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Evaluation of immunochromatographic-gold nanoparticle based assay efficacy in the detection of protease inhibitor in HIV-1 infected patient's plasma

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Abstract
By the use of nanotechnology in the development of bioassay kit, the ideal goals that inevitable are rapid, convenience and cost effective. Through our knowledge toward Human Immunodeficiency Virus-1/Acquire Immunodeficiency Disease (HIV-1/AIDS), we successfully produced a novel test kit for investigating both of HIV protease activity and HIV-1 protease inhibitors (PIs). This assay was developed using an immunochromatographic (IC) assay combined with colloidal gold tracers to establish the enzymatic activity IC strip test which can interpret result with the naked eye. In this present study we evaluated the efficacy of strip test by comparing the result of the strip test with the quantity of level of PI in HIV-infected patients detected by the High Performance Liquid Chromatography (HPLC) method. Various parameters including relative accuracy, relative sensitivity, relative specificity, and Kappa co-efficiency (k) of test kit were analyzed. The results revealed that the relative accuracy, relative sensitivity and relative specificity of IC strip were 97.8, 100%, and 96.8 % respectively. The Kappa co-efficiency (k) value was 0.95 showing the high strength of agreement of PI strip with the gold standard, HPLC method ($p < 0.05$). Suggesting that IC strip test has suitable efficacy to determine the PI in plasma samples from human immunodeficiency virus-infected patients.

Keywords: HIV-1 protease, HIV-1 protease, Immunochromatographic strip test, gold nanoparticle

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