Evaluating automated nucleic acid extraction using Abbott RealTi*me*™ assays with the Freedom EVO® Clinical 75 workstation

*Tecan's Freedom EVO® Clinical 75 performs fully automated RNA and DNA extraction from up to 24 samples in 3 hours, using magnetic microparticle processing. The Laboratory LABCON-OWL in Bad Salzuflen, Germany evaluated the instrument's performance in combination with the Abbott RealTi*me*™ HIV-1 and HCV assays, and compared it to the previously validated Abbott m2000™ processing system.*

The Freedom EVO Clinical 75 workstation for nucleic acid extraction

Nucleic acid extraction is the most critical and labor-intensive step in nucleic acid-based diagnostic assays. The overall sensitivity of the assay is determined by the nucleic acid yield, its purity and the amount of sample equivalent that can be transferred to the amplification reaction. Manual sample preparation methods are labor-intensive and are also susceptible to contamination, handling variation and error. Tecan's Freedom EVO Clinical 75 provides fully automated extraction of nucleic acids from a broad range of clinical samples. The workstation includes a fully integrated Te-MagS™ magnetic bead separation module for efficient separation of target molecules.

Dr Carsten Tiemann, director of molecular diagnostics at Laboratory LABCON-OWL, has evaluated the performance of the Freedom EVO Clinical 75 as a front-end extraction system in combination with the Abbott RealTi*me*™ HIV-1 and HCV virological PCR assays. The automated steps of the extraction system include sample and reagent pipetting, heating and incubation, magnetic capture and washing, and elution, all of which are optimized in ready-to-use protocols provided by Tecan. The subsequent PCR amplification and real-time detection are performed on Abbott's *m2000rt*™.

Automating the extraction method using the Freedom EVO Clinical 75 showed high reliability of extraction, with HCV and HIV viral load measurements that correlated well with those obtained using the Abbott *m2000*™ system (Figure 1). Reliable detection of low levels of HCV and HIV viral load after sample extraction on the Freedom EVO Clinical 75 could also be proven (Figure 2). Sensitivity, precision and linearity were comparable between both extraction systems, and no cross-contamination was observed when tested with strongly positive HIV and HCV reference material. The Freedom EVO Clinical 75 allows purification of viral nucleic acids from human plasma in reproducible yield, purity and amount for reliable, sensitive and specific detection and quantitation of RNA viruses using the Abbott RealTi*me*™ HIV-1 and HCV assays.

"Molecular diagnostics can be optimized thanks to the reproducibility and precision of the Freedom EVO Clinical 75, and its capacity to handle small sample numbers of a broad range of different specimen types, such as bacterial cell culture, swabs, feces and urine," said Dr Carsten Tiemann. "Beside other available instruments the Freedom EVO Clinical 75 is a good additional option to maximize cost-effectiveness."
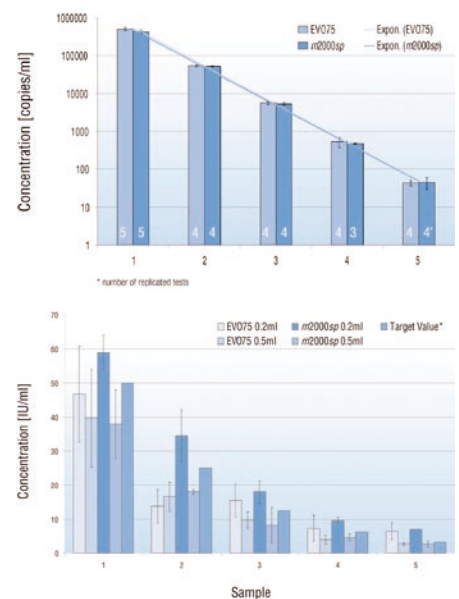

*Figure 1: Precision and linearity when using the Freedom EVO Clinical 75 were similar to those obtained using the m2000sp™ for sample preparation in combination with the Abbott RealTi*me*™ HIV-1 assay. DNA extractions were compared using the m2000sp™ and Freedom EVO Clinical 75, using dilution series of the Calibrator B from the Abbott RealTi*me*™ HIV-1 assay.*

*Figure 2: Sensitivity of the Abbott RealTi*me*™ HCV assay, tested on patient samples diluted in NHP with two different sample input volumes (0.2 and 0.5 ml) using the Freedom EVO Clinical 75 or the m2000sp™.*

Reference
1. Tiemann C, Knoop D, Dunn C, Huber C, Schaffer S. Performance evaluation of a new instrument for genomic or viral DNA or RNA extraction with HIV-1 and HCV viral load assays. Poster presented at the Third European Congress of Virology in Nürnberg, Germany, 1-5 September, 2007.

The Freedom EVO Clinical 75 is not available for sale in the USA and Canada.

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