SUMMARY OF THE INVENTION

【0007】 Therefore it is ~~a primary~~an object of the present invention to provide monoclonal antibody that binds specifically to dengue virus NS1 antigen. It can be effectively employed to detect dengue virus infection in a subject, such as a human. Such assays can be employed to detect the presence of dengue virus infection using biological samples including blood, serum, plasma, saliva, cerebrospinal fluid.(Monique da Rocha Queiroz Lima et al., PLOSNTDS, v5 (5), e1147, 2011).In one ~~embodiment~~example, the disclosed assays employ a first antibody specific for dengue NS1 as a capture antibody, with a second antibody specific for dengue NS1 in monomeric and/or oligomeric (primarily dimeric) forms being employed as a detection antibody.

【0008】 Another object of the present invention is to provide an antibody composition having at least one monoclonal antibody that binds specifically to dengue antigen for detection of dengue NS1 antigen. Thus a monoclonal antibody of the antibody composition can be mass-produced and applied to detect dengue pathogens.

【0009】 In order to achieve the above objects, an antibody composition of the present invention includes at least one monoclonal antibody. In one aspect, there is provided an antibody composition comprising a first monoclonal antibody; the monoclonal antibody specifically binds type 1 dengue antigen; wherein the monoclonal antibody includes heavy chain complementarity determining region 1(HCDR1) of sequence ID number (SEQ ID NO):26, heavy chain complementarity determining region 2(HCDR2) of SEQ ID NO:28, heavy chain complementarity determining region 3(HCDR3) of SEQ ID NO:30, light chain complementarity determining region 1(LCDR1) of SEQ ID NO:32, light chain

complementarity determining region 2(LCDR2) of SEQ ID NO:34, light chain complementarity determining region 3(LCDR3) of SEQ ID NO:36. In one aspect, there is provided an antibody composition comprising a second monoclonal antibody; the monoclonal antibody specifically binds type 2 dengue antigen; wherein the monoclonal antibody includes HCDR1 of SEQ ID NO:62, HCDR2 of SEQ ID NO:64, HCDR3 of SEQ ID NO:66, LCDR1 of SEQ ID NO:68, LCDR2 of SEQ ID NO:70, LCDR3 of SEQ ID NO:72. In another aspect there is provided an antibody composition comprising a third monoclonal antibody; the monoclonal antibody specifically binds type 3 dengue antigen; wherein the monoclonal antibody includes HCDR1 of SEQ ID NO:74, HCDR2 of SEQ ID NO:76, HCDR3 of SEQ ID NO:78, LCDR1 of SEQ ID NO:80, LCDR2 of SEQ ID NO:82, LCDR3 of SEQ ID NO:84. In yet another aspect there is provided an antibody composition comprising a fourth monoclonal antibody; the monoclonal antibody specifically binds type 4 dengue antigen; wherein the monoclonal antibody includes HCDR1 of SEQ ID NO:50, HCDR2 of SEQ ID NO:52, HCRD3 of SEQ ID NO:54, LCDR1 of SEQ ID NO:56, LCDR2 of SEQ ID NO:58, LCDR3 of SEQ ID NO:60. In a further aspect there is provided an antibody composition comprising a fifth monoclonal antibody; the monoclonal antibody specifically binds type 1 or type 2 dengue antigens; wherein the monoclonal antibody includes HCDR1 of SEQ ID NO:2, HCDR2 of SEQ ID NO:4, HCDR3 of SEQ ID NO:6, LCDR1 of SEQ ID NO:8, LCDR2 of SEQ ID NO:10, LCDR3 of SEQ ID NO:12. In one aspect there is provided an antibody composition comprising a sixth monoclonal antibody; the monoclonal antibody specifically binds type 1 or type 3 dengue antigens; wherein the monoclonal antibody includes HCDR1 of SEQ ID NO:14, HCDR2 of SEQ ID NO:16, HCDR3 of SEQ ID NO:18, LCDR1 of SEQ ID NO:20, LCDR2 of SEQ ID NO:22, LCDR3 of SEQ ID NO:24. In another aspect there is provided an antibody composition comprising a seventh monoclonal antibody; the monoclonal

antibody specifically binds type 1, type 2, type 3 or type 4 dengue antigens; wherein the monoclonal antibody includes HCDR1 of SEQ ID NO:38, HCDR2 of SEQ ID NO:40, HCDR3 of SEQ ID NO:42, LCDR1 of SEQ ID NO:44, LCDR2 of SEQ ID NO:46, LCDR3 of SEQ ID NO:48. ~~The antibody composition features on that t~~The monoclonal antibody specifically binds to a dengue NS1 antigen so as to detect dengue fever. The dengue fever can be type 1 dengue fever, type 2 dengue fever, type 3 dengue fever, or dengue virus type 4.

【0010】 At the same time, a method for producing the antibody composition of the present invention includes a plurality of steps. In one aspect, there is provided a method for producing a monoclonal antibody comprising the steps of: providing at least one dengue *antigen of at least one dengue fever*; immunizing an experimental *animal with* the dengue antigen; *yielding a hybridoma cell* by fusing a splenocyte from the experimental animal with a tumor cell; and producing a monoclonal *antibody* by the hybridoma *cell;* wherein the dengue fever is selected from the group consisting of type 1 dengue fever, type 2 dengue fever, type 3 dengue fever and type 4 dengue fever. In one example, the steps are f~~F~~irst provide a dengue antigen of dengue fever and use the dengue antigen to immunize an experimental animal. Then yield a hybridoma cell by fusing a splenocyte from the experimental animal with a tumor cell.

the dengue antigen is Dengue virus nonstructural protein 1 (nonstructural protein 1, NS1).

7. An antibody composition comprising a fourth monoclonal antibody; the monoclonal antibody specifically binds type 4 dengue antigen; wherein the monoclonal antibody includes HCDR1 of SEQ ID NO:50, HCDR2 of SEQ ID NO:52, HCRD3 of SEQ ID NO:54, LCDR1 of SEQ ID NO:56, LCDR2 of SEQ ID NO:58, LCDR3 of SEQ ID NO:60.

8. The antibody composition as claimed in claim 7, wherein the dengue antigen is Dengue virus nonstructural protein 1 (nonstructural protein 1, NS1).

9. An antibody composition comprising a fifth monoclonal antibody; the monoclonal antibody specifically binds type 1 or type 2 dengue antigens; wherein the monoclonal antibody includes HCDR1 of SEQ ID NO:2, HCDR2 of SEQ ID NO:4, HCDR3 of SEQ ID NO:6, LCDR1 of SEQ ID NO:8, LCDR2 of SEQ ID NO:10, LCDR3 of SEQ ID NO:12.

10. The antibody composition as claimed in claim 9, wherein the dengue antigen is Dengue virus nonstructural protein 1 (nonstructural protein 1, NS1).

11. An antibody composition comprising a sixth monoclonal antibody; the monoclonal antibody specifically binds type 1 or type 3 dengue antigens; wherein the monoclonal antibody includes HCDR1 of SEQ ID NO:14, HCDR2 of SEQ ID NO:16, HCDR3 of SEQ ID NO:18, LCDR1 of SEQ ID NO:20, LCDR2 of SEQ ID NO:22, LCDR3 of SEQ ID NO:24.

12. The antibody composition as claimed in claim 11, wherein the dengue antigen is Dengue virus nonstructural protein 1 (nonstructural protein 1, NS1).

13. An antibody composition comprising a seventh monoclonal antibody; the monoclonal antibody