STREAMLINED FORENSIC WORKFLOW WITH THE INVESTIGATOR™ QUANTIPLEX KIT AND AUTOMATED REACTION SETUP

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Commonly short tandem repeat (STR) analysis is performed for human identification, although recently alternative approaches like the analysis of deletions and insertions (DIPs) have been become commercially available (For description of DIPs, see abstract entitled "DIPplex: Multiplex analysis of Deletion Insertion Polymorphisms for human identification").
However, these multiplex assays used for human identification are complex systems that require a defined range of template input. Accuracy of quantification, even of low concentrated samples and an assessment of the presence of PCR inhibitors are key requirements to ensure successful genotyping on the first try.

Quantitative real-time PCR has become the standard method for quantification of DNA in forensic samples. However, there is a need for advanced solutions further streamlining the forensic workflow by increasing the accuracy of the quantification results, especially for low concentrated samples, and reducing the time for analysis by faster procedures.

Here we present a novel human DNA quantification assay – the Investigator Quantiplex Kit - which provides fast and accurate quantification of human DNA in forensic database and casework samples. The assay provides sensitivity down to less than 2 pg/reaction (preliminary data - developmental validation of limit of detection still ongoing), with highly accurate quantification in linear range of standard curve of less than 10 pg/reaction. Detection of PCR inhibitors is ensured by a balanced internal amplification control. The Investigator Quantiplex assay makes use of PCR fast cycling technology allowing fast time to result. When used with the Rotor-Gene Q system, quantification can be performed in less than 50 minutes.

Automation of laboratory procedures is gaining more and more importance in the forensic laboratories, saving time for routine procedures like PCR set-up and performing dilutions, but also avoiding user errors.

The QIAgility system is a benchtop instrument allowing automation of routine procedures in the forensic PCR laboratory workflow, involving PCR setup for real-time PCR based DNA quantification. The instrument also allows automated adjustment of DNA concentration of forensic samples to a specified concentration making use of real-time PCR based quantification results. Additionally, the reaction setup of the multiplex human identification assay, either STR or DIP based, can be performed by the instrument, as well as preparing samples for CE.

Hence, the combination of the new fast and accurate human DNA quantification assay with advanced instrumentation like the Rotor-Gene Q significantly shortens time to results in forensic DNA quantification with increased accuracy and sensitivity. When further combined with the QIAgility instrument, the workflow can be further streamlined and time consuming and error-prone manual interactions are minimized.