RAPID STR PRESECREENING OF FORENSIC SAMPLES AT THE CRIME SCENE

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Technological advances in DNA analysis including STR (Short Tandem Repeat) profiling have led to improved investigation and prosecution of crimes and have now become standard procedure in forensic laboratories. The next step is a portable system that would provide an invaluable tool for crime scene investigators by providing real-time pre-analysis of probative samples, eliminate downstream laboratory analysis of non-probative samples and provide on-site information to aid in the investigation. We have developed a proprietary approach for STR typing based on hybridization analysis that significantly reduces cost, time to results and analysis constraints posed by other approaches. By combining our approach with a microfluidics platform, samples are extracted and amplified according to existing protocols and allele detection is accomplished by hybridization with allelic probes followed by automated analysis. Transfer of this protocol to a microfluidic lab-on-a-card format will permit processing (extraction, amplification and hybridization), analysis of samples in an enclosed environment thereby minimizing the chances for cross contamination and would enable post-analysis archiving of DNA extracts for follow-on laboratory testing. Our development work aims to overcome difficulties associated with capillary electrophoresis (CE) based STR profiling that act as a barrier to rapid objective prescreening of probative samples at the crime scene through validation of our genotyping technology. Micronics, Inc. is one of the world's leading providers of microfluidics-enabled custom laboratory-on-a-card devices for DNA extraction and amplification. The National Center for Forensic Science (NCFS) is also a leader in testing and evaluating forensic methods and technologies to facilitate technology transfer. Collaborative efforts will produce a platform for on-site STR based prescreening of probative samples in a rapid cost effective manner that will provide a new tool for crime scene investigators with the added benefit of sample archiving for follow-on laboratory analysis.