

examples of this nature, ordinals such as "first" or "second" are intended simply to differentiate one from another, and are not intended to imply an order. Such compositions optionally further includes a pharmaceutically acceptable diluent, adjuvant, excipient, stabilizer, preservative, or carrier.

[0022a] In one aspect, the present disclosure refers to an antigenic composition comprising the VLP as disclosed herein, wherein the VLP is present in the composition at a concentration of 0.1-2000 µg/ml, in a pharmaceutically acceptable carrier, diluent, stabilizer, preservative, or adjuvant, said composition inducing one or more of a protective immune response, production of anti-Zika neutralizing antibody, and production of anti-Zika protective antibody.

[0022b] In another aspect, the present disclosure refers to an antigenic composition comprising the VLP as disclosed herein in a pharmaceutically acceptable carrier, diluent, stabilizer, preservative, or adjuvant, said composition comprising SEQ ID NO: 15.

[0023] In a related example, the disclosure is an antigenic composition comprising first, second, and third VLP as described herein. For instance, the first, second, and third VLP comprise different sequences independently selected from amino acid sequences at least 80% identical to SEQ ID NOs: 2-11, 22-33, 46-47, and 50-51.

[0024] In another related example, the disclosure is an antigenic composition comprising first, second, third, fourth, fifth, sixth, and seventh VLP as described herein. For example, the first, second, third, fourth, fifth, sixth, and seventh VLP comprise different sequences independently selected from SEQ ID NOs: 2-11, 22-33, 46-47, and 50-51.

[0025] The disclosure also includes a kit comprising a VLP as described herein, or comprises an article of manufacture as described herein, packaged with at least one reagent useful for performing an immunoassay. Exemplary suitable reagents include an enzyme substrate, a detection antibody, positive and negative control reagents, substrate/s detection solution, and washing, blocking, and diluent buffer. In some examples, the kit includes a specific apparatus used for the execution of the protocol and for the detection.

[0025a] In one aspect, the present disclosure refers to a kit comprising the VLP as disclosed herein packaged with at least one reagent selected from an enzyme substrate, a detection antibody, and a blocking buffer.

[0026] The disclosure further includes an antigenic composition comprising a peptide, a chimeric peptide or chimeric protein, or a VLP as described herein in a

WHAT IS CLAIMED IS:

1. A chimeric peptide comprising a first peptide selected from SEQ ID NOS: 2-11, 22-33, 46, 47, 50 and 51 operably linked to a second heterologous peptide having an amino acid sequence that is at least 80% identical to a Woodchuck Hepatitis core Antigen protein (WHcAg) comprising an amino acid sequence of SEQ ID NO: 1 or a functional fragment thereof.
2. The chimeric peptide of claim 1, wherein the first peptide replaces amino acids from positions 77 to 82 of SEQ ID NO: 1 or functional fragments thereof.
3. The chimeric peptide according to claim 1, further including at least one peptide linker of 1-10 amino acids linking the first peptide to the sequence that is at least 90% identical to a WHcAg protein.
4. A polynucleotide comprising a nucleotide sequence encoding the chimeric peptide of claim 1.
5. An expression vector comprising the polynucleotide of claim 4 operably linked to an expression control sequence.
6. A recombinant host cell comprising the expression vector of claim 5.
7. The recombinant host cell of claim 6, wherein the host cell is:
 - (i) a eukaryotic cell selected from the group consisting of mammalian, yeast, insect, plant, amphibian and avian cells; or
 - (ii) a prokaryotic cell.
8. A virus like particle (VLP) comprising the chimeric peptide of claim 1.
9. The VLP according to claim 8, attached to a solid support microbead, an assay plate, a test strip, or a filter.

10. An antigenic composition comprising the VLP of claim 8, wherein the VLP is present in the composition at a concentration of 0.1-2000 µg/ml, in a pharmaceutically acceptable carrier, diluent, stabilizer, preservative, or adjuvant, said composition inducing one or more of a protective immune response, production of anti-Zika neutralizing antibody, and production of anti-Zika protective antibody.

11. An antigenic composition comprising the VLP of claim 8 in a pharmaceutically acceptable carrier, diluent, stabilizer, preservative, or adjuvant, said composition comprising SEQ ID NO: 15.

12. The antigenic composition of claim 11 comprising a VLP according to claim 8, and one or more VLP comprising different sequences independently selected from amino acid sequences at least 80% identical to SEQ ID NOs: 2-4, 6-11, 22-33, 46-47, or 50-51.

13. A composition comprising the vector of claim 5 in a pharmaceutically acceptable carrier, diluent, stabilizer, preservative, or adjuvant.

14. The composition of claim 13, comprising an adjuvant.

15. A kit comprising the VLP of claim 8 packaged with at least one reagent selected from an enzyme substrate, a detection antibody, and a blocking buffer.

16. A vaccine comprising the antigenic composition of claim 11, and an adjuvant.

17. Use of an effective amount of the antigenic composition of claim 11 in the manufacture of a medicament for producing an immune response to a Zika virus in a subject.

18. Use of the vaccine of claim 16 in the manufacture of a medicament for inhibiting Zika virus infection in a subject, wherein the subject is to be administered with an effective amount of the medicament, thereby preventing a disease or disorder caused by a Zika virus infection in the subject.

19. The use of claim 18, wherein administration of the medicament is vaginal or nasal mucosal administration.

20. A method of detecting or measuring antibodies to Zika virus in a biological sample comprising:

a) contacting the VLP of claim 8 with a biological sample under conditions suitable for the formation of an antigen-antibody complex; and

b) measuring or detecting antibodies to Zika virus by detecting or measuring an antigen-antibody complex formed between antibodies in the biological sample and the VLP.