

Forensic genetics as a tool for peace and justice: An overview on DNA quantification

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In Forensic Genetics, DNA analysis is performed to obtain a Short Tandem Repeat (STR) profile from an evidence sample, which is then compared with the victim and suspect(s) reference sample STR profile, to determine their contribution for that evidence sample. However, forensic biological samples can be present in low quantities, and be exposed to different environmental insults leading to DNA degradation and contamination by inhibitor compounds. Thus, it is desirable for the forensic scientist to have useful information about the forensic sample quantity and quality prior to STR amplification.

New methods in Forensic DNA analysis for detecting, preserving and quantifying DNA, as well as its recover from different biological material are continually being developed. Real Time PCR (RT-PCR) assays for DNA quantification, like the recent Quantifiler® Duo DNA quantification kit (Applied Biosystems) proved to be very useful in forensic samples. Since many samples, mainly those resulted from sexual assault cases are often composed by unbalanced male/female DNA mixtures, the new RT-PCR quantification assay, developed to quantify relative male/female DNA ratio, contributes not only for total DNA determination, but also to ascertain the presence and quantity of enough male DNA in the sample. These results are important to guide for the optimal STR analysis selection, such as autosomal STR, Y-STR or mini-STR, increasing downstream analysis success rates. In this work we present real forensic caseworks where the DNA amount and quality was important to guide for the selection of the appropriate STR amplification kit in order to increase the success of profiling in the first attempt, reducing the number of samples that need to be reprocessed and thereby decreasing the turnaround time in a forensic laboratory.

Biography

Cláudia Isabel Vieira da Silva holds a BSc in Biology and a MD in biostatistics completed at the age of 38 years. Since 1998, she works as a Forensic Geneticist at Forensic Genetics Service from the National Institute of Legal Medicine, located in Lisbon, Portugal. She has a vast experience in forensic genetics caseworks, in criminal and kinship analysis, and has been involved with a number of Portuguese high profile cases. As a scientist, she also introduces in the laboratory some of the fundamental tests used in current modern DNA analysis, including STR multiplexes for casework application. She published more than 20 papers in peer reviewed scientific literature and currently teaches forensic genetics to forensic science students. She has research interest in forensic genetics, forensic and population statistics, and also in DNA interpretation.

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