CLAIMS

1. An isolated antibody or a fragment thereof that specifically binds to at least one conformational (non-linear) epitope of enterovirus 71 (EV71), wherein the antibody comprises at least one variable light chain and at least one variable heavy chain, wherein the variable light chain amino acid sequence comprises SEQ ID NO: 3 or antigen-binding fragment thereof, and the variable heavy chain amino acid sequence comprises at least one of SEQ ID NOs: 4 and 5 or antigen-binding fragment thereof, wherein the antibody is a neutralizing antibody or fragment thereof.

2. The isolated antibody or fragment thereof according to claim 1, wherein the variable light chain comprises at least one of SEQ ID NOs: 16, 17 and 18 or antigen-binding fragment thereof, and the variable heavy chain comprises at least one of SEQ ID NOs: 19, 20, 21, and 22 or antigen-binding fragment thereof.

3. An isolated antibody or a fragment thereof that specifically binds to at least one conformational (non-linear) epitope of enterovirus 71 (EV71), wherein the antibody comprises at least one variable light chain and at least one variable heavy chain, wherein the variable light chain amino acid sequence comprises SEQ ID NO: 1 or 15 or antigen-binding fragment thereof, and the variable heavy chain amino acid sequence comprises SEQ ID NO: 2 or antigen-binding fragment thereof, wherein the antibody is a neutralizing antibody or fragment thereof .

4. An isolated antibody or a fragment thereof that specifically binds to at least one conformational (non-linear) epitope of EV71, wherein the antibody comprises at least one variable light chain and at least one variable heavy chain, wherein the variable light chain amino acid sequence comprises SEQ ID NO: 6 or antigen-binding fragment thereof, and the variable heavy chain amino acid sequence comprises SEQ ID NO: 7 or antigen-binding fragment thereof, wherein the antibody is a neutralizing antibody or fragment thereof.

5. The isolated antibody or antigen-binding fragment thereof according to any one of the preceding claims, wherein the antibody is a monoclonal mouse, humanized or chimeric antibody.

6. The isolated antibody or fragment thereof according to any one of claims 1-5 for use in EV71 vaccine process control, candidate EV71 vaccine purification or determining EV71 antibody potency standards.

7. A pharmaceutical composition comprising at least one antibody or antigen-binding fragment thereof defined in any one of claims 1-5.

8. An isolated antibody or antigen-binding fragment thereof according to any one of claims 1-5 for use in the treatment of EV71 infection and/or at least one EV71-linked disease.

9. The isolated antibody or antigen-binding fragment thereof according to claim 8, wherein the EV71-linked diseases is selected from the group consisting of aseptic meningitis, encephalitis, cranial nerve palsies, Guillain-Barre syndrome, poliomyelitis-like syndrome, brainstem encephalitis, herpangina, and Hand, Foot and Mouth disease.

10. Use of at least one antibody or antigen-binding fragment thereof defined in any one of claims 1-5 for the preparation of a medicament for treatment of EV71 infection and/or at least one EV71-linked disease.

11. The use according to claim 10, wherein the medicament comprises the humanized antibody defined in claim 4 and one or more other antibodies hereinbefore defined.

12. The use according to claim 10 or 11, wherein the EV71-linked disease is selected from the group consisting of aseptic meningitis, encephalitis, cranial nerve palsies, Guillain-Barre syndrome, poliomyelitis-like syndrome, brainstem encephalitis, herpangina, and Hand, Foot and Mouth disease.

13. A method of producing an antibody specific for picornavirus conformational epitopes, the method comprising:

immunizing at least one non-human mammal with at least one empty immature picornavirus particle comprising at least two viral proteins of the picornavirus to form at least one B cell specific for the picornavirus;

selecting at least one B cell specific to the picornavirus;

fusing the selected B cell with at least one immortalized cell to produce at least one hybridoma, wherein the hybridoma is capable of producing at least one antibody or a antigen-binding fragment thereof specific for the picornavirus; and

optionally isolating the antibody from the hybridoma and sequencing the variable heavy and light chains.

14. The method according to claim 13, wherein the immature picornavirus particle comprises a precursor for at least one viral protein of the picornavirus.

15. The method according to any one of claims 13 or 14, wherein the picornavirus may be selected from the group consisting of Aphthovirus, Aquamavirus, Avihepatovirus, Cardiovirus, Cosavirus, Dicipivirus, Enterovirus, Erbovirus, Hepatovirus, Kobuvirus, Megrivirus, Parechovirus, Salivirus, Sapelovirus, Senecavirus, Teschovirus, and Tremovirus.

16. The method according to any one of claims 13-15, wherein the picornavirus is selected from the group consisting of Enterovirus A, Enterovirus B, Enterovirus C, Enterovirus D, Enterovirus E, Enterovirus F, Enterovirus G, Enterovirus H, Enterovirus J, Rhinovirus A, Rhinovirus B, and Rhinovirus C.

17. The method according to any one of claims 13-16, wherein the picornavirus is EV71.

18. The method according to claim 17, wherein the at least two viral proteins are selected from the group consisting of VP0, VP1, VP2, VP3, and VP4.

19. The method according to claim 17 or 18, wherein the at least two viral proteins comprise VP2 and VP3.

20. The method according to any one of claims 17 to 19, wherein the precursor is VP0.

21. An isolated nucleic acid molecule encoding

(a) at least one variable light chain of the antibody or a antigen-binding fragment thereof defined in any one of claims 1-3, 8 and 9, wherein the variable light chain comprises at least one amino acid sequence selected from the group consisting of SEQ ID NOs: 3 and 16-18 or antigen-binding fragment thereof; and

(b) at least one variable heavy chain of the antibody or a antigen-binding fragment thereof defined in any one of claims 1, 2 and 5, wherein the variable heavy chain comprises at least one amino acid sequence selected from the group consisting of SEQ ID NOs: 4, 5 and 19-22 or antigen-binding fragment thereof.

22. The isolated nucleic acid molecule according to claim 21, wherein the at least one nucleic acid sequence in (a) has at least 90% sequence identity to SEQ ID NO: 10 and/or 24 and/or 25 and/or26; and/or

the at least one nucleic acid sequence in (b) has at least 90% sequence identity to SEQ ID NO: 11 and/or 12 and/or 27, and/or 28 and/or 29 and/or 30.

23. The isolated nucleic acid molecule according to claim 22, comprising:

(a) at least one nucleic acid sequence from the group consisting of SEQ ID NOs: 10 and 24-26 or fragment thereof; and/or

(b) at least one nucleic acid sequence from the group consisting of SEQ ID NOs: 11, 12, and 27-30 or fragment thereof.

24. An isolated nucleic acid molecule encoding

(a) at least one variable light chain of the antibody or a antigen-binding fragment thereof defined in any one of claims 3 and 5, wherein the variable light chain comprises at least one amino acid sequence selected from the group consisting of SEQ ID NOs: 1 and 15 or antigen-binding fragment thereof; and

(b) at least one variable heavy chain of the antibody or a antigen-binding fragment thereof defined in any one of claims 3, and 5, wherein the variable heavy chain comprises at least one amino acid sequence of SEQ ID NO: 2 or antigen-binding fragment thereof.

25. The isolated nucleic acid molecule according to claim 24, wherein the at least one nucleic acid sequence in (a) has at least 90% sequence identity to SEQ ID NO: 8 and/or 23; and/or

the at least one nucleic acid sequence in (b) has at least 90% sequence identity to SEQ ID NO: 9.

26. The isolated nucleic acid molecule according to claim 25, comprising:

(a) at least one nucleic acid sequence of SEQ ID NO: 8 and/or 23 or fragment thereof; and/or

(b) at least one nucleic acid sequence of SEQ ID NO: 9 or fragment thereof.

27. An isolated nucleic acid molecule encoding

(a) at least one variable light chain of the antibody or a antigen-binding fragment thereof defined in any one of claims 6-9, wherein the variable light chain comprises at least one amino acid sequence of SEQ ID NO: 6 or antigen-binding fragment thereof; and

(b) at least one variable heavy chain of the antibody or a antigen-binding fragment thereof defined in any one of claims 4 and 5, wherein the variable heavy chain comprises at least one amino acid sequence of SEQ ID NO: 7 or antigen-binding fragment thereof.

28. The isolated nucleic acid molecule according to claim 27, wherein the at least one nucleic acid sequence in (a) has at least 90% sequence identity to SEQ ID NO: 13; and

the at least one nucleic acid sequence in (b) has at least 90% sequence identity to SEQ ID NO: 14.

29. The isolated nucleic acid molecule according to claim 28, comprising:

(a) at least one nucleic acid sequence of SEQ ID NO: 13 or fragment thereof; and

(b) at least one nucleic acid sequence of SEQ ID NO: 14 or fragment thereof.

30. An expression vector comprising at least one of isolated nucleic acid molecule defined in any one of claims 21 to 29.

31. A host cell comprising the expression vector defined in claim 30.

32. A kit comprising at least one antibody or antigen-binding fragment thereof defined in any one of claims 1-5.