

DNA TESTING IN KINSHIP ANALYSIS

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We have successfully used RFLP DNA testing methods to perform kinship analyses of extended pedigrees as well as limited pedigrees such as sibships in both civil and criminal casework. The analysis uses DNA VNTR probes to examine the DNA profiles of test subjects and/or questioned evidence at up to twelve different genetic loci. Generally accepted population, genetic and statistical (Baysian approach) techniques are used to generate a series of reports comparing the various possible ways in which the subjects may be related.

In the "Hillblom" sibship case, GeneLex Corporation was asked to determine if four children, each with a different mother, could be the offspring of Larry Hillblom, the deceased founder of DHL courier service. In this high profile civil case, the Attorney General of California represented the estate; a mole purportedly excised from Hillblom was unavailable for testing, as were Hillblom's mother and full brother.

An indirect strategy was employed - proving a relationship among Hillblom's geographically disparate alleged children. Seven other DNA testing laboratories were involved either at sample collection, re-testing or case review. GeneLex tested twelve RFLP loci. The allele frequency data obtained was used to calculate the probability of half-sibship or unrelatedness in a series of comparisons between different combinations of the four tested mother/child pairs. In general, the more genes that two children have in common, the more likely it becomes that they have a common parent. The data indicated that one of the children was unrelated. Comparisons among the other three apparently related children indicated that the data is at least 40 million times more likely if all three have the same father than if any one of them is unrelated.

A typical example of testing an extended pedigree is when the alleged father is deceased and subjects tested include the mother(s), child(ren), alleged paternal grandparents(s) and/or alleged parental sibling(s). It is not possible to obtain a direct exclusion in many of these cases. Analysis of multiple loci becomes extremely important to the statistical resolution of these cases. Comparative kinship analysis using RFLP and STR DNA batteries will be presented.