Other and further aspects, features and advantages of the present invention will be apparent from the following description of the presently preferred embodiments of the invention. These embodiments are given for the purpose of disclosure.

SUMMARY OF THE INVENTION

Accordingly, in a first embodiment~~aspect~~, the present disclosure~~invention~~ provides an immunogenic composition comprising at least one polypeptide or a nucleic acid molecule encoding said at least one polypeptide, wherein said at least one polypeptide is selected from the group consisting of:

(i) A polymerase moiety comprising al least 450 amino add residues of a polymerase protein originating from a first HBV virus;

(it) A core moiety comprising at least 100 amino acid residues of a core protein originating trom a second HBV vims; and

(iii) An env moiety comprising one or more immunogenic domain(s) of 15 to 100 consecutive amino acid residues of a HBsAg protein originating from a third HBV virus; or

Any combination of said polymerase moiety, core moiety, env moiety, said nucleic acid molecule encoding said polymerase moiety, said nucleic acid molecule encoding said core moiety and/or said nucleic acid molecule encoding said env moiety,

In one aspect, there is provided an immunogenic composition comprising a combination of three polypeptides or of the nucleic acid molecules encoding said polypeptides wherein said polypeptides are:

(i) A polymerase moiety comprising at least 450 amino acid residues of a polymerase protein originating from a first HBV virus;

(ii) A core moiety comprising at least 100 amino acid residues of a core protein originating from a second HBV virus; and

(iii) An env moiety comprising one or more immunogenic domain(s) of 20 to 100 consecutive amino acid residues of a HBsAg protein originating from a third HBV virus.

In another aspect, there is provided a nucleic acid molecule encoding a combination of the polymerase moiety as defined above, the core moiety as defined above and the env moiety as defined above.

In another aspect, there is provided a plasmid or viral vector comprising one or more nucleic acid molecule(s) as defined above.

In yet another aspect, there is provided an infectious viral particle comprising the nucleic acid molecule as defined above or the vector as defined above.

In a further aspect, there is provided a host cell comprising the nucleic acid molecule as defined above, the vector as defined above or the infectious viral particle as defined above.

In yet a further aspect, there is provided a composition comprising the nucleic acid molecule as defined above, the vector as defined above or the infectious viral particle as defined above or the host cell as defined above and a pharmaceutically acceptable vehicle.

In another aspect, there is provided the use of at least one of the immunogenic composition as defined above, of the nucleic acid molecule as defined above, of the vector as defined above, of the infectious viral particle as defined above, of the host cell as defined above or of the composition as defined above for the preparation of a drug intended for treating or preventing an HBV infection or an HBV-associated disease or pathologic condition, and preferably for treating a patient having a chronic hepatitis B viral infection.

In still another aspect, there is provided the use of a therapeutically effective amount of at least one of the immunogenic composition as defined above, of the nucleic acid molecule as defined above, of the vector as defined above, of the infectious viral particle as defined above, of the host cell as defined above or of the composition as defined above in the preparation of a drug for the treatment or prevention of an HBV infection, or an HBV-associated disease or pathologic condition, and preferably for the treatment of a chronic hepatitis B viral infection.

In another aspect, there is provided the use of at least one of the immunogenic composition as defined above, of the nucleic acid molecule as defined above, of the vector as defined above, of the infectious viral particle as defined above, of the host cell as defined above or of the composition as defined above in the preparation of the drug for inducing or stimulating an immune response, and preferably a CD4+ and/or CD8+-mediated cellular response, against HBV in a host organism.

In a further aspect, there is provided a kit of parts for use in the treatment of an HBV infection, wherein said kit comprises a plurality of active agents selected from the group consisting of the HBV moieties as defined above, of the immunogenic composition as defined above, of the nucleic acid molecule as defined above, of the vector as defined above, of the infectious viral particle as defined above, of the host cell as defined above or of the composition as defined above.

In a further aspect, there is provided an immunogenic composition comprising a combination of at least two independent vectors, each vector carrying one or two of the nucleic acid molecules encoding the polymerase moiety, the core moiety and the env moiety as defined above.

Definitions

As used herein throughout the entire application, the terms "a" and "an" are used in the sense that they mean "at least one", "at least a first", "one or more" or "a plurality" of the referenced compounds or steps, unless the context dictates otherwise. For example, the term "a cell" includes a plurality of cells including a mixture thereof.

The term "and/or" wherever used herein includes the meaning of "and", "or" and "all or any other combination of the elements connected by said term".

The term "about" or "approximately" as used herein means within 10%, preferably within 8%, and more preferably within 5% of a given value or range.

As used herein, when used to define products, compositions and methods, the term "comprising" (and any form of comprising, such as "comprise" and "comprises"), "having" (and any form of having, such as "have" and "has"), "including" (and any form of including,