# EXPLANATION OF DNA PATERNITY TEST RESULTS

By testing genetic markers, it is possible to determine who is the most likely father of a child. There are more than 50,000 genetic markers in human DNA (genetic material). Every person has a pair (two) of each genetic marker known as alleles. One allele comes from the mother (the maternal allele) and the other comes from the father (the paternal allele). Thus, the parents and child are expected to share one of the pair, for each marker tested. This rule of inheritance is very reliable. If the tested man does not possess the paternal allele of the child in multiple independently inherited markers (i.e. on separate chromosomes), then the tested man can be excluded as the biological father of the child.

Since there are 50,000 or more pairs of genetic markers in our DNA, there are potentially 50,000 or more DNA tests. The alleles of the genetic markers vary sufficiently among people so that, with the exception of identical twins, we are each genetically unique. It is not yet practical or necessary to test all, or even most of these genetic markers. The DNA tests used are so powerful that just a few tests are sufficient to exclude more than 99% of non-fathers. We are able to use the same CODIS markers used by FBI and law enforcement to solve crimes. Thus, exclusion of paternity testing at our laboratory is accepted and conclusive by the courts.

When the tested man is not excluded as the biological father of the child (i.e. he matches the child's paternal markers in all, or all but one, of the markers tested), this does not prove with 100% certainty that he is the father, because we cannot completely eliminate the possibility that he matches the child by chance (coincidence). However, the courts do not require 100% certainty to rule that a man is the father. The significance of a genetic match between a tested man and child is summarized by the paternity index (PI), which represents the factor by which paternity is favored-genetically over non-paternity. For example, a PI of 100 means that the genetic evidence favors paternity over non-paternity by a factor of 100 to 1; in other words, the genetic odds are 100 to 1 that the tested man is the father (as opposed to not the father). PI of 100 has the same significance as a match that would occur by chance 1 in 100 times (of 100 random men/non-fathers, we would expect one to match). It also means that, all else being equal, the probability that the tested man is the father is 99%. **The only critical assumptions made prior to computation of Pl is that the tested man has about 50% chance of being the true father, and a close relatives of the tested man (such as brothers) are not possible fathers.**

The "Parentage Study" report identifies the specific markers and alleles observed for each of the tested parties. If the tested man is excluded as the biological father, the possible paternal alleles of the child are listed on the report instead of the calculated PI. If the tested man is not excluded as the biological father, then the report indicates: (1) the paternity index for each individual DNA marker, (2) the combined paternity index for all markers tested, which represents the product of the individual paternity index values, and (3) the probability of paternity, which is computed from the combined paternity index and based on the assumption that the probability before testing (prior probability) is 50%.