A NEWLY DESIGNED QUADRUPLEX TYPING SYSTEM FOR Y-STRS USEFUL FOR DEGRADED DNA SAMPLES

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Haplotyping of STRs on Y-chromosome (Y-STRs) is very useful for personal identification in sexual assaults and for examinations in male sibling relationships. A new multiplex typing system with four fluorescent dyes (6-FAM, VIC, NED and PET) was designed for four simple tetranucleotide Y-STR loci (DYS19, DYS389I, DYS439 and DYS460), each of which has STR diversity of more than 0.5 in Japanese, to haplotype from highly degraded DNA samples. All these PCR products were obtained with less than about 110 bp fragment length. Each genotyping was performed semi-automatically using a Genotyper template from the allelic ladder markers made by us. The evaluation of this system from highly degraded DNA and small amounts of DNA samples confirmed the high accuracy and sensitivity (50 pg of high molecular template DNA at 30 cycles). The haplotype diversity calculated from 94 Japanese was 0.972. This system was also applied to long-aged specimens (dried umbilical cords) to confirm the paternal relationship, and the samples were haplotyped accurately. The newly designed multiplex system in the present study would be useful in the forensic field, especially for highly degraded DNA specimens.