Analysis of recombinant, polyvalent Dengue virus containing non-structural proteins (NS1) from serotypes-1, -2 and -4 and expressed in Baculovirus

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Dengue virus (DENV) has four serotypes that cause a public health problem in Indonesia and other countries. Currently, there is no preventative vaccine for this disease, but some model vaccines are in development. The NS1 protein genes from three isolates of Dengue virus (DENV-1, -2 and -4) were isolated, cloned into E. coli and then sub-cloned into a Baculovirus vector before co-transfection into Sf9 cells. Recombinant NS1 genes were inserted between the Smal and Sacl sites of the plasmid, adjacent to the baculoviral structural gene, polyhedrin. The sequence of recombinant NS1 gene was relatively stable with 97-98% homology, although there were amino acid substitutions in some regions. The recombinant protein was more antigenic when exposed to polyclonal sera from infected humans than sera from immunized mice, but its binding to monoclonal antibodies IgG1a and IgG2b was stronger than other isolopes, including IgM, IgG and Ig1b. Recombinant NS1 protein induced cellular immune responses in immunized mice, as demonstrated by lymphocyte secretion of IL-3. This study indicates that recombinant NS1 protein expressed in a baculovirus system can induce humoral and cellular immune responses.

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