

CLAIMS

1. An isolated multispecific antibody, or an antigen binding fragment thereof, specifically binding to at least two distinct Zika virus epitopes, wherein the antibody, or an antigen binding fragment thereof, comprises an epitope binding site comprising CDRH1, CDRH2, and CDRH3 amino acid sequences and CDRL1, CDRL2, and CDRL3 amino acid sequences (i) according to SEQ ID NOs: 19 – 23 and 25, respectively; or (ii) according to SEQ ID NOs: 19 – 22 and 24 – 25, respectively.
2. The antibody, or the antigen binding fragment thereof, according to claim 1, wherein the antibody, or the antigen binding fragment thereof, neutralizes Zika virus infection.
3. The antibody, or the antigen binding fragment thereof, according to any of claims 1 – 2, characterized in that the antibody, or antigen binding fragment thereof, comprises an Fc moiety; preferably the antibody, or antigen binding fragment thereof, comprises a mutation in the Fc moiety, said mutation reducing binding of the antibody to an Fc receptor; more preferably the antibody, or antigen binding fragment thereof, comprises a CH2 L4A mutation, a CH2 L5A mutation, or both.
4. The antibody, or the antigen binding fragment thereof, according to any of claims 1 – 3, wherein the at least two distinct Zika virus epitopes include a Zika virus envelope protein (ZIKV E protein).
5. The antibody, or the antigen binding fragment thereof, according to any one of claims 1 – 4, characterized in that the antibody, or the antigen binding fragment thereof, further comprises secondary CDRH1, CDRH2, and CDRH3 amino acid sequences and secondary CDRL1, CDRL2, and CDRL3 amino acid sequences (i) according to SEQ ID NOs: 1 - 5 and 7; or functional sequence variants thereof having at least 70%, at least 75%, at least 80%, at least 85%, at least 88%, at least 90%, at least 92%, at least 95%, at least 96%, at least 97%, at least 98% or at least 99% sequence identity; (ii) according to SEQ ID NOs: 1 – 4 and 6 – 7; or functional sequence variants thereof having at least 70%, at least 75%, at least 80%, at least 85%, at least 88%, at least 90%, at least 92%, at least 95%, at least 96%, at least 97%, at least 98% or at least 99% sequence identity; (iii) according to SEQ ID NOs: 37 – 41 and 43; or functional sequence variants thereof having at least 70%, at least 75%, at least 80%, at least 85%, at least 88%, at least 90%, at least 92%, at least 95%, at least 96%, at least 97%, at least 98% or at least 99% sequence identity; (iv) according to SEQ ID NOs: 37 – 40 and 42 – 43; or functional sequence variants thereof having at least 70%, at least 75%, at

least 80%, at least 85%, at least 88%, at least 90%, at least 92%, at least 95%, at least 96%, at least 97%, at least 98% or at least 99% sequence identity; (v) according to SEQ ID NOs: 55 – 59 and 61; or functional sequence variants thereof having at least 70%, at least 75%, at least 80%, at least 85%, at least 88%, at least 90%, at least 92%, at least 95%, at least 96%, at least 97%, at least 98% or at least 99% sequence identity; (vi) according to SEQ ID NOs: 55 – 58 and 60 – 61; or functional sequence variants thereof having at least 70%, at least 75%, at least 80%, at least 85%, at least 88%, at least 90%, at least 92%, at least 95%, at least 96%, at least 97%, at least 98% or at least 99% sequence identity; (vii) according to SEQ ID NOs: 73 – 77 and 79; or functional sequence variants thereof having at least 70%, at least 75%, at least 80%, at least 85%, at least 88%, at least 90%, at least 92%, at least 95%, at least 96%, at least 97%, at least 98% or at least 99% sequence identity; or (viii) according to SEQ ID NOs: 73 – 76 and 78 – 79; or functional sequence variants thereof having at least 70%, at least 75%, at least 80%, at least 85%, at least 88%, at least 90%, at least 92%, at least 95%, at least 96%, at least 97%, at least 98% or at least 99% sequence identity,

wherein the secondary CDRH1, CDRH2, and CDRH3 amino acid sequences and the secondary CDRL1, CDRL2, and CDRL3 amino acid sequences comprise secondary regions separate from the CDRH1, CDRH2, and CDRH3 amino acid sequences and the CDRL1, CDRL2, and CDRL3 amino acid sequences of claim 1.

6. The antibody, or the antigen binding fragment thereof, according to any of claims 1 – 5, characterized in that the antibody, or the antigen binding fragment thereof, comprises a heavy chain variable region (VH) comprising or consisting of an amino acid sequence according to SEQ ID NO: 26; or a functional variant of SEQ ID NO: 26 thereof having at least 70%, at least 75%, at least 80%, at least 85%, at least 88%, at least 90%, at least 92%, at least 95%, at least 96%, at least 97%, at least 98% or at least 99% sequence identity; and a light chain variable region (VL) comprising or consisting of an amino acid sequence according to SEQ ID NO: 27 or a functional variant of SEQ ID NO: 27 thereof having at least 70%, at least 75%, at least 80%, at least 85%, at least 88%, at least 90%, at least 92%, at least 95%, at least 96%, at least 97%, at least 98% or at least 99% sequence identity.

7. Use of the antibody, or the antigen binding fragment thereof, according to any one of the previous claims, in the manufacture of a medicament for the prevention and/or treatment of Zika virus infection.

8. A nucleic acid molecule comprising at least one polynucleotide encoding the antibody, or the antigen binding fragment thereof, according to any one of claims 1 – 6.

9. A vector comprising the nucleic acid molecule according to claim 8.
10. A plurality of nucleic acid molecules, each comprising at least one polynucleotide encoding the antibody, or of the antigen binding fragment thereof, according to any one of claims 1 – 6, wherein the plurality of nucleic acids encodes the antibody, or the antigen binding fragment thereof, according to any one of claims 1 – 6.
11. A plurality of vectors encoding the antibody, or the antigen binding fragment thereof, according to any one of claims 1 – 6.
12. A cell expressing the antibody, or the antigen binding fragment thereof, according to any of claims 1 – 6; or comprising the vector according to claim 9 or the plurality of vectors according to claim 11.
13. A pharmaceutical composition comprising the antibody, or the antigen binding fragment thereof, according to any one of claims 1 – 6, the nucleic acid molecule according to claim 8, the vector according to claim 9, the plurality of nucleic acid molecules according to claim 10, the plurality of vectors according to claim 11 and/or the cell according to claim 12.
14. Use of the antibody, or the antigen binding fragment thereof, according to any one of claims 1 – 6, the nucleic acid molecule according to claim 8, the vector according to claim 9, the plurality of nucleic acid molecules according to claim 10, the plurality of vectors according to claim 11, the cell according to claim 12, or the pharmaceutical composition according to claim 13, in the manufacture of a medicament for the prevention or treatment of Zika virus infection.
15. Use of the antibody, or the antigen binding fragment thereof, according to any of claims 1 – 6, the cell according to claim 12, or the pharmaceutical composition according to claim 13 comprising the antibody, or the antigen binding fragment thereof, for monitoring the quality of an anti-Zika vaccine by checking that the antigen of said vaccine contains the specific epitope in the correct conformation.
16. Use of the antibody, or the antigen binding fragment thereof, according to any of claims 1 – 6, the cell according to claim 12, or the pharmaceutical composition according to claim 13 comprising the antibody, or the antigen binding fragment thereof, in in vitro diagnosis of Zika virus infection.

17. A kit of parts comprising the antibody, or the antigen binding fragment thereof, according to any of claims 1 – 6, at least one nucleic acid according to claim 8, at least one vector according to claim 9, the plurality of nucleic acid molecules according to claim 10, the plurality of vectors according to claim 11, at least one cell according to claim 12, or at least one pharmaceutical composition according to claim 13.