A NANO-BASED ELECTROCHEMICAL IMMUNOSENSOR FOR RAPID AND SENSITIVE DIAGNOSIS OF *Schistosoma* IN KENYA

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ABSTRACT

Schistosomiasis also known as Bilharzia is caused by the parasites of the species *Schistosoma* and is one of the 17 Neglected Tropical Diseases (NTDs). It affects over 950million people in the world with Africa being the most affected due to escalating levels of poverty. In Kenya, it affects about 20 million people whose economic activities involve direct contact with otherwise infected waters. The effect of the disease becomes complicated with time and therefore early detection using a very sensitive and accurate method is important in its treatment and management. Its diagnosis currently is performed by microscopic detection of eggs (in urine or stool) or by immunological methods (antibody or antigen detection). However, these methods suffer low sensitivity and occasionally give unreliable results especially in low prevalence areas. This study sets to develop a versatile and sensitive electrochemical technique based on Silver (Ag) and Gold (Au) nano-particles (NPs) for detection of Schistosomiasis soluble egg antigens (SEA) in excreta from infected individuals. The nano-immunosensor will consist of a biolayer of Ag/Au-NPs conjugated to anti-schistosoma antibodies or SEA. The conjugate will be characterized by UV/Vis and Cyclic Voltammetry(CV) before immobilizing on a sensor platform. The molecular recognition of NPs-Antibody or NPs-SEA conjugate with an enzyme will be studied using Enzyme Linked Immunosorbent Assay (ELISA) and the analytical signal arising from this characterized electrochemically using CV. The signal will be relayed to a micro-processor and eventually to a display. This response signal is rapid, specific and fast enough to give real-time diagnostic results for Schistosomiasis. The data obtained on reliability, precision, selectivity and sensitivity tests shall be subjected to standard statistical analysis procedures.