Development of a combined immunoassay for the detection of HIV-1/2/O antigen and antibodies, for use on the new LIAISON® XL analyzer.

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We have developed the LIAISON® XL HIV Ab/Ag assay for use on the DiaSorin LIAISON® XL analyzer. The LIAISON® XL HIV Ab/Ag assay is capable of combining qualitative results for earlier detection of HIV-1, HIV-2, HIV-1 subtype “O” antibodies and HIV p24 antigen in human serum/plasma specimens with sensitivity and specificity comparable to the best IV generation assays currently available on the market.

The LIAISON® XL HIV Ab/Ag assay should be used as an aid in the diagnosis of HIV-1/HIV-2 infection and as a screening test for donated blood and plasma.

References:
**INTRODUCTION**

The LIAISON® XL HIV Ab / Ag assay employs chemiluminescence immunoassay (CLIA) technology for the combined qualitative determination of p24 antigen of human immunodeficiency virus type 1 (HIV-1) and specific antibodies to both human immunodeficiency virus type 1 (group M and group O) and/or human immunodeficiency virus type 2 (HIV-2) in human serum or plasma samples. The assay was designed with two different reagent cartridges, one for HIV antibody detection and one for p24 antigen detection. The method for qualitative determination of specific antibodies to HIV is an antigen sandwich chemiluminescence immunoassay (CLIA). HIV-1, HIV-1 group O, and HIV-2 antigens are coated onto magnetic particles (solid phase) and are also conjugated to an isoluminol derivative (isoluminol-antigen conjugate). The method for qualitative determination of HIV p24 antigen is a sandwich chemiluminescence immunoassay (CLIA) based on the use of monoclonal antibodies anti-p24. In both methods the starter reagents are added and a flash chemiluminescence reaction is thus induced. Then the light signal is measured by a photomultiplier as relative light units (RLU) and it is indicative of HIV p24 antigen or antibodies presence in calibrator, samples or controls. When the assay is started, the specimens are run on both integrals to provide combined results. Evaluation of diagnostic performance stems from interpretation of data obtained by the automatic combination of results from anti-HIV antibody and HIV p24 antigen assays.

**METHODS & RESULTS**

**SPECIFICITY ASSESSMENT**

A study was performed on a total of 5117 serum and plasma specimens collected in two blood donation centers (Lille and Normandie). The assay shows an excellent 99.69% diagnostic specificity (95% confidence interval: 99.49-99.82%). Additional 819 specimens were also tested, randomly selected from hospitalized patients, dialysis patients, pregnant women, high-risk subjects (i.e., haemophiliacs, intravenous drug users, multiple transfusion recipients, and patients affected by sexually transmitted diseases), obtaining a diagnostic specificity of 99.51% (95% confidence interval: 98.75-99.87%). A detail of the specificity on blood donors is showed in Graphs I and II for both HIV p24 Ag and Antibodies detection, while Table I shows also the specificity data obtained in a open population.

**SENSITIVITY ASSESSMENT**

100% diagnostic sensitivity was obtained by testing 562 specimens from anti-HIV-1 (see Graph III) positive patients (including samples with defined anti-HIV subtypes), 100 samples from anti-HIV-2-positive patients (see Graph IV) as well as 52 specimens from HIV p24-positive patients. The ability of the LIAISON® XL assay to detect HIV antibodies was also evaluated by testing sequentially-collected specimens belonging to 51 commercially available, pre-characterized panels. The panels were also tested by reference anti-HIV assays. The test diagnostic sensitivity in detection of HIV early infection is substantially equivalent to the reference assays (see Table II for some example) and it is slightly better on seroconversion HIV9017 showing proven greater sensitivity on soroonversion without p24 Antigen detectable level (Table III). The sensitivity of the Assay for the p24 Antigen detection is assayed 27.4 pg/mL HIV P24 Ag (AFSSAPS panel) and 1,268 IU/mL HIV-P24 Ag (1stInt. Ref. Reagent, NIBSC). 123 positive samples for HIV-1 of different subtypes were all detected demonstrating good sensitivity toward different HIV-1 subtypes (see Graph V). Testing of matched sets of serum and various plasma types showed no significant differences.