24:02, and HLA-B*07:02.

40. The recombinant *Listeria* strain of any one of claims 30-39, wherein the immunogenic fragments comprise:

(a) all of the peptides set forth in Table 3;

(b) all of the peptides set forth in Table 7;

(c) all of the peptides set forth in Table 9;

(d) all of the peptides set forth in Table 11;

(e) all of the peptides set forth in Table 13;

(f) all of the peptides set forth in Table 15; or

(g) all of the peptides set forth in Table 21.

41. The recombinant *Listeria* strain of any one of claims 30-40, wherein the PEST-containing peptide comprises a bacterial secretion signal sequence, and the fusion polypeptide further comprises a ubiquitin protein fused to a carboxy-terminal antigenic peptide, wherein the PEST-containing peptide, the ubiquitin, and the carboxy-terminal antigenic peptide are arranged in tandem from the amino-terminal end to the carboxy-terminal end of the fusion polypeptide.

42. The recombinant *Listeria* strain of any one of claims 30-41, wherein the immunogenic fragments are fused directly to each other without intervening sequence.

43. The recombinant *Listeria* strain of any one of claims 30-41, wherein the immunogenic fragments are linked to each other via peptide linkers.

44. The recombinant *Listeria* strain of claim 43, wherein one or more of the linkers set forth in SEQ ID NOS: 209-217 are used to link the immunogenic fragments.

45. The recombinant *Listeria* strain of any one of claims 30-44, wherein the PEST-containing peptide is on the N-terminal end of the fusion polypeptide.

46. The recombinant *Listeria* strain of claim 45, wherein the PEST-containing peptide is an N-terminal fragment of LLO.

47. The recombinant *Listeria* strain of claim 46, wherein the N-terminal fragment of LLO has the sequence set forth in SEQ ID NO: 59.

48. The recombinant *Listeria* strain of any one of claims 30-47, wherein the nucleic acid is in an episomal plasmid.

49. The recombinant *Listeria* strain of any one of claims 30-48, wherein the nucleic acid does not confer antibiotic resistance upon the recombinant *Listeria* strain.

50. The recombinant *Listeria* strain of any one of claims 30-49, wherein the recombinant *Listeria* strain is an attenuated, auxotrophic *Listeria* strain.

51. The recombinant *Listeria* strain of claim 50, wherein the attenuated, auxotrophic *Listeria* strain comprises a mutation in one or more endogenous genes that inactivates the one or more endogenous genes.

52. The recombinant *Listeria* strain of claim 51, wherein the one or more endogenous genes comprise *actA*, *dal*, and *dat*.

53. The recombinant *Listeria* strain of any one of claims 30-52, wherein the nucleic acid comprises a second open reading frame encoding a metabolic enzyme.

54. The recombinant *Listeria* strain of claim 53, wherein the metabolic enzyme is an alanine racemase enzyme or a D-amino acid aminotransferase enzyme.

55. The recombinant *Listeria* strain of any one of claims 30-54, wherein the fusion polypeptide is expressed from an *hly* promoter.

56. The recombinant *Listeria* strain of any one of claims 30-55, wherein the recombinant *Listeria* strain is a recombinant *Listeria monocytogenes* strain.

57. The recombinant *Listeria* strain of any one of claims 30-56, wherein the recombinant *Listeria* strain is an attenuated *Listeria monocytogenes* strain comprising a deletion

of or inactivating mutation in *actA*, *dal*, and *dat*, wherein the nucleic acid is in an episomal plasmid and comprises a second open reading frame encoding an alanine racemase enzyme or a D-amino acid aminotransferase enzyme, and wherein the PEST-containing peptide is an N-terminal fragment of LLO.

58. An immunogenic composition comprising:

(a) the recombinant bacteria strain of any one of claims 17-29 or the recombinant *Listeria* strain of any one of claims 30-57; and

(b) an adjuvant.

59. The immunogenic composition of claim 58, wherein the adjuvant comprises a detoxified listeriolysin O (dtLLO), a granulocyte/macrophage colony-stimulating factor (GM-CSF) protein, a nucleotide molecule encoding a GM-CSF protein, saponin QS21, monophosphoryl lipid A, or an unmethylated CpG-containing oligonucleotide

60. The use of a composition in the manufacture of a medicament for inducing or enhancing an immune response against a tumor or cancer in a subject, wherein the composition comprises the pharmaceutical composition of any one of claims 1-16, the recombinant bacteria strain of any one of claims 17-29, the recombinant *Listeria* strain of any one of claims 30-57, or the immunogenic composition of any one of claims 58-59.

61. The use of a composition in the manufacture of a medicament for preventing or treating a tumor or cancer in a subject, wherein the composition comprises the pharmaceutical composition of any one of claims 1-16, the recombinant bacteria strain of any one of claims 17-29, the recombinant *Listeria* strain of any one of claims 30-57, or the immunogenic composition of any one of claims 58-59.

62. The use of a composition of claim 60 or 61, wherein the cancer is non-small cell lung cancer, prostate cancer, pancreatic cancer, bladder cancer, breast cancer, uterine cancer, ovarian cancer, low-grade glioma, colorectal cancer, or head and neck cancer.