A MULTIPLEX SYSTEM OF AUTOSOMAL AND Y CHROMOSOME STRS INTEGRATED WITH ABO TYPING FOR FORENSIC DNA ANALYSIS

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The ABO blood group is accepted as one of the most important markers in forensic testing. As autosomal STR genotyping continues to be recognized as the dominant technique for human identity determination, Y chromosome STR analysis is playing increasingly important roles in solving criminal cases recently. In this paper, we describe an integrated amplification system of ABO, autosomal STR and Y-STR genotyping in a single reaction. The system allows for the simultaneous detection of 18 autosomal STR loci (13 CODIS loci as well as D2S1338, D6S1043, D12S391, Penta D and Penta E), the ABO blood group locus, the Y-STR locus DYS391 and the sex-determining locus Amelogenin. Primers are designed and optimized so that the amplicons are distributed ranging from 80 to 420 bp within a five-dye fluorescent design with the fifth dye reserved for the internal size standard. Sensitivity assays resulted in successful amplification of genomic DNA range from 0.25–2 ng with 30 PCR cycles. A total of 90 individuals from the Chinese Han population were studied and forensic genetic data were present. No significant deviations from Hardy–Weinberg equilibrium were observed. We conclude that this integrated system could be a powerful and efficient solution for forensic DNA analysis.