DEVELOPMENT OF A NANOTECHNOLOGY TOOL FOR THE DIAGNOSIS OF SCHISTOSOMIASIS

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Schistosomiasis is a public health problem that infects over 1.5 million people in Brazil. The gold standard test for diagnosing this disease is Kato-Katz, based on the detection of eggs in stool samples. However, it often yields false negative results for patients with a low parasitic load. Therefore, it is essential to develop more sensitive tests for the diagnosis of schistosomiasis. Currently, the use of biosensors has been used as promising tools for the diagnosis of other pathogens, such as SARS-CoV. Therefore, the objective of this study was to use EPEL technology - Portable Light Scattering Spectrometer (patent BR1020160097657) - to standardize a new form of diagnosis for schistosomiasis. EPEL performs analytical detection measurements based on the principle of dynamic light scattering in depolarized mode (DLS) emitted by the optical signal produced by gold nanorods bio-conjugated with recognition elements of interest. In this study, the tips of the nanorods were conjugated with a high molecular weight protein fraction extracted from the adult worm of *Schistosoma mansoni* (SmJ1). For standardization, the soluble extract of the adult worm was initially produced and fractionated in an exclusion column to obtain the SmJ1 fraction; then, the production of gold nanorods (150pM) and their functionalization with SmJ1 was carried out through chemical bonding mediated by linker 11-mercaptoundecanoic acid. After confirmation of the successful functionalization, serum from patients in the endemic region of Januária (Minas Gerais, Brazil) were tested at different concentrations. Preliminary tests indicate that the biosensors with SmJ1 were able to recognize and differentiate the association profile of the sensor with serum proteins from an individual infected with *S. mansoni* and an uninfected individual, indicating that this is a promising tool for the diagnosis of schistosomiasis.

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