FORENSIC GENOMICS
INNOVATION HUB

Paternity DNA Testing Factsheet

Paternity means fatherhood. A paternity test establishes proof as to whether an alleged father is the biological father of a child. Paternity is excluded if a DNA test shows that an alleged father is not the biological father.

What is a paternity DNA test?

Paternity DNA tests are genetic tests. Many DNA locations across our entire genetic make up (our genome) are analysed to construct a unique DNA profile for each individual. Almost every cell in our body contains a complete copy of our genome meaning that a paternity test can be performed on a variety of specimen types. However, for at home peace of mind paternity tests only the swabs sent out in the sampling kit are to be used for obtaining DNA. This is for laboratory validation reasons.

The science behind paternity DNA testing

We inherit half of our genetic material (DNA) from each of our biological parents when we are conceived. In paternity testing DNA is obtained from a child and the alleged father using a simple mouth swab. The DNA is analysed and compared, to determine whether the DNA of the child was inherited from the alleged father. This analysis assists in determining the likelihood that a man is the biological father of a child.

During the test 24 DNA locations are analysed to construct a DNA profile. A person has two numbers at each location (marker). These are inherited from our parents at conception. One number comes from the mother and one from the father. The DNA profile of the child is first compared with that of the biological mother. One of the child's numbers will match up with a number from the mother's sample. The other number should match up with a number from the alleged father's sample if he is the biological father. The probability of paternity is then statistically confirmed and reported by the laboratory. If the numbers of the child do not match up with the numbers of the alleged father at more than two locations, he is excluded as the biological father. For more information on the science visit our blog on Genetic Fingerprinting.

Accuracy of paternity DNA testing

DNA paternity testing is currently the most accurate and widely-used technology to determine parentage. If numbers between the child and the alleged father do not match at more than two DNA locations, then that alleged father is excluded as the biological father. This means that the probability of paternity is practically zero and he is not the biological father of the child. If the numbers between the mother, child and the alleged father match at every DNA location, then the probability of paternity is 99,99% or greater. This result indicates that the alleged father is the biological father of the child.

Paternity testing without a sample from the mother

DNA profiles of only the child and the alleged father can be compared when the mother is not available, but the mother should be included in the testing, whenever possible, especially if the biological father is a close male relative of the tested alleged father. In this instance the statistics can be too low to be sufficiently assured of paternity as the two men could share a lot of their DNA. The mother or other alleged father will be asked to provide a sample in order to increase the certainty of paternity.

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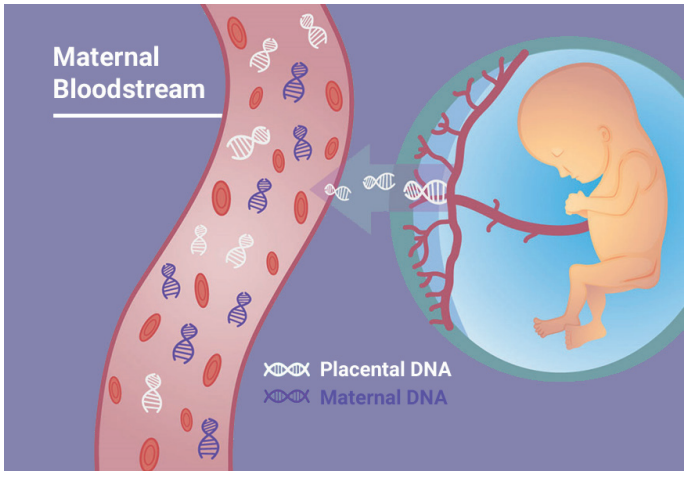
Why is the mother's DNA sample important in paternity testing?

Although a sample from the mother is not essential for paternity testing, it is advisable to include her. A number of DNA locations are analysed to construct a DNA profile. These DNA locations are scattered across our entire genetic make-up (our genome). Although each person possesses two numbers at each location, a marker by itself is not unique to an individual. These markers are inherited from the parents at conception and it is the pattern of these markers that is unique. Once it is established which numbers were given to the child by the mother, the remaining numbers must come from the father. Therefore, complete information which includes the mother and father increases the certainty of paternity testing.

When paternity DNA testing can be done

Paternity DNA testing can be performed at any age. Before a child is born DNA can be obtained from the mother's blood from around 10 weeks of pregnancy. DNA from the baby is found to be free floating in mother's blood in small amounts and can be used to determine the paternity of the baby. This is performed using a technique called next generation DNA sequencing.

Should you need more information and/or would like to enquire about different paternity testing options please contact us on 02380 118980 or email lab@fgih.co.uk. All queries are handled in the strictest confidence.



Paternity DNA testing when a father is deceased

It is possible to identify a biological father of a child, even after the man has passed away. These are called kinship tests. It is the exact same test but different statistical hypothesis are analysed and other family members are required to give samples for DNA profiling. Biological parents, siblings or other children of the deceased father can be analysed against the DNA of the child in order to obtain a likelihood of paternity. It is not routinely as conclusive but may well suggest a biological relationship between the deceased and the child.

IMPORTANT Requirements regarding consent in DNA profiling for paternity testing

The Forensic Genomics Innovation Hub adheres to the Human Tissue Act 2004 and the Childrens Act 2004.

The Human Tissue Act 2004 regulates the removal, storage and use of human tissue. This is defined as material that has come from a human body and consists of, or includes, human cells. The Human Tissue Act 2004 also created an offence of DNA 'theft'. It is unlawful to have human tissue with the intention of its DNA being analysed, without the consent of the person from whom the tissue came. It is therefore imperative that every adult consents to a sample being taken for the purpose of DNA profiling and that any child under the age of 16 has a lawful guardian who provides their consent for the DNA profile to be obtained for the purpose of parentage testing. They are required to make a legal declaration that they meet the parental responsibility as detailed in UK law and have the legal right to sign consent on the child's behalf.

As the home test requires no legal verification of the identification of the individuals who are sampled these results are not valid in court.

Contact the Forensic Genomics Innovation Hub

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