Paternity Tests: Blood Tests and DNA

Paternity can be determined by highly accurate tests conducted on blood or tissue samples of the father (or alleged father), mother and child. These tests have an accuracy range of between 90 and 99 percent. They can exclude a man who is not the biological father, and can also show the likelihood of paternity if he is not excluded. Each party in a contested paternity case must submit to genetic tests at the request of either party. If the father could be one of several men, each may be required to take a genetic test. There are several different ways to establish whether an alleged father is the natural and legal father of the minor child.

Blood Tests

Paternity blood testing was first performed in the middle half of the twentieth century, by comparing blood types of tested parties. This involved isolation of blood sera from antigen-challenged individuals that did not possess certain red blood cell antigens. These antigens are protein molecules that may be combined with sugar molecules, and reside in the red blood cell membrane. These sera cause coagulation of red blood cells in individuals that possess that particular red blood cell antigen. In the ABO blood typing system, humans can possess the A antigen (A blood type), the B antigen (B blood type), both the A and B antigen (AB blood type), or neither of these antigens (O blood type). Red blood cell antigen systems of this sort can be used for paternity testing because there are genes that code for the antigens and these are inherited genes. A mother who has Type B blood and a father who has Type O blood could not have a child who has type AB blood. The true father of the child must have the gene for the A antigen. Using RBC antigen systems for paternity testing did not provide for a very powerful test because the frequencies of the genes that coded for the antigens are not very low.

In the 1970s a more powerful test was developed using white blood cell antigens or Human Leukocyte Antigens (HLA), resulting in a test that was able to exclude about 95 percent of falsely accused fathers. Several milliliters of blood are required to perform the test.

Blood types alone cannot be used to determine who the father is, but can be used to determine the biological possibility of fatherhood.

DNA Tests

DNA (Deoxyribonucleic Acid) is the genetic material present in every cell of the human body. Except in the case of identical multiple births, each individual's DNA is unique. A child receives half of his or her genetic material (DNA) from the biological mother, and half from the biological father. During DNA testing, the genetic characteristics of the child are compared to those of the mother. Characteristics that cannot be found in the mother must have been inherited from the father.

DNA paternity testing is the most accurate form of paternity testing possible. If DNA patterns between the child and the alleged father do not match on two or more DNA probes, then the alleged father can be totally ruled out. If the DNA patterns between mother, child, and the alleged father match on every DNA probe, the likelihood of paternity is 99.9 percent. To conduct DNA testing, either a blood test known as Restriction Fragment Length Polymorphism (RFLP) or a procedure called a Buccal scrap is used. A swab is rubbed vigorously against the inside of the subject's cheek. This provides a DNA sample for testing. Children can be tested at any age. Paternity testing can even be done on an umbilical cord blood specimen at birth. Since DNA is the same in every cell of the human body, the accuracy of testing performed on cheek cells utilizing the Buccal Swab is the same as an actual blood sample.
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