Claims

1. A nucleic acid molecule encoding a synthetic antibody comprising a nucleic acid sequence having at least about 95% identity over an entire length of the nucleic acid sequence selected from the group consisting of:

(a) a nucleic acid sequence as set forth in SEQ ID NO:67;

(b) a nucleic acid sequence as set forth in SEQ ID NO:69;

(c) a nucleic acid sequence as set forth in SEQ ID NO:71;

(d) a nucleic acid sequence as set forth in SEQ ID NO:73;

(e) a nucleic acid sequence as set forth in SEQ ID NO:75;

(f) a nucleic acid sequence as set forth in SEQ ID NO:77;

(g) a nucleic acid sequence as set forth in SEQ ID NO:65.

2. The nucleic acid molecule of claim 1, wherein the nucleic acid sequence is selected from the group consisting of:

(a) the nucleic acid sequence as set forth in SEQ ID NO:67;

(b) the nucleic acid sequence as set forth in SEQ ID NO:69;

(c) the nucleic acid sequence as set forth in SEQ ID NO:71;

(d) the nucleic acid sequence as set forth in SEQ ID NO:73;

(e) the nucleic acid sequence as set forth in SEQ ID NO:75;

(f) the nucleic acid sequence as set forth in SEQ ID NO:77; and

(g) the nucleic acid sequence as set forth in SEQ ID NO:65.

3. A nucleic acid molecule encoding a synthetic antibody comprising a nucleic acid sequence encoding a protein having at least about 95% identity over an entire length of the amino acid sequence selected from the group consisting of:

(a) an amino acid sequence as set forth in SEQ ID NO:68;

(b) an amino acid sequence as set forth in SEQ ID NO:70;

(c) an amino acid sequence as set forth in SEQ ID NO:72;

(d) an amino acid sequence as set forth in SEQ ID NO:74;

(e) an amino acid sequence as set forth in SEQ ID NO:76;

(f) an amino acid sequence as set forth in SEQ ID NO:78; and

(g) an amino acid sequence as set forth in SEQ ID NO:66.

4. The nucleic acid molecule of claim 3, wherein the nucleic acid encodes a protein having the amino acid sequence selected from the group consisting of:

(a) an amino acid sequence as set forth in SEQ ID NO:68;

(b) an amino acid sequence as set forth in SEQ ID NO:70;

(c) an amino acid sequence as set forth in SEQ ID NO:72;

(d) an amino acid sequence as set forth in SEQ ID NO:74;

(e) an amino acid sequence as set forth in SEQ ID NO:76;

(f) an amino acid sequence as set forth in SEQ ID NO:78; and

(g) an amino acid sequence as set forth in SEQ ID NO:66.

5. The nucleic acid molecule of claim 1, wherein the nucleic acid sequence encodes a light chain polypeptide, a heavy chain polypeptide, both a light chain polypeptide and a heavy chain polypeptide, or fragments thereof.

6. The nucleic acid molecule of claim 5, wherein when the nucleic acid sequence encodes a light chain polypeptide and a heavy chain polypeptide, the nucleic acid sequence also encodes a protease cleavage site.

7. The nucleic acid molecule of claim 6, wherein the protease cleavage site is located between the light chain polypeptide and the heavy chain polypeptide and wherein the protease cleavage site includes a furin cleavage site and 2A peptide sequence.

8. The nucleic acid molecule of claim 1, wherein the nucleic acid molecule further encodes an immunoglobulin (Ig) signal peptide.

9. The nucleic acid molecule of claim 8, wherein the Ig signal peptide comprises an IgE signal peptide.

10. The nucleic acid molecule of claim 1, wherein the nucleic acid molecule comprises an expression vector.

11. A composition comprising the nucleic acid molecule of claim 1.

12. The composition of claim 11 further comprising a pharmaceutically acceptable excipient.

13. The nucleic acid molecule of claim 1 for use in the prevention of a disease in a subject in need thereof.

14. Use of the nucleic acid molecule of claim 1 in the manufacture of a medicament for preventing a disease in a subject in need thereof wherein the disease is infection by Chikungunya virus (CHIKV) or Dengue virus (DENV).

15. The use of claim 14, wherein when the disease is infection by CHIKV, the nucleic acid sequence is the nucleic acid sequence as set forth in SEQ ID NO:65.

16. The use of claim 14, wherein when the disease is infection by DENV, the nucleic acid sequence is selected from the group consisting of:

(a) the nucleic acid sequence as set forth in SEQ ID NO:67;
(b) the nucleic acid sequence as set forth in SEQ ID NO:69;
(c) the nucleic acid sequence as set forth in SEQ ID NO:71;
(d) the nucleic acid sequence as set forth in SEQ ID NO:73;
(e) the nucleic acid sequence as set forth in SEQ ID NO:75; and
(f) the nucleic acid sequence as set forth in SEQ ID NO:77.

17. The use of claim 14, wherein when the disease is infection by CHIKV, the amino acid sequence is the amino acid sequence as set forth in SEQ ID NO:66.

18. The use of claim 14, wherein when the disease is infection by DENV, the amino acid sequence is selected from the group consisting of:

(a) the amino acid sequence as set forth in SEQ ID NO:68;
(b) the amino acid sequence as set forth in SEQ ID NO:70;
(c) the amino acid sequence as set forth in SEQ ID NO:72;
(d) the amino acid sequence as set forth in SEQ ID NO:74;
(e) the amino acid sequence as set forth in SEQ ID NO:76; and
(f) the amino acid sequence as set forth in SEQ ID NO:78.

19. The use of claim 14, wherein the medicament is to be administered by at least one of electroporation and injection.

20. The nucleic acid molecule of claim 1 for use in treating a disease in a subject in need thereof.

21. Use of the nucleic acid molecule of claim 1 in the manufacture of a medicament for treating a disease in a subject in need thereof,

wherein the disease is infection by Chikungunya virus (CHIKV) or Dengue virus (DENV).

22. The use of claim 21, wherein when the disease is infection by CHIKV, the nucleic acid sequence is the nucleic acid sequence as set forth in SEQ ID NO:65.

23. The use of claim 21, wherein when the disease is infection by DENV, the nucleic acid sequence is selected from the group consisting of:

(a) the nucleic acid sequence as set forth in SEQ ID NO:67;
(b) the nucleic acid sequence as set forth in SEQ ID NO:69;
(c) the nucleic acid sequence as set forth in SEQ ID NO:71;
(d) the nucleic acid sequence as set forth in SEQ ID NO:73;
(e) the nucleic acid sequence as set forth in SEQ ID NO:75; and
(f) the nucleic acid sequence as set forth in SEQ ID NO:77.

24. The use of claim 21, wherein when the disease is infection by CHIKV, the amino acid sequence is the nucleic acid sequence as set forth in SEQ ID NO:66.

25. The use of claim 21, wherein when the disease is infection by DENV, the amino acid sequence is selected from the group consisting of:

(a) the amino acid sequence as set forth in SEQ ID NO:68;
(b) the amino acid sequence as set forth in SEQ ID NO:70;
(c) the amino acid sequence as set forth in SEQ ID NO:72;
(d) the amino acid sequence as set forth in SEQ ID NO:74;
(e) the amino acid sequence as set forth in SEQ ID NO:76; and
(f) the amino acid sequence as set forth in SEQ ID NO:78.

26. The use of claim 21, wherein the medicament is to be administered by at least one of electroporation and injection.

27. A composition comprising a recombinant nucleic acid sequence encoding an anti-CHIKV or anti-DENV antibody or an antigen binding fragment thereof, for use in generating an anti-CHIKV synthetic antibody or anti-DENV synthetic antibody in a cell, wherein the recombinant nucleic acid sequence is expressed in the cell to generate the synthetic antibody,

wherein the anti-CHIKV or anti-DENV antibody comprises an amino acid sequence having at least about 95% identity over an entire length of the amino acid sequence selected from the group consisting of:

(i) an amino acid sequence as set forth in SEQ ID NO:68;
(ii) an amino acid sequence as set forth in SEQ ID NO:70;
(iii) an amino acid sequence as set forth in SEQ ID NO:72;
(iv) an amino acid sequence as set forth in SEQ ID NO:74;
(v) an amino acid sequence as set forth in SEQ ID NO:76;
(vi) an amino acid sequence as set forth in SEQ ID NO:78; and
(vii) an amino acid sequence as set forth in SEQ ID NO:66.

28. Use of a composition comprising a recombinant nucleic acid sequence encoding an anti-CHIKV or anti-DENV antibody or an antigen binding fragment thereof, in the manufacture of a medicament for generating an anti-CHIKV synthetic antibody or anti-DENV synthetic antibody in a cell, to treat infection by Chikungunya virus (CHIKV) or Dengue virus (DENV), wherein the recombinant nucleic acid sequence is expressed in the cell to generate the synthetic antibody,

wherein the anti-CHIKV or anti-DENV antibody comprises an amino acid sequence having at least about 95% identity over an entire length of the amino acid sequence selected from the group consisting of:

(viii) an amino acid sequence as set forth in SEQ ID NO:68;
(ix) an amino acid sequence as set forth in SEQ ID NO:70;
(x) an amino acid sequence as set forth in SEQ ID NO:72;
(xi) an amino acid sequence as set forth in SEQ ID NO:74;
(xii) an amino acid sequence as set forth in SEQ ID NO:76;
(xiii) an amino acid sequence as set forth in SEQ ID NO:78; and

(xiv) an amino acid sequence as set forth in SEQ ID NO:66.

29. The use of claim 28, wherein the anti-CHIKV or anti-DENV antibody comprises an amino acid sequence selected from the group consisting of

(a) an amino acid sequence as set forth in SEQ ID NO:68;
(b) an amino acid sequence as set forth in SEQ ID NO:70;
(c) an amino acid sequence as set forth in SEQ ID NO:72;
(d) an amino acid sequence as set forth in SEQ ID NO:74;
(e) an amino acid sequence as set forth in SEQ ID NO:76;
(f) an amino acid sequence as set forth in SEQ ID NO:78; and
(g) an amino acid sequence as set forth in SEQ ID NO:66.

30. The use of claim 28, wherein the recombinant nucleic acid sequence comprises a nucleic acid sequence having at least about 95% identity over an entire length of the nucleic acid sequence selected from the group consisting of:

(a) a nucleic acid sequence as set forth in SEQ ID NO:69;
(b) a nucleic acid sequence as set forth in SEQ ID NO:71;
(c) a nucleic acid sequence as set forth in SEQ ID NO:73;
(d) a nucleic acid sequence as set forth in SEQ ID NO:75;
(e) a nucleic acid sequence as set forth in SEQ ID NO:77; and
(f) a nucleic acid sequence as set forth in SEQ ID NO:65.

31. The use of claim 28, wherein the recombinant nucleic acid sequence comprises a nucleic acid sequence selected from the group consisting of:

(a) the nucleic acid sequence as set forth in SEQ ID NO:67;
(b) the nucleic acid sequence as set forth in SEQ ID NO:69;
(c) the nucleic acid sequence as set forth in SEQ ID NO:71;
(d) the nucleic acid sequence as set forth in SEQ ID NO:73;
(e) the nucleic acid sequence as set forth in SEQ ID NO:75;
(f) the nucleic acid sequence as set forth in SEQ ID NO:77; and
(g) the nucleic acid sequence as set forth in SEQ ID NO:65.

32. A composition comprising two or more recombinant nucleic acid sequences, wherein

each recombinant nucleic acid sequence encodes an antibody, wherein the antibody comprises an amino acid sequence having at least about 95% identity over an entire length of an amino acid sequence selected from the group consisting of:

(a) an amino acid sequence as set forth in SEQ ID NO:68;

(b) an amino acid sequence as set forth in SEQ ID NO:70;

(c) an amino acid sequence as set forth in SEQ ID NO:72;

(d) an amino acid sequence as set forth in SEQ ID NO:74;

(e) an amino acid sequence as set forth in SEQ ID NO:76;

(f) an amino acid sequence as set forth in SEQ ID NO:78.