

VAC_13 - Development and comparison of potential DNA and mRNA vaccines for Dengue serotype 2

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Introduction: Dengue is the main arbovirus that affects the human population. It is an acute systemic viral disease transmitted by mosquitoes of the genus *Aedes* in tropical and subtropical areas. Brazil has four dengue serotypes circulating endemic. Due to the lack of adequate differential diagnosis, specific treatment, and an efficient vaccine available with high coverage in the population, it is one of the neglected diseases with the greatest impact on the Brazilian health system. Breaking the death record in 2022, with more than a thousand confirmed cases.

Objectives: The development of a prophylactic vaccine, aimed specifically at the Brazilian context, developed quickly and accessible to the population, would be the ideal strategy to overcome the current situation. We evaluated the immunogenicity response of nucleic acid vaccines in the form of DNA or mRNA, which encodes the envelope protein and the non-structural protein 1 for dengue serotype 2.

Methodology: We used DNA and mRNA coated with a lipid nanoparticle of the sequences that codify the proteins and induce production in vivo, triggering the development of the immune response. The immunization of C57BL/6 mice was carried out, in a two-dose schedule with an interval of 21 days, administering 100ug for DNA and 10ug for LNP mRNA, blood collection between doses for evaluation of the humoral response, and euthanasia 30 days after the boost, with the collection of the spleen to evaluate the cellular response.

Results: Confirmation of 293T transfection and in vitro protein production was performed by FACs and Western blot. A humoral response was observed from prime for animals immunized with NS1D2 by DNA and LNP mRNA and for animals immunized with E80D2 by DNA. There was a significant increase in IgG titers after the NS1D2 boost, with a similar DNA and mRNA response. In the evaluation of IFN-gamma, an increase in titer was detected after stimulation.

Conclusion: We can assess the effective immunogenic potential of these candidate vaccines, based on the positive evaluation of the humoral and cellular response, as it is essential for the mechanism of protection against Dengue. The evaluation of the protective potential will be performed to better characterize these immunizers, as well as the development of this strategy for the other serotypes.

Keywords: Dengue vaccine, DNA, mRNA