CLAIMS

WHAT IS CLAIMED IS:

1. A polypeptide comprising the amino acid sequence as set forth in any one of SEQ ID NOs:15, 24, 25, 26, 1-11, 14, 16-23, or 27-36.

2. The polypeptide of claim 1, comprising the amino acid sequence as set forth in SEQ ID NO:15.

3. The polypeptide of claim 1, comprising the amino acid sequence as set forth in SEQ ID NO:24.

4. The polypeptide of claim 1, comprising the amino acid sequence as set forth in SEQ ID NO:25.

5. The polypeptide of claim 1, comprising the amino acid sequence as set forth in SEQ ID NO:26.

6. A polypeptide comprising two or more amino acid sequences as set forth in SEQ ID NOs:24, 25, 26, 16-23, and 27-36.

7. The polypeptide of claim 6, comprising two or more amino acid sequences as set forth in SEQ ID NO:15 and 24-26.

8. The polypeptide of claim 7, comprising the amino acid sequences as set forth in SEQ ID NO:15 and 24-26.

9. The polypeptide of claim 6, wherein the polypeptide comprises the amino acid sequence as set forth in SEQ ID NO:19 or 29, the amino acid sequence as set forth in SEQ ID NO:16, 21, 27, 28, or 34, and the amino acid sequence as set forth in SEQ ID NO:20, 22, 23, 30, 31, 35, or 36.

10. The polypeptide of claim 6, wherein the polypeptide comprises the amino acid sequence as set forth in SEQ ID NO:3 and the amino acid sequence as set forth in SEQ ID NO:4.

11. The polypeptide of claim 6, wherein the polypeptide comprises the amino acid sequence as set forth in SEQ ID NO:5 and the amino acid sequence as set forth in SEQ ID NO:6.

12. The polypeptide of claim 6, wherein the polypeptide comprises the amino acid sequence as set forth in SEQ ID NO:7 and the amino acid sequence as set forth in SEQ ID NO:8.

13. The polypeptide of claim 6, wherein the polypeptide comprises the amino acid sequence as set forth in SEQ ID NO:9, the amino acid sequence as set forth in SEQ ID NO:10, and the amino acid sequence as set forth in SEQ ID NO:11.

14. The polypeptide of claim 9, further comprising one or more amino acid sequences as set forth in SEQ ID NOs:17 and 18.

15. A cytomegalovirus (CMV) vector comprising a polynucleotide comprising the sequence encoding one or more amino acid sequences as set forth in SEQ ID NOs:15, 24, 25, 26, 1-14, 16-23, and 27-36.

16. The CMV vector of claim 15, wherein the polynucleotide comprises the sequence encoding the amino acid sequence as set forth in SEQ ID NO:15.

17. The CMV vector of claim 15, wherein the polynucleotide comprises the sequence encoding the amino acid sequence as set forth in SEQ ID NO:24.

18. The CMV vector of claim 15, wherein the polynucleotide comprises the sequence encoding the amino acid sequence as set forth in SEQ ID NO:25.

19. The CMV vector of claim 15, wherein the polynucleotide comprises the sequence encoding the amino acid sequence as set forth in SEQ ID NO:26.

20. The CMV vector of claim 15, wherein the polynucleotide comprises the sequence encoding two or more amino acid sequences as set forth in SEQ ID NO:15 and 24-26.

21. The CMV vector of claim 20, wherein the polynucleotide comprises the sequence encoding the amino acid sequences as set forth in SEQ ID NO:15 and 24-26.

22. The CMV vector of claim 15, wherein the CMV vector is a human CMV (HCMV) vector or a rhesus CMV (RhCMV) vector.

23. The CMV vector of claim 15, wherein the CMV vector lacks the UL82 gene.

24. The CMV vector of claim 15, wherein the CMV vector lacks the UL128-UL130 gene region and lacks the UL146-UL147 gene region.

25. The CMV vector of claim 15, wherein the CMV vector has an intact UL128-UL130 gene region and an intact UL146-UL147 gene region.

26. The CMV vector of claim 15, wherein the one or more amino acid sequences comprise one or more of SEQ ID NOs:1-11, SEQ ID NOs:14-15, and SEQ ID NOs:24-26.

27. The CMV vector of claim 15, wherein the one or more amino acid sequences comprise one or more of SEQ ID NOs:16-23 and SEQ ID NOs: 27-36.

28. The CMV vector of claim 15, wherein the one or more amino acid sequences comprise two or more of SEQ ID NOs:16-23 and SEQ ID NOs: 27-36.

29. The CMV vector of claim 15, wherein the one or more amino acid sequences comprise:

a) the sequence as set forth in SEQ ID NO:19 or 29;

b) the sequence as set forth in any one of SEQ ID NOs:16, 21, 27, 28, or 34; and

c) the sequence as set forth in any one of SEQ ID NOs:20, 22, 23, 30, 31, 33, 35, or 36.

30. The CMV vector of claim 29, wherein the one or more amino acid sequences further comprise one or more of SEQ ID NOs:17 and 18.

31. The CMV vector of claim 27, wherein the sequences encoded by the polynucleotide are ordered for improved expression.

32. The CMV vector of claim 15, wherein the one or more amino acid sequences comprise:

a) the sequence as set forth in SEQ ID NO:3; and

b) the sequence as set forth in SEQ ID NO:4.

33. The CMV vector of claim 15, wherein the one or more amino acid sequences comprise:

a) the sequence as set forth in SEQ ID NO:5; and

b) the sequence as set forth in SEQ ID NO:6.

34. The CMV vector of claim 15, wherein the one or more amino acid sequences comprise:

a) the sequence as set forth in SEQ ID NO:7; and

b) the sequence as set forth in SEQ ID NO:8.

35. The CMV vector of claim 15, wherein the one or more amino acid sequences comprise:

a) the sequence as set forth in SEQ ID NO:9;

b) the sequence as set forth in SEQ ID NO:10; and

c) the sequence as set forth in SEQ ID NO:11.

36. A composition comprising two or more CMV vectors according to any of claims 15-35.

37. A hepatitis B virus (HBV) vaccine comprising one or more polypeptides according to any of claims 1-14.

38. The polypeptide of any one of claims 1-14, the vector of any one of claims 15-35, the vaccine of claim 37, or the composition of claim 36 for use in therapy.

39. Use of the polypeptide of any one of claims 1-14, or the vector of any one of claims 15-35, the vaccine of claim 37, or the composition of claim 36 for the manufacture of a medicament for treating HBV.

40. Use of the polypeptide of any one of claims 1-14, or the vector of any one of claims 15-35, the vaccine of claim 37, or the composition of claim 36 for the manufacture of a medicament for protecting a subject from an HBV infection.

41. Use of the polypeptide of any one of claims 1-14, the vector of any one of claims 15-35, the vaccine of claim 37, or the composition of claim 36 for the manufacture of a medicament for generating or inducing an immune response to HBV in a subject.

42. A method of designing and producing an HBV vaccine for a subject in a geographic area comprising:

(a) designing one or more episensus antigens that efficiently cover the HBV genotype diversity within the geographic area; and

(b) producing one of:

an HBV vaccine comprising a CMV backbone and a nucleic acid encoding the episensus antigens; or

an HBV vaccine comprising the episensus antigens.

43. A method of designing and producing an HBV vaccine for a subject comprising:

(a) determining the amino acid sequence of HBV viruses in the subject;

(b) designing one or more episensus antigens to efficiently cover the HBV genotype diversity within the viruses present in the subject; and

(c) producing one of:

an HBV vaccine comprising a CMV backbone and a nucleic acid encoding the episensus antigens; or

an HBV vaccine comprising the episensus antigens.

44. The method of any one of claims 42-43, wherein the one or more episensus antigens comprise one or more of the amino acid sequences selected from the group consisting of SEQ ID NOs:1-11, SEQ ID NOs:14-36.