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Molecular validation of putative antimicrobial peptides for improved Human Immunodeficiency Virus diagnostics via HIV protein p24

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The Human Immunodeficiency Virus-1 is responsible for causing the acquired immunodeficiency syndrome pandemic. More than 40 million people are infected globally, with 60% of the infected people residing in sub-saharan Africa. Earlier detection translates into earlier treatment, which ensures improved quality of life. However, difficulties remain in the field of HIV diagnostics. The p24 antigen detection assay is preferred due to its ability to decrease the window period. The current p24 diagnostic assay displays insensitivity due to the p24 antibody produced by the body, binding to the C-terminal of the p24 antigen. This interaction obstructs detection, the basis of the current p24 assay. *In silico* approaches identified novel antimicrobial peptides (AMP) which bind to the N-terminal domain of the p24 antigen (provisional patent). This binding is important because if the p24 antibody binds to the C-terminal, the unoccupied N-terminal domain would provide a binding pocket for the AMP. Conjugation of nanoparticles to the positively validated AMPs, can lead to development of a diagnostic lateral flow device (LFD). *In silico* studies were done to identify additional AMPs that bind the N-terminal domain of p24 antigen with increased binding affinity. A preliminary study sought to design a LFD containing the identified AMPs to test HIV positive sera. Protein expression of p24 was done to test in binding studies against the AMPs. *In silico* studies predicted 9 AMPs to bind to the p24 antigen. Binding interaction between p24 and AMPs were molecularly validated. Consequently, a sensitive LFD for HIV diagnostics could be developed.

Biography

Monray Edward Williams is an MSc Biotechnology candidate from the University of the Western Cape, South Africa, devoted in research fields HIV diagnostics, bioinformatics and molecular biology. He obtained his BSc (Hon) from the University of the Western Cape. His current research focus is HIV diagnostics, whereby he holds a provisional patent for antimicrobial peptide sequences which are currently being implemented in a sensitive diagnostic device to detect HIV within the window period.

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