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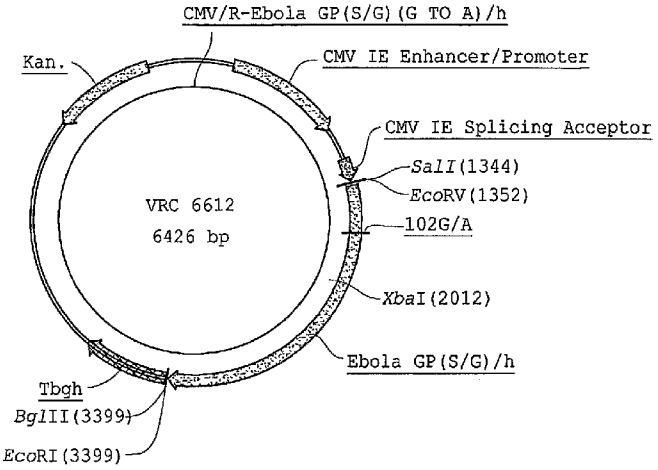
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(54) Title: OPTIMIZED VACCINES TO PROVIDE PROTECTION AGAINST EBOLA AND OTHER VIRUSES



(57) Abstract: The invention is related to a nucleic acid molecule comprising a polynucleotide encoding a modified filovirus glycoprotein (GP) having at least one amino acid change located in a relatively conserved region of said GP that decreases *in vitro* cytotoxicity and retains immunogenicity when compared to *in vitro*cytotoxicity and immunogenicity of a wild type filovirus GP, and related modified filovirus GPs, plasmid DNAs, recombinant viruses, adenoviruses, pharmaceutical compositions, vaccine compositions, antibodies that are specifically reactive with the modified filovirus GPs, and related methods of making and using the same.

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