

DETERMINATION OF SIBSHIP FOR CHINESE IN TAIWAN

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With advancement of molecular biology, DNA typing of the genetic markers has become reliable and popular methods for parentage testing. With DNA typings, many genetic markers could easily be performed. Consequently, paternity index (PI) and plausibility of paternity (W) have improved drastically; in many situations, from a few hundred thousand to a few hundred million for PI and 99.999% to 99.999999% for W. In the mean time, parentage tests with single parent analysis has also offered efficient results. Similarly, with applications of many DNA markers, sibship analysis becomes possible. Since there are no guidelines regarding proper cutoff for sibling index to obtain maximal efficiency, we try to establish some guidelines for sibling testing in this study. For paternity tests in Chang Gung Memorial Hospital, Lin-Kou Medical Center, routinely, we determine ABO, Rh phenotypings for CcDEe, HLA-A,B and Cw serologically, and 15 short tandem repeats (STRs) loci as DNA markers. We collected blood a sibling pair from 34 families. Since no kinship exists between any combination of families, we selected randomly the first member person from 20 of these families and matched each other to form 190 non-sibling-pairs as a contrast group. Sibling index (SI) was determined. The SI's for combined ABO & Rh systems, HLA-A, B & Cw, and STRs are 2.4967 (1.3051) for non-sibling pairs), 3504.7234 (6.7434 for non-sibling pairs) and, 18477.3505 (0.1526 for non-sibling pairs), respectively. Combining all systems, an SI of about 0.5 billion (0.8556 for non-sibling pairs) was observed. The false positive rate (FP) and false negative rates (FN) to generate a receiver operating characteristic (ROC) curve, using different cutoff levels of SI, namely SI=1, 5, 10, 20, and 50 etc. We found that ABO and Rh phenotypings are not suitable for sibling testing, while HLA and STRs have better results. If we use SI>10 as cutoff level, there are 2.1% FP and 11.8% FN. If SI>20 was used, there are no FP and 20.6% FN. We suggest that an SI of 20 be used for sibling testing for Chinese.

	SI>1		SI>5		SI>10		SI>20		SI>50	
	FP	FN	FP	FN	FP	FN	FP	FN	FP	FN
ABO-Rh	90/190 47.4%	6/34 17.6%	1/190 0.5%	31/34 91.2%	1/190 0.5%	31/34 91.2%	0/190 0%	34/34 100%	0/190 0%	34/34 100%
HLA-ABCw	36/190 18.9%	5/34 14.7%	15/190 7.9%	9/34 26.5%	10/190 5.3%	15/34 44.1%	7/190 3.7%	18/34 52.9%	1/190 0.5%	22/34 64.7%
STR	8/190 4.2%	2/34 5.9%	0/190 0%	9/34 26.5%	0/190 0%	13/34 38.2%	0/190 0%	14/34 41.2%	0/190 0%	16/34 47.1%
ALL	28/190 14.7%	1/34 2.9%	4/190 2.1%	3/34 8.8%	4/190 2.1%	4/34 11.8%	0/190 0%	7/34 20.6%	0/190 0%	8/34 23.5%