

VAC_12 - *In silico* identification of epitopes target of humoral response against Sphingomyelinase 2 (Sph2) of pathogenic *Leptospira*

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Introduction: Widely disseminated, leptospirosis, a disease caused by pathogenic spirochetes of the genus *Leptospira*, affects more than 1 million people around the world every year, leading to about 60,000 deaths. It is endemic in Brazil, and during the rainy season, it becomes epidemic, affecting more than 3,500 people every year, with 75% of cases evolving to hospitalization and 11% to death. Although considerable for public health, it lacks an effective diagnostic methods and protective vaccines, which contributes to the increased occurrence of the disease and hospitalizations caused by aggravation of the cases. In this sense, the hemolysin Sph2 has been studied as a vaccine candidate for its relevance in the invasion of the organism and contribution to the proliferation of *Leptospira*. Thus, immunoinformatics represents a promising strategy for the identification of Sph2 epitopes for vaccine and diagnostic purposes.

Objective: To identify, *in silico*, epitopes target of antibodies in the Sph2 protein.

Methodology: Through the combination of 7 immunoinformatics algorithms, linear epitopes were predicted, observing the sequences in agreement between at least 5 of the 7 algorithms used and with more than 10 amino acids. The predicted peptides were synthesized and tested through ELISA tests against 51 samples reactive for leptospirosis and 43 non-reactive samples in order to evaluate their immunogenicity.

Results: From the combination of results, we reached a total of 4 predicted epitopes, from which 2 were selected for their amino acid chain length. As a result, 29% of the reactive samples (15) presented antibodies against peptide 1, while for peptide 2, 18% of the reactive samples (9) presented antibodies. In the control group, only 2% of the non-reactive samples (1) presented antibodies against peptide 1, a similar pattern of peptide 2, where 5% of the non-reactive samples (4) presented antibodies against this peptide.

Conclusion: Through immunoinformatics it was possible to identify 2 epitopes in this protein. The ELISA tests allowed the evaluation of the immunogenicity of peptides 1 and 2 against antibodies present in the serum of patients. We believe that this study can contribute to advances in vaccine research against leptospirosis.

Keywords: Leptospirosis vaccine; Sph2; *In silico*