

USLegal Guide to DNA Testing



INTRODUCTION

DNA (deoxyribonucleic acid) is the genetic blueprint that determines a person's biological characteristics. DNA is located in the cell of the human body. One reason for DNA testing is to determine the paternity of a child. Upon conception, a child inherits one half of its DNA from its mother and one half from its father. This unique combination of DNA will match that of the biological parents of the child. When a child's DNA does not match that of the alleged father, he is excluded 100% as the biological father of the child. However, a DNA test can prove a probability of 99% or greater for paternity.

DNA testing is also gaining in popularity as a method of solving crimes. A fingerprint is the only unique identification source (identical twins have the same DNA). But if a

criminal leaves no prints behind, law enforcement officials must rely on minute DNA samples from blood, saliva and other bodily fluids, hair, or skin. DNA determines each individual's hereditary characteristics. Each person's DNA is different and is found in each living cell. A hair, blood, skin or any part of the body can be used to identify and distinguish an individual from all other people. Therefore, DNA testing helps to prove one's involvement or lack of involvement in a crime scene. The way DNA evidence is collected, preserved, and tested is critical to the success of its use in criminal cases. Some criminal convictions have been reversed by DNA evidence which proved the convicted person was not the perpetrator.

TECHNIQUES USED

DNA testing can be done by standard techniques such as restrictive fragment length polymorphisms (RFLP), polymerase chain reaction (PCR), short tandem repeat (STR), and mitochondrial analysis. In RFLP testing, a DNA

sample is mixed with a chemical substance that helps examiners isolate and identify specific key fragments of the sample that can be used in comparison analysis. A drawback of RFLP is that it requires a fairly large DNA sample. With PCR, a series of chemical reactions helps generate copies of a minute DNA sample, thus amplifying a small or degraded piece of information. In STR, various DNA regions in a sample are compared with other samples for similarities. The FBI uses STR using special software that can identify thirteen of these regions in a DNA sample.

Mitochondrial DNA analysis is often used for extracting samples from bones and teeth, for which the other methods are not effective. Proving a relationship based on comparison of the mitochondrial genome is much easier than that based on the nuclear genome. However, testing the mitochondrial genome can only prove if two individuals are related by common descent through maternal lines only from a common

ancestor. Therefore, it could not be used to test for paternity.

In the US, the American Association of Blood Banks (AABB) regulates DNA paternity and family relationship testing industry. Only the DNA test results produced by an AABB-accredited laboratory are legally admissible and accepted by government child support agencies, welfare benefits offices and immigration authorities such as USCIS and U. S. embassies overseas in a family-based immigration petition.

In a paternity case, DNA testing may be done either before or after the baby is born. The methods used are as follows:

Postnatal (after your child's birth) DNA testing:

- Blood collection and testing
- Buccal swab (cheek swab) collection and testing
- Umbilical cord collection and testing
- Other sample collection and testing (semen, tissue, hair, etc.)

Prenatal (before your child's birth) DNA testing:

■ Amniocentesis: This test is performed in the second trimester, anywhere from the 14th-20th weeks of pregnancy. During this procedure, the doctor uses ultrasound to guide a thin needle into your uterus, through your abdomen. The needle collects a small amount of amniotic fluid, which is tested. Risks include a small chance of harming the baby and miscarriage. Other side effects may include cramping, leaking of amniotic fluid, and vaginal bleeding. A doctor's consent is needed to do this procedure for paternity testing.

■ Chorionic Villus Sampling (CVS): A doctor inserts a thin needle or tube from the vagina, through the cervix, guided by an ultrasound, to obtain chorionic villi.

Chorionic villi are little finger-like pieces of tissue attached to the wall of the uterus. The chorionic villi and the fetus come from the same fertilized egg, and have the same genetic makeup. This testing can be done earlier in

pregnancy from the 10th-13th weeks. A doctor's consent is needed to do this procedure for paternity testing.

The FBI keeps a computerized databank of DNA samples called CODIS (Combined DNA Index System), which contained about 1.7 million DNA profiles as of 2003. The profiles stored in CODIS can be used to convict criminals, and also to exonerate innocent people. There are numerous examples of criminals whose DNA matched a profile from an earlier crime and who were then charged with the crime; likewise, there are examples of individuals whose innocence was confirmed when DNA found at a crime scene turned out to belong to another person identified through the profiles.

DNA USE TO PROVE INNOCENCE

Not only can DNA be used to convict criminals, it has successfully been used to exonerate individuals, some of whom were wrongly imprisoned for more than two decades.

Often, the person who is wrongly convicted of a serious crime such as murder or rape has a criminal record for petty crimes, which means a record already exists. These individuals are frequently convicted on eyewitness testimony, but without any physical evidence tying them to the crime.

The Innocence Project, created in 1992 by Peter Neufeld and Barry Scheck at the Benjamin Cardozo School of Law in New York, works to exonerate people by use of postconviction DNA, in which DNA from the crime scene is tested against the accused's DNA. Often, physical evidence from a crime is kept for many years. If the evidence includes samples of blood, hair, skin, or other evidence that can include DNA, it can often be used to prove that the person accused could not have committed the crime. Moreover, if it turns out that the DNA matches a profile in a database such as CODIS, the real criminal can be located and tried. From 1992 to the beginning of 2006, the Innocence Project helped exonerate 173 prisoners.

Opponents of capital punishment have pushed for DNA testing to be used more regularly, and many of those who favor capital punishment agree that those convicted for a capital offense should be allowed to make use of all evidence. One of the fears that come with capital punishment is that the wrong person could be executed for a crime. A case involving a man who was executed in 1992 gained national attention in 2005 when Governor Mark Warner of Virginia ordered DNA testing on a 24-year-old DNA sample to determine whether Roger Keith Coleman had murdered his sister-in-law in 1981. Coleman had proclaimed his innocence, and although his DNA had been tested before his execution, lawyers said the examiner might have misinterpreted the results. Using more advanced technology, Coleman's DNA was tested in January 2006, and the results confirmed that he was in fact the killer. Although supporters of capital punishment said that claims of the death penalty's fallibility were

unfounded, but opponents noted that the danger of a wrongful execution still existed, and called for increased use of DNA as an identification tool.

DNA USE TO PROVE PATERNITY

Today, the use of DNA testing for positive identification in paternity litigation has rendered most of the previous legal practice and procedure obsolete. The alleged father need only submit a painless DNA sample (usually in the form of a saliva swab) to prove or disprove his parentage. DNA matching has replaced the Human Leukocyte Antigen (HLA) Test, which was used to match not only blood type, but also tissue type and other genetic factoring. Experts had asserted that the HLA was at least 98 percent accurate. But presumptive fathers (based upon HLA results) could rebut those presumptions by proving they were out of the state, impotent (in pre-Viagra years), or sterile at the time the child was conceived. Conversely, DNA testing has a more conclusive accuracy

(close to 100 percent) that becomes almost impossible to defeat.

Most states have laws that require an unmarried couple to fill out an Acknowledgment of Paternity (AOP) form at the hospital to legally establish who the father. If the couple is unmarried and the mother has not been married in the last 300 days, then no father will be listed on the birth certificate until this form is filled out. The AOP is sent to the state's Bureau of Vital Statistics, where it is recorded, and the father listed becomes the legal father.

After the AOP is signed, couples have a limited amount of time, which varies by state, to request a DNA paternity test to be done and amend the AOP; if this is not done, the father previously listed on the AOP could be held legally responsible for the child even if he is not the biological father. If biological fatherhood is in question, a first step is to conduct a paternity test. If parents can't agree to the test, the court may order it. A court will not

automatically order paternity tests simply because a paternity action has been filed. It will review the petition to determine if there is sufficient information contained therein to warrant or justify the compelling of such a test. If the court orders a paternity test, the mother, child, and alleged father will all be tested at a court-designated facility. A court determination of paternity is final, and a copy of the court's order will be needed to establish the child's rights, both present and future. A man is presumed to be the father if he has been married to the mother for a certain time before the child is born. That presumption may be rebutted by clear and convincing standards of evidence, such as a DNA test. These genetic test results are often conclusive, although courts often allow contradicting evidence, such as proof that the alleged father had no physical access to the mother at the time of conception.

When the alleged father is deceased, in some cases there will be

access to the father's DNA, perhaps from a preserved tissue sample. Where the father's DNA is not available, it may be possible to compare the child's DNA to other close relatives of the father, such as the child's grandparents or the father's other children. DNA testing of close relatives can establish paternity with a high degree of probability, and will probably satisfy the needs of any court or government agency.

COST OF TESTING

Prices can range from \$400.00 to \$2,000.00. Prenatal testing is often more expensive than testing done after a baby is born because of the additional doctor and hospital-related fees. Some testing sites offer lower cost testing that is non-court-approved, or "curiosity testing." Most facilities offer payment plans and will require full payment before they release the results to you.