Title: **Multiplex Microchip-PCR for STR analysis**

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TEXT:

DNA amplification using the polymerase chain reaction (PCR) has become a very useful tool in scientific research and forensic laboratories. Genetic identification using short tandem repeat (STR) analysis relies on PCR to amplify the fragments of interest, allowing identification from limited numbers of starting copies of DNA template. However, the conventional technique is time-consuming, and the reagents are expensive. Miniaturization of PCR amplifications using microdevices has the potential to drastically reduce the reaction time and reagent consumption while simultaneously improving the efficiency of the reaction. While originally focused on the clinical and analytical fields, microdevices are adapting to fit the needs of the forensic community in both integrated and modular formats. IR mediated heating have previously been employed to selectively heat the PCR solution, providing rapid thermocycling in microdevices with amplification of fragments from human genomic DNA. This method has been adapted for amplification of multiple fragments in a single chamber and applied to the Promega cTTv multiplex STR kit amplification system. Compared with traditional thermocycling, the microchip amplification protocol was performed in less time and required less reagents. The technique was tested on human genomic DNA extracted from a variety of biological samples to show the forensic relevance of the technique. The number of starting copies was also decreased to determine the lower limits of this amplification method.

Key Terms: DNA amplification, short tandem repeat, microdevice