

Applications of whole genome amplification prior to STR typing of limited quantity samples

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Rapid advances in the field of forensic DNA analysis have allowed laboratories to obtain an exceptional amount of information from samples of limited quantity and quality. However, issues involving low copy number profile interpretation are still prominent in the community. Studies herein were designed to determine if whole genome amplification (WGA) with the GenomiPhi(TM) kit offered an advantage to enhancing template quantity of purified DNA extracts for the purpose of downstream STR typing. Furthermore, since WGA can be conducted in less stringent conditions than multiplex STR amplifications, experiments were conducted to determine if whole genome amplification could be carried out on sample cell lysates to increase the amount of available STR template prior to conventional concentration and purification. Interpretation of results focused on possible advantages of the application of whole genome amplification to forensic materials as compared to current standard multiplex STR kit capabilities based on previously conducted validation studies of the PowerPlex® 16 BIO system. Results indicated that WGA of purified aqueous DNA prior to STR typing generated profiles with significant imbalance between and within loci, and that observed imbalance was likely imparted during the WGA process. Furthermore, while profiles were observed from lysis reactions estimated to contain 50-100 cells, profile quality was severely compromised. It was concluded that GenomiPhi(TM) kit amplification of purified DNA and/or cell lysates prior to STR typing offered no clear advantage for downstream STR typing applications.