Claims

1. A Modified Vaccinia Ankara (MVA) vector comprising a non-naturally occurring nucleic acid molecule comprising a first polynucleotide sequence encoding an HBV polymerase antigen comprising an amino acid sequence that is at least 98% identical to SEQ ID NO: 4.

2. The MVA vector of claim 1, wherein the HBV polymerase antigen comprises the amino acid sequence of SEQ ID NO: 4.

3. The MVA vector of claim 1, wherein the first polynucleotide sequence comprises the polynucleotide sequence of SEQ ID NO: 3.

4. A composition comprising the MVA vector of claim 1 and a pharmaceutically acceptable carrier.

5. The MVA vector of claim 1, wherein the HBV polymerase antigen is capable of inducing an immune response in a mammal against at least two HBV genotypes.

6. The MVA vector of claim 1, wherein the HBV polymerase antigen is capable of inducing a T cell response in a mammal against at least HBV genotypes B, C and D.

7. The MVA vector of claim 1, wherein the HBV polymerase antigen is capable of inducing a CD8 T cell response in a human subject against at least HBV genotypes A, B, C, and D.

8. The MVA vector of claim 1, further comprising a polynucleotide sequence encoding a signal sequence operably linked to the HBV polymerase antigen.

9. The MVA vector of claim 8, wherein the signal sequence comprises the amino acid sequence of SEQ ID NO: 6 or SEQ ID NO: 11.

10. The MVA vector of claim 8, wherein the signal sequence is encoded by the polynucleotide sequence of SEQ ID NO: 5 or SEQ ID NO: 10.

11. The MVA vector of claim 1, wherein the first polynucleotide sequence is at least 90% identical to SEQ ID NO: 3.

12. The MVA vector of claim 1, wherein the first polynucleotide sequence is at least 90% identical to SEQ ID NO: 19.

13. The MVA vector of claim 12, wherein the first polynucleotide sequence comprises the polynucleotide sequence of SEQ ID NO: 19.

14. The MVA vector of claim 1, wherein the first polynucleotide sequence is at least 90% identical to SEQ ID NO: 20.

15. The MVA vector of claim 14, wherein the first polynucleotide sequence comprises the polynucleotide sequence of SEQ ID NO: 20.

16. The MVA vector of claim 1, wherein the HBV polymerase antigen does not have reverse transcriptase activity and RNase H activity.

17. The MVA vector of claim 16, wherein the HBV polymerase comprises an amino acid sequence that is at least 99% identical to SEQ ID NO: 4.

18. The MVA vector of claim 16, wherein the HBV polymerase comprises the amino acid sequence of SEQ ID NO: 4.

19. The MVA vector of claim 16, wherein the HBV polymerase antigen is capable of inducing a T cell response in a mammal against at least HBV genotypes B, C and D.

20. The MVA vector of claim 16, wherein the HBV polymerase antigen is capable of inducing a CD8 T cell response in a human subject against at least HBV genotypes A, B, C, and D.