SYNTHESIS OF A MOLECULAR IMPRINTED POLYMER-BASED CHEMOSENSOR FOR DIFFERENTIAL DIAGNOSIS OF DENGUE IN RELATION TO OTHER VIRAL INFECTIONS.

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INTRODUCTION: Dengue fever, transmitted by Aedes aegypti, poses significant health risks in tropical areas. Its resurgence and the recent increase in cases demonstrate its importance as a public health problem. Differentiating it from similar viruses, such as Zika and Chikungunya, is a diagnostic challenge, highlighting the need for more accurate and accessible diagnostic methods. OBJECTIVE: This project aims to develop a molecularly imprinted polymer (MIP) biosensor synthesized on a printed circuit board (PCB) electrode. The main objective of this research is to develop a new diagnostic method for dengue fever by identifying a common epitope in the dengue NS1 proteins. This epitope will be used to create a molecularly imprinted polymer (MIP) with high affinity for the NS1 protein, allowing the selective detection of dengue fever and the differentiation of other arboviruses. MATERIALS AND METHODS: Molecular imprinting is a highly specific process that creates a polymer with unique properties by forming cavities tailored to the target molecule. When synthesizing the polymer, highly specific binding sites are created, mimicking the natural recognition properties of antibodies and enzymes, but at a lower cost. A significant innovation in this research is the development of MIPs on a PCB. These electrodes provide a narrow interface that allows the formation of selective "channels" within the polymer for the chosen epitopes. These electrodes, connected to a device that emits electrical signals, facilitate the detection of analytes by emitting a signal inversely proportional to the adsorption of the analyte, allowing its quantification. RESULTS AND CONCLUSION: These MIPs present high stability and selectivity, making them suitable for clinical diagnostics. The potential of MIPs to provide accurate and cost-effective diagnosis of dengue fever could significantly improve patient care by enabling accurate and timely treatment decisions, thereby reducing the risk of severe outcomes. By targeting a common epitope in the NS1 protein of all dengue serotypes, this method offers a promising alternative to current diagnostic techniques, aiming to improve clinical outcomes and aid healthcare professionals in decision-making. Future work will focus on in vitro validation and further optimization of the MIP-based diagnostic approach.

Keywords: Dengue; Epitopes; NS1; Molecular imprint; Electroanalysis.

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