CLAIMS

~~1. An immunogenic composition comprising a replication-defective chimpanzee adenoviral (ChAd) vector comprising a polynucleotide encoding a hepatitis B surface antigen (HBs), a polynucleotide encoding a hepatitis B virus core antigen (HBc) and a polynucleotide encoding the human invariant chain (hIi) fused to the HBc.~~

~~2. An immunogenic composition according to claim 1 wherein the ChAd vector is selected from the group consisting of ChAd3, ChAd63, ChAd83, ChAd155, ChAd 157, Pan 5, Pan 6, Pan 7 and Pan 9.~~

~~3. An immunogenic composition according to claim 1 or claim 2 wherein the ChAd vector is ChAd155 and comprises a polynucleotide encoding hIi, HBc, 2A and HBs.~~

~~4. An immunogenic composition according to any one of claims 1 to 3 wherein the vector comprises polynucleotides encoding an HBc comprising SEQ ID NO:11 or an amino acid sequence at least 98% homologous thereto fused to a polynucleotide encoding an hIi comprising SEQ ID NO:7 or an amino acid sequence at least 98% homologous thereto or SEQ ID NO:12 or an amino acid sequence at least 98% homologous thereto, and an HBs comprising SEQ ID NO:1 or an amino acid sequence at least 98% homologous thereto, wherein the polynucleotides encoding hIi-HBc and HBs are separated by a polynucleotide encoding an amino acid sequence comprising SEQ ID NO:3, or an amino acid sequence at least 98% homologous thereto, which incorporates the 2A cleaving region of the foot and mouth disease virus.~~

~~5. An immunogenic composition according to any one of claims 1 to 4 wherein the vector comprises a polynucleotide encoding the amino acid sequence of SEQ ID NO:9 or a polynucleotide encoding the amino acid sequence of SEQ ID NO.15.~~

~~6. An immunogenic composition according to any one of claims 1 to 5 wherein the vector comprises a polynucleotide sequence given in SEQ ID NO:10 or a polynucleotide sequence given in SEQ ID NO:14.~~

~~7~~1. An immunogenic composition comprising a Modified Vaccinia Virus Ankara (MVA) vector comprising a polynucleotide encoding a hepatitis B surface antigen (HBs)~~,~~ and a polynucleotide encoding a hepatitis B virus core antigen (HBc)~~,~~.

~~8. An immunogenic composition according to claim 7~~ wherein the polynucleotides encoding HBs and HBc are separated by a polynucleotide encoding the 2A cleaving region of the foot and mouth disease virus (FMDV)

~~9. An immunogenic composition according to claim 7 or claim 8 wherein the vector comprises polynucleotides encoding an HBc comprising SEQ ID NO:11 or an amino acid sequence at least 98% homologous thereto and an HBs comprising SEQ ID NO:1 or an amino acid sequence at least 98% homologous thereto, wherein the polynucleotides encoding HBc and HBs are separated by a polynucleotide encoding an amino acid sequence comprising SEQ ID NO:3, or an amino acid~~

~~sequence at least 98% homologous thereto, which incorporates the 2A cleaving region of the foot and mouth disease virus.~~

~~10. An immunogenic composition according to any one of claims 7 to 9 wherein the vector comprises a polynucleotide encoding the amino acid sequence of SEQ ID NO:5.~~

~~11. An immunogenic composition according to any one of claims 7 to 10 wherein the vector comprises a polynucleotide sequence given in SEQ ID NO:6.~~

~~12~~2. An immunogenic composition comprising a recombinant hepatitis B surface antigen (HBs), a C-terminal truncated recombinant hepatitis B virus core antigen (HBc)~~,~~ and an adjuvant containing MPL and QS-21~~.~~

~~13. An immunogenic composition according to claim 12 wherein the truncated recombinant HBc comprises amino acids 1-145, 1-146, 1-147, 1-148 or amino acids 1-149 of a wild-type hepatitis B core antigen protein.~~

~~14. An immunogenic composition according claim 12 or claim 13 comprising~~; wherein the ratio of recombinant HBc ~~and~~ to recombinant HBs in the composition is about ~~in a ratio of~~ 1.5:1, 2:1, 2.5:1, 3:1, 3.5:1, 4:1, 4.5:1, 5:1, 5.5:1, or 6:1 ~~or more (e.g. 3:1 to 5:1, such as 4:1)~~.

~~15. An immunogenic composition according to any one of claims 12 to 14 comprising recombinant HBs (SEQ ID NO: 1), amino acids 1-149 of HBc (SEQ ID NO: 2) and an adjuvant comprising MPL, QS-21 and liposomes composed of dioleoyl phosphatidylcholine (DOPC) and cholesterol in a phosphate buffered saline solution.~~

~~16~~3. An immunogenic combination comprising:

a) a composition comprising a replication-defective chimpanzee adenoviral (ChAd) vector comprising a polynucleotide encoding a hepatitis B surface antigen (HBs) and a ~~nucleic acid~~ polynucleotide encoding a hepatitis B virus core antigen (HBc);

b) a composition comprising a Modified Vaccinia Virus Ankara (MVA) vector comprising a polynucleotide encoding a hepatitis B surface antigen (HBs) and a ~~nucleic acid~~ polynucleotide encoding a hepatitis B virus core antigen (HBc), wherein the polynucleotides encoding HBs and HBc are separated by a polynucleotide encoding the 2A cleaving region of the foot and mouth disease virus (FMDV); and

c) a composition comprising a recombinant hepatitis B surface antigen (HBs), a recombinant hepatitis B virus core antigen (HBc) comprising amino acids 1-145, 1-146, 1-147, 1-148, or 1-149 of a wild-type hepatitis B virus core antigen protein, and an adjuvant.

~~17~~4. ~~An~~ The immunogenic combination according to claim ~~16~~ 3, wherein the ChAd vector ~~composition~~ of component a) of the combination further comprises a polynucleotide encoding the human invariant chain (hIi) fused to the HBc~~, is a composition according to any one of claims 1 to 6, the composition of component b) of the combination is a composition according to any one of claims~~

~~7 to 11 and the composition~~ the recombinant HBc of component c) of the combination is C-terminal truncated, the adjuvant of component c) of the combination contains MPL and QS-21, and the ratio of recombinant HBc to recombinant HBs of component c) of the combination is about 1.5:1, 2:1, 2.5:1, 3:1, 3.5:1, 4:1, 4.5:1, 5:1, 5.5:1, or 6:1~~a composition according to any one of claims 12 to 15~~.

~~18~~5. A kit comprising the following components:

a) a composition comprising a replication-defective chimpanzee adenoviral (ChAd) vector comprising a polynucleotide encoding a hepatitis B surface antigen (HBs) and a polynucleotide~~nucleic acid~~ encoding a hepatitis B virus core antigen (HBc);

b) a composition comprising a Modified Vaccinia Virus Ankara (MVA) vector comprising a polynucleotide encoding a hepatitis B surface antigen (HBs) and a polynucleotide~~nucleic acid~~ encoding a hepatitis B virus core antigen (HBc), wherein the polynucleotides encoding HBs and HBc are separated by a polynucleotide encoding the 2A cleaving region of the foot and mouth disease virus (FMDV); and

c) a composition comprising a recombinant hepatitis B surface antigen (HBs), a recombinant hepatitis B virus core antigen (HBc) comprising amino acids 1-145, 1-146, 1-147, 1-148, or 1-149 of a wild-type hepatitis B core antigen protein, and an adjuvant,

with instructions for administration of the components sequentially or concomitantly for the treatment of chronic hepatitis B (CHB).

6. The immunogenic combination according to claim 3, wherein the HBc of component b) comprises SEQ ID NO:11 or an amino acid sequence at least 98% homologous thereto and the HBs of component b) comprises SEQ ID NO:1 or an amino acid sequence at least 98% homologous thereto, wherein the polynucleotides encoding the HBc and HBs of component b) are separated by a polynucleotide encoding an amino acid sequence comprising SEQ ID NO:3, or an amino acid sequence at least 98% homologous thereto.

7. The immunogenic combination according to claim 3, wherein the MVA vector of component b) comprises a polynucleotide encoding the amino acid sequence of SEQ ID NO:5.

8. The immunogenic combination according to claim 3, wherein the MVA vector of component b) comprises a polynucleotide having the nucleotide sequence of SEQ ID NO:6.

9. The immunogenic combination according to claim 3, wherein the composition of component c) comporises a recombinant HBs (SEQ ID NO:1), a recombinant HBc comprising amino acids 1-149 (SEQ ID NO:2) and an adjuvant compirisng MPL, QS-21 and liposomes composed of dioleoyl phosphatidylcholine (DOPC) and cholesterol in a phosphate buffered saline solution.