A Novel Application of a Lateral Flow Immunoassay To Develop a Non-Invasive and Rapid Whole Blood Diagnostic Method for Alzheimer's Disease

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Alzheimer's disease (AD), a progressive neurological illness defined by the death of brain nerve cells, frequently leads to dementia as well as impairments in judgment, memory, and communication. Currently, AD has no cure, although early detection of the condition is possible. However, present diagnosis methods are highly invasive, costly, and require complex technology, inherently putting third world countries at a disadvantage due to the lack of access. On a large scale, the use of a lateral flow immunoassay strives to overcome this challenge and studies to test the role of the antibody selective to the ptau-181 antigen, a common biomarker used by multiple studies to detect AD. More specifically, varied quantities of antibodies binding together can produce a vast range of results (some better than others), hypothesizing that an “ideal” ratio of antibodies could be reached. Different concentrations of varying antibodies (selective to the ptau-181 antigen) mixed into solutions with blocking buffers, once placed on the layered test strip (specifically the control line and conjugate pad), were tested to determine which ratio provides the strongest binding site. Results show that certain variations of antibodies produced the clearest and most vibrant imaging (presented visually by the naked eye and magnified through a fluorescent microscope) as compared to both higher and lower ratios of the antibody combinations. The results were as expected and supported both hypotheses while serving as justification that lateral flow immunoassays could serve as enhanced alternatives to the current invasive procedures that diagnose AD.