

AN APPROACH FOR EXCLUSION OF FULL-SIBLING RELATIONSHIP WHEN MULTIPLE KNOWN FULL-SIBLINGS INCLUDED-5TH ALLELE EXCLUSION METHOD

Xudong Wang, School of Criminal Investigation, Southwest University of Political Science and Law

Objective: Establish a method for examination of full-sibling relationship-the 5th allele exclusion method. Method: According to Mendel's genetic law, the total number of alleles on a specific STR site detected from full-sibling's parents should be 1-4. When more than 2 known full-siblings joined in the examination for the full-sibling relationship identification of a suspect, the total number of different allele from all the tested people should be less than 5. If not, the STR was named 5th allele STR and such a STR site is out of the genetic law. If 3 or more 5th allele STRs were detected in an identification system, the suspect should be excluded, i.e. the suspect was not a full-sibling of the known-siblings. To evaluate the exclusion power of STR system, 19 STR loci of 2 or 3 known full-siblings were satisfied and compared with 100-unrelated persons in this study using the Goldeneye™ 20A kit. Results: When 2-known full-sibling participated the examination, the exclusion rate were 47.7% while the corresponding exclusion rate raised to 88.0% when 3-known full-siblings were included, the data came from 100 unrelated DNA typing using the 19 autosome STRs from Goldeneye™ 20A kit. The STR was named efficient STR when the total number from known full-siblings was 3 or more. The exclusion rate rises while the efficient STR number increases. Conclusion: The 5th allele exclusion method is simple and clear. This approach could be used in the full-siblings relationship examination when 2 or more known full-siblings join the full-sibling identification.

1. Tamura T, Osawa M, Kimura R, et al. Evaluation of the Allele-sharing Approach, Known as the IBS Method in Kinship Analysis. *Journal of forensic and legal medicine*. 2013, 20(2): 112-116.
2. LU Hui-ling, ZHOU Ke-wei, LU De-jian¹, et al. Application of ITO Method and Discriminant Functions in Full Sibling and Half Sibling Identification. *Journal of Forensic Medicine*, 2009, 25(2): 118-122.
3. ZHAO Shu-min, ZHANG Su-hua, QUE Ting-zhi, et al. Establishment of Universal Algorithms for Commonly Used Kinship Indices between Two Individuals. *Journal of Forensic Medicine*, 2011, 27(5): 330-333.