CLAIMS

1. A vaccine comprising:

(a) a nucleic acid molecule encoding one or more proteins selected from the group consisting of: SEQ ID NO:10, SEQ ID NO:14, a protein that is 95% identical over the entire length of the amino acid sequence of the full length amino acid sequence of SEQ ID NO:10, and a protein that is 95% identical over the entire length of the amino acid sequence of the full length amino acid sequence of SEQ ID NO:14; or

(b) a nucleic acid molecule encoding one or more proteins selected from the group consisting of: SEQ ID NO: 12, SEQ ID NO:16, a protein that is 95% identical over the entire length of the amino acid sequence of the full length amino acid sequence of SEQ ID NO:12, and a protein that is 95% identical over the entire length of the amino acid sequence of the full length amino acid sequence of SEQ ID NO:16.

2. The vaccine of claim 1, further comprising:

(c) a nucleic acid molecule encoding one or more proteins selected from the group consisting of: SEQ ID NO:2, SEQ ID NO:4, and SEQ ID NO:6.

3. The vaccine of claim 1, comprising:

(a) a nucleic acid molecule encoding one or more proteins selected from the group consisting of: SEQ ID NO:10, SEQ ID NO:14, a protein that is 95% identical over the entire length of the amino acid sequence of the full length amino acid sequence of SEQ ID NO:10, and a protein that is 95% identical over the entire length of the amino acid sequence of the full length amino acid sequence of SEQ ID NO:14;

(b) a nucleic acid molecule encoding one or more proteins selected from the group consisting of: SEQ ID NO: 12, SEQ ID NO:16, a protein that is 95% identical over the entire length of the amino acid sequence of the full length amino acid sequence of SEQ ID NO:12, and a protein that is 95% identical over the entire length of the amino acid sequence of the full length amino acid sequence of SEQ ID NO:16; and

(c) a nucleic acid molecule encoding one or more proteins selected from the group consisting of: SEQ ID NO:2, SEQ ID NO:4, and SEQ ID NO:6.

4. The vaccine of claim 3, wherein the nucleic acid molecules comprise one or more nucleotide sequences selected from the group consisting of: SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:5, SEQ ID NO:9, SEQ ID NO:11, SEQ ID NO:13, and SEQ ID NO:15.

5. The vaccine of claim 1, wherein the nucleic acid molecules are plasmids.

6. The vaccine of claim 1, wherein the nucleic acid molecules are incorporated into viral particles.

7. The vaccine of claim 1 further comprising an adjuvant molecule.

8. The vaccine of claim 7, wherein the adjuvant is IL-12, IL-15, IL-28, or RANTES.

9. A method of inducing an immune response against an HBV antigen comprising administering a vaccine of claim 1 to a subject.

10. A method of protecting a subject from HBV infection comprising administering a vaccine of claim 1 to the subject.

11. A method of protecting a subject who has been diagnosed with HBV infection comprising administering a vaccine of claim 1 to the subject.

12. A nucleic acid molecule comprising a coding sequence that encodes one or more proteins selected from the group consisting of: a protein comprising SEQ ID NO:2; a protein that is 95% identical over the entire length of the amino acid sequence of the full length

amino acid sequence of SEQ ID NO:2; an immunogenic fragment of a protein comprising SEQ ID NO:2 that is at least 20 amino acids; and an immunogenic fragment of a protein that is 95% identical over the entire length of the amino acid sequence of SEQ ID NO:2 that is at least 20 amino acids.

13. The nucleic acid molecule of claim 12 further comprising a signal peptide linked to the N terminus of the proteins.

14. The nucleic acid molecule of claim 12 encoding one or more proteins selected from the group consisting of: SEQ ID NO:2; SEQ ID NO:4 and SEQ ID NO:6.

15. The nucleic acid molecule of claim 12 comprising one or more sequences selected from the group consisting of: a nucleic acid sequence comprising SEQ ID NO:1; a nucleic acid sequence that is 98% identical over the entire length of the amino acid sequence of SEQ ID NO:1; fragments thereof that comprise a nucleic acid sequence encoding immunogenic fragments comprising at least 20 amino acids encoded by SEQ ID NO:1; and fragments thereof that comprise a nucleic acid sequence encoding immunogenic fragments comprising at least 20 amino acids of a protein that is 98% identical over the entire length of the amino acid sequence of a protein encoded by SEQ ID NO:1.

16. The nucleic acid molecule of claim 12 further comprising a signal peptide linked to the 5' end of the nucleic acid sequence.

17. The nucleic acid molecule of claim 12 comprising one or more nucleotide sequences selected from the group consisting of: SEQ ID NO:1; SEQ ID NO:3; and SEQ ID NO:5.

18. The nucleic acid molecule of claim 12 wherein the nucleic acid molecule is a plasmid.

19. The nucleic acid molecule of claim 12 wherein the nucleic acid molecule is an expression vector and sequences encoding said one more proteins are operable linked to regulatory elements.

20. The nucleic acid molecule of claim 12 wherein the nucleic acid molecule is incorporated into a viral particle.

21. The nucleic acid molecule of claim 12 wherein said nucleic acid molecule comprises a coding sequence that encodes one or more proteins selected from the group consisting of: an immunogenic fragment of a protein comprising SEQ ID NO:2 that is at least 60 amino acids; and an immunogenic fragment of a protein that is 98% identical over the entire length of the amino acid sequence of SEQ ID NO:2 that is at least 60 amino acids.

22. The nucleic acid molecule of claim 12 wherein said nucleic acid molecule comprises a coding sequence that encodes one or more proteins selected from the group consisting of: an immunogenic fragment of a protein comprising SEQ ID NO:2 that is at least 120 amino acids; and an immunogenic fragment of a protein that is 98% identical over the entire length of the amino acid sequence of SEQ ID NO:2 that is at least 120 amino acids.

23. The nucleic acid molecule of claim 12 wherein said nucleic acid molecule comprises a coding sequence that encodes one or more proteins selected from the group consisting of: an immunogenic fragment of a protein comprising SEQ ID NO:2 that is at least 180 amino acids; and an immunogenic fragment of a protein that is 98% identical over the entire length of the amino acid sequence of SEQ ID NO:2 that is at least 180 amino acids.

24. A method of inducing an immune response against an HBV antigen comprising administering a nucleic acid molecule of claim 12 to an individual.

25. A method of protecting an individual from HBV infection comprising administering a nucleic acid molecule of claim 12 to an individual.

26. A method of protecting an individual who has been diagnosed with HBV infection comprising administering a nucleic acid molecule of claim 12 to an individual.

27. A protein selected from the group consisting of:

(a) SEQ ID NO:2;

(b) a protein that is 95% identical over the entire length of the amino acid sequence of the full length sequence as set forth in SEQ ID NO:2;

(c) an immunogenic fragment of SEQ ID NO:2 comprising 20 or more amino acids of SEQ ID NO:2;

(d) an immunogenic fragment of a protein that is 95% identical over the entire length of the amino acid sequence of SEQ ID NO:2 comprising 20 or more amino acids.

28. The protein of claim 27 wherein said protein is selected from the group consisting of: an immunogenic fragment of a protein comprising SEQ ID NO:2 that is at least 60 amino acids; and an immunogenic fragment of a protein that is 98% identical over the entire length of the amino acid sequence of SEQ ID NO:2 that is at least 60 amino acids.

29. The protein of claim 27 wherein said protein is selected from the group consisting of: an immunogenic fragment of a protein comprising SEQ ID NO:2 that is at least 120 amino acids; and an immunogenic fragment of a protein that is 98% identical over the entire length of the amino acid sequence of SEQ ID NO:2 that is at least 120 amino acids.

30. The protein of claim 27 wherein said protein is selected from the group consisting of: an immunogenic fragment of a protein comprising SEQ ID NO:2 that is at least 180 amino acids; and an immunogenic fragment of a protein that is 98% identical over the entire length of the amino acid sequence of SEQ ID NO:2 that is at least 180 amino acids.

31. A method of inducing an immune response against an HBV antigen comprising administering a nucleic acid molecule of claim 27 to an individual.

32. A method of protecting an individual from HBV infection comprising administering a nucleic acid molecule of claim 27 to an individual.

33. A method of protecting an individual who has been diagnosed with HBV infection comprising administering a nucleic acid molecule of claim 27 to an individual.

34. A nucleic acid molecule comprising a coding sequence that encodes one or more proteins selected from the group consisting of:

(a) a protein comprising SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14, or SEQ ID NO:16;

(b) a protein that is 98% identical over the entire length of the amino acid sequence of SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14, or SEQ ID NO:16;

(c) an immunogenic fragment of a protein comprising SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14, or SEQ ID NO:16 that is at least 20 amino acids; and

(d) an immunogenic fragment of a protein that is 98% identical over the entire length of the amino acid sequence of SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14, or SEQ ID NO:16 that is at least 20 amino acids.

35. The nucleic acid molecule of claim 34 comprising one or more sequences selected from the group consisting of:

(a) a nucleic acid sequence comprising SEQ ID NO:9, SEQ ID NO:11, SEQ ID NO:13, or SEQ ID NO:15;

(b) a nucleic acid sequence that is 98% identical over the entire length of the amino acid sequence of SEQ ID NO:9, SEQ ID NO:11, SEQ ID NO:13, or SEQ ID NO:15;

(c) fragments thereof that comprise a nucleic acid sequence encoding immunogenic fragments comprising at least 20 amino acids encoded by SEQ ID NO:9, SEQ ID NO:11, SEQ ID NO:13, or SEQ ID NO:15; and

(d) fragments thereof that comprise a nucleic acid sequence encoding immunogenic fragments comprising at least 20 amino acids of a protein that is 98% identical over the entire length of the amino acid sequence of a protein encoded by SEQ ID NO:9, SEQ ID NO:11, SEQ ID NO:13, or SEQ ID NO:15.

36. The nucleic acid molecule of claim 34, wherein the nucleic acid molecule is a plasmid.

37. The nucleic acid molecule of claim 34, wherein the nucleic acid molecule is an expression vector and sequences encoding said one or more proteins are operably linked to regulatory elements.

38. The nucleic acid molecule of claim 34, wherein the nucleic acid molecule is incorporated into a viral particle.

39. A method of inducing an immune response against an HBV antigen comprising administering a nucleic acid molecule of claim 34 to a subject.

40. A method of protecting a subject from HBV infection comprising administering a nucleic acid molecule of claim 34 to the subject.

41. A method of protecting a subject who has been diagnosed with HBV infection comprising administering a nucleic acid molecule of claim 34 to the subject.

42. A protein selected from the group consisting of:

(a) SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14, or SEQ ID NO:16;

(b) a protein that is 98% identical over the entire length of the amino acid sequence of SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14, or SEQ ID NO:16;

(c) an immunogenic fragment of SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14, or SEQ ID NO:16 comprising 20 or more amino acids; and

(d) an immunogenic fragment of a protein that is 98% identical over the entire length of the amino acid sequence of SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14, or SEQ ID NO:16 comprising 20 or more amino acids.

43. A vaccine useful for generating an immune response against HBV in a subject comprising:

a nucleic acid molecule of claim 34, and

an adjuvant molecule.

44. The vaccine of claim 43, wherein said adjuvant is IL-12, IL-15, IL-28, or RANTES.

The invention claimed is:

1. An immunogenic composition comprising:

(a) a nucleic acid molecule encoding one or more proteins selected from the group consisting of: SEQ ID NO:10 and a protein that is 95% identical to the full length amino acid sequence of SEQ ID NO:10; or

(b) a nucleic acid molecule encoding one or more proteins selected from the group consisting of: SEQ ID NO: 12 and a protein that is 95% identical to the full length amino acid sequence of SEQ ID NO:12.

2. The immunogenic composition of claim **1**, further comprising:

(c) a nucleic acid molecule encoding SEQ ID NO:2.

3. The immunogenic composition of claim **1**, comprising:

(a) a nucleic acid molecule encoding one or more proteins selected from the group consisting of: SEQ ID NO:10 and a protein that is 95% identical to the full length amino acid sequence of SEQ ID NO:10;

(b) a nucleic acid molecule encoding one or more proteins selected from the group consisting of: SEQ ID NO: 12 and a protein that is 95% identical to the full length amino acid sequence of SEQ ID NO:12; and

(c) a nucleic acid molecule encoding SEQ ID NO:2.

4. The immunogenic composition of claim **3**, wherein the nucleic acid molecules comprise one or more nucleotide sequences selected from the group consisting of: SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:5, SEQ ID NO:9, and SEQ ID NO:11.

5. The immunogenic composition of claim **1**, wherein the nucleic acid molecules are plasmids.

6. The immunogenic composition of claim **1**, wherein the nucleic acid molecules are incorporated into viral particles.

7. The immunogenic composition of claim 1 further comprising an adjuvant molecule.

8. The immunogenic composition of claim **7**, wherein the adjuvant is IL-12, IL-15, IL-28, or RANTES.

9. A method of inducing an immune response against an HBV antigen comprising administering the immunogenic composition of claim **1** to a subject.