

peutically, competition for same binding site on ESB GP, and/or use of the same combination of complementarity determining regions. The antibodies can be of any class such as IgG, IgM, or IgA or any subclass such as IgG1, IgG2a, and other subclasses known in the art. Further, the antibodies can be produced by any method, such as phage display, or produced in any organism or cell line, including bacteria, insect, mammal or other type of cell or cell line which produces antibodies with desired characteristics, such as humanized antibodies. The antibodies can also be formed by combining a Fab portion and a Fc region from different species, or by keeping the complementarity-determining regions and modifying the framework regions to that of another species (such as a human, which is described in more detail below).

[0024] The monoclonal antibodies of the present invention described below recognize epitopes on Ebola Sudan Boniface GP (SEQ ID NO: 13 describes the amino acid sequence of ESB GP used as an immunogen) within the sequence extending from residues 32 and 533. More specifically, the MAbs 16H11 (SEQ ID NOS. 1 and 2), 19B3 (SEQ ID NOS. 3 and 4), 17F6 (SEQ ID NOS. 5, 11 and 6, 12), and 16F6 (SEQ ID NOS. 7-10) recognize conformational epitopes in the ESB GP sequence that compromise discontinuous ESB virus amino acids (SEQ ID NO. 19 and FIG. 17).

[0025] A further embodiment of the present invention provides for mixtures of the above-described antibodies, as well as to methods of using individual antibodies, or mixtures thereof for the prevention and/or therapeutic treatment of ESB infections in vitro and in vivo, and/or for improved detection of ESB infections.

[0026] Another embodiment relates to the treatment or prevention of ESB virus infection by administering a therapeutically or prophylactically effective amount of one antibody of the present invention or a mixture of antibodies of the present invention to a subject in need of such treatment.

[0027] A further embodiment provides passive vaccines for treating or preventing ESB virus infections comprising a therapeutically or prophylactically effective amount of the antibodies of the present invention which protect against ESB virus, in combination with a pharmaceutically acceptable carrier or excipient.

[0028] Yet another embodiment provides methods for diagnosis of ESB virus infection by assaying for the presence of ESB in a sample using the antibodies of the present invention.

[0029] Still another embodiment provides novel immunoprobes and test kits for detection of ESB virus infection comprising antibodies according to the present invention. For immunoprobes, the antibodies are directly or indirectly attached to a suitable reporter molecule, e.g., and enzyme or a radionuclide. The test kit includes a container holding one or more antibodies according to the present invention and instructions for using the antibodies for the purpose of binding to ESB virus to form an immunological complex and detecting the formation of the immunological complex such that presence or absence of the immunological complex correlates with presence or absence of ESB virus.

[0030] In another embodiment, there are provided anti-idiotypic antibodies raised against one of the present monoclonal antibodies for use as a vaccine to elicit an active anti-GP response.

[0031] In a further embodiment, there are provided antigenic epitopes as a component of a ESB virus vaccine. The epitopes described above comprising SEQ ID NO: 19, or conservative changes thereof which are still recognized by

the antibodies, are useful for actively immunizing a host to elicit production of protective antibodies against ESB.

[0032] It is an object of the present invention to facilitate the identification of the Sudan Boniface species of Ebola virus in an outbreak situation.

[0033] It is another object of the present invention that these antibodies or "humanized" versions of these monoclonals could be used as therapeutic treatment in Ebola Sudan patients.

[0034] It is, further still, an object of the present invention that the glycoprotein disclosed be produced by alternative cells such as insect cell lines and mammalian cell lines producing this protein.

[0035] Another object of this invention is to disclose means for quantification for dosing determination of vaccine candidates utilizing the Sudan Boniface glycoprotein.

[0036] The various features of novelty that characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and specific objects attained by its uses, reference is made to the accompanying drawings and descriptive matter in which a preferred embodiment of the invention is illustrated.

BRIEF DESCRIPTION OF THE DRAWINGS

[0037] In the drawings:

[0038] FIG. 1 is a graph showing percentage of primary antibody expression (at specified concentrations) in VERO cells infected with replicon expressing Sudan Boniface GP using a goat-anti mouse IgG FITC-conjugated secondary antibody.

[0039] FIG. 2 is a graph showing percentage of primary antibody expression (at specified concentrations) in VERO cells infected with replicon expressing Sudan Gulu GP using a goat-anti mouse IgG FITC-conjugated secondary antibody.

[0040] FIG. 3 is a graph showing percentage of primary antibody expression (at specified concentrations) in VERO cells infected with replicon expressing Zaire GP using a goat-anti mouse IgG FITC-conjugated secondary antibody.

[0041] FIG. 4 is a graph showing percentage of primary antibody expression (at specified concentrations) in VERO cells infected with replicon expressing Lassa NP using a goat-anti mouse IgG FITC-conjugated secondary antibody.

[0042] FIG. 5 is a photograph of 96-well nitrocellulose plates containing overlapping 13-mer peptides of Ebola Sudan GP incubated from antibodies generated from the 19F10 and 19B3 hybridomas. Dark spots identify the linear sequence of binding by indirect immunochemical means.

[0043] FIG. 6 is a photograph of 96-well nitrocellulose plates containing overlapping 13-mer peptides of Ebola Sudan GP incubated from antibodies generated from the 3C10 and 17F6 hybridomas. Dark spots identify the linear sequence of binding by indirect immunochemical means.

[0044] FIG. 7 is a table showing an overview of murine antibodies generated against Sudan Boniface Glycoprotein.

[0045] FIG. 8 is a table showing an overview of murine antibodies generated against Sudan Boniface Glycoprotein.

[0046] FIG. 9 is a photograph of 96-well nitrocellulose plates containing overlapping 13-mer peptides of Ebola Sudan GP incubated from antibodies generated from the 584 hybridoma. Dark spots identify the linear sequence of binding by indirect immunochemical means.