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X-STR and SNP and mtDNA analysis in maternity testing when the false mother can't be excluded by 46 STRs genotyping

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To reach an accurate conclusion, X-STR, SNP and mtDNA analysis was applied to an extreme maternity case where the false mother and the child have at least one allele shared at autosomal 46 STR loci.

Method: 19 autosomal STR loci were amplified using the AmpFlSTR® Sinofiler™ kit and PowerPlex®16 System. An additional 27 autosomal STR loci were analyzed using two domestic kits AGCU 21+1 and STRtyper-10G. Further testing of 24 X-STR loci, 40 SNP loci and mtDNA was carried out. Particularly, 24 X-STR loci were amplified using Mentype® Argus X-8 kit and an in-house kit Xplex-16. mtDNA HV1 and HV2 were amplified using primer pairs L16047/H16464, L29/H408 respectively and the PCR products were sequenced. Additionally, SNP assay was carried out and mtDNA assay of base compositions was applied. Using PLEX-ID system, base compositions of 12 amplicons in HV1 derived from primers covering coordinates15924-16428 and base compositions of 12 amplicons in HV2 derived from primers covering coordinates 31-576 were determined.

Results: The alleged mother and the boy shared at least one allele at all 46 tested autosomal STR loci. But, according to the profile data for 24 X-STR and 40 SNP markers, different genotypes at 13 X-STR loci and five SNP loci excluded maternity. Mitochondrial profiles also clearly exclude mother as a parent of the son because they have multiple differences.

Conclusions: Different kinds of genetic markers needfully supplement the use of autosomal STR loci in case where the alleged parent is suspected to be related to the true parent.

Biography

Li Li is a Professor of department of forensic Biology in Institute of Forensic Sciences, Ministry of Justice, China. Her responsibilities include forensic DNA analysis (typing of STR, X-STR, Y-STR, SNP, X-SNP and mtDNA) and testify in court. She processes thousands of cases including parentage and sibling testing every year.