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Dna test from hair

The standard for paternity testing and other DNA tests is the oral swab. This is because a swab is so simple to use and offers a high success rate. However, many people inquire about using other samples for testing. Hair DNA testing is in fact one of the most common tests people wish to have carried out but there is much to say about hair and the validity of using this sample in a test. Hair DNA Testing: But what is hair? Hair is divided into two parts- the shaft which is what you see above the surface of your skin and the root or follicle which is below the surface of the skin. Hairs are made up of a type of protein known as keratin and are made up of between two-three intertwined layers. DNA testing companies will discourage strongly using a sample of cut or shed hair for paternity testing and most other tests. Cut hair samples are no of course entirely useless- they in fact do just fine for a very specific type of test known as the MtDNA test. The MtDNA test (Mitochondrial DNA test) is used to determine whether two people share the same maternal line and given the low rate of mutation in the type of DNA, this test is rather accurate. However, this is the only type of hair DNA test you can have carried out unless you can specifically see a white ball attached to the end of the hair (this little ball would be the hair root). If hairs have been ripped or torn from the scalp or plucked, then you can send these in for DNA testing. Hair DNA testing with freshly plucked hair is of course always better and a minimum of 5 hairs is recommended. If the hair is very old, one can opt to use advanced testing methods but these will come at an added, extra cost. Nevertheless, whether the hair is old or freshly plucked, you can still conduct your hair DNA paternity test. How do I collect and send my hair DNA sample? Once you have determined the type of test and whether the hairs you possess do or do not have the root, you can simply put these in a dry paper envelope making sure not to touch the hairs as much as possible and send these for laboratory analysis. With hair DNA testing other than to carry out an MtDNA test, the success rate is 75%; thus, if the hairs contain the follicle, laboratories have a fairly high chance of extracting the necessary, undegraded DNA to conduct the type of test you have opted for. Always contact the company you choose for your test before sending any DNA samples. Do you need to confirm a relationship? Curious to know if you can test DNA from hair? In this blog, we'll walk you through how hair DNA testing works, the advantages, the drawbacks, and more. Can You Do a DNA Test with Hair? Using hair as a DNA source for testing has been common practice for decades. Hair is made up of a protein called keratin, and at the root of each hair is a follicle, which contains DNA. When a hair is plucked, often the DNA-containing follicle is removed with it. Access to the hair follicle DNA is one of the most critical aspects of testing. Technicians can use the DNA found in hair follicles for a variety of tests, including: How Does DNA Testing with Hair Work? A sample of multiple hairs (7-10) with intact follicles is necessary to achieve the best results from a hair DNA test. To ensure a hair sample has the necessary follicles attached, it is vital to look at the end of the hair closely. A hair with an intact follicle will appear slightly thicker at the root end and you will see a tiny light-colored bulb called a dermal papilla. After the testing provider receives the hair sample, they can begin processing it for DNA extraction. Normally, the DNA within the hair sample will be amplified or copied so that there is enough of it to be analyzed. The amplification of DNA is achieved through a process called polymerase chain reaction (PCR). PCR works by repeatedly heating and cooling DNA. When DNA is heated, it separates into two single strands. Next, an enzyme called "Taq polymerase" is introduced to the sample. This enzyme synthesizes and uses the original DNA strands to "build" two new strands of DNA. Technicians can repeat this process many times, producing millions of copies of the original DNA. With paternity testing, a laboratory technician would compare the extracted DNA from the alleged father's hair to the child's DNA. They would analyze the two DNA samples and look for similarities. From there, they could determine a probability of paternity based on either the presence or absence of similarities in the DNA. The Advantages of a Hair DNA Test Using hair as a sample for DNA testing is a method that has been around for many years. Below are some of the advantages that a hair DNA test provides. It's Great for People Unable to Provide a Cheek Swab Hair DNA testing is totally non-invasive, meaning that it is a great option when a tested party (adult or child) is unable to provide a cheek swab. The non-invasive aspect of hair testing makes it a more comfortable and convenient experience. Hair DNA Testing is Reliable Hair DNA testing is a reliable identification method and has been used for many years across a plethora of industries. Hair DNA testing is often used in forensic investigations to identify potential suspects of crimes. In some scenarios, it can even be used to legally establish paternity. Using a Hair Sample is Sometimes Less Expensive Hair DNA testing is occasionally more affordable than other types, such as blood testing. Certain DNA testing providers have more extensive fees when it comes to handling biohazards like blood. Discrete Sample Collection is Possible Discrete sample collection using hair can be possible, though it is vital to remember that multiple hairs would need to be removed from the dermal layer of the skin with intact follicles. Perhaps you're a mother, and you are questioning who the biological father of your child is, but you do not want to alarm the potential father. In this scenario, using the alleged father's hair as a sample for a paternity test could be an option for you. The Drawbacks of a Hair DNA Test Although using hair for DNA testing is generally considered to be reliable and accurate, there are some limitations, including: Hair Samples Must Contain The Follicle Hair clippings and shed hair on a brush do not make for acceptable samples. A hair sample for DNA testing needs to have the hair follicle attached. Some DNA testing companies may claim otherwise, but accredited industry leaders will strongly discourage DNA testing with a hair sample that does not contain a follicle. Best Practice Requires Multiple Hairs In addition to the hair sample needing to have the follicle attached, the sample also should be comprised of more than one hair; 7-10 hairs is the industry standard when it comes to an acceptable sample size. A DNA Test Is Only as Good as the Testing Provider The accuracy of a hair DNA test can be affected by several factors, including the testing provider. If the laboratory that performs the test lacks necessary accreditations or does not have a good reputation, it is more likely to produce inaccurate or untrustworthy results. Other DNA Test Sample Options Overall, hair DNA tests are a valuable tool for identifying individuals. However, it is essential to be aware of the limitations of this type of testing. Many other types of samples can be used for DNA testing, including: A Buccal Swab (Cheek Swab) Blood/Dried Blood Stains Semen Nail Clippings Diabetic Test Strips A Toothbrush Ear Swabs Shaving Razor Blades Cigarette Butts Chewing Gum (Sugar-Free Is Preferred) And More Our DNA experts are happy to provide a free consultation and help you understand all of your testing options for your unique situation. including pricing. Give us a call at 800-929-0847. It is crucial to note that DNA samples collected at home are only applicable for peace-of-mind testing. In order for a DNA test to be admissible in court, a specific chain of custody needs to be followed. Samples must be collected in an approved facility where individuals provide identification before submitting samples. This chain of custody ensures that DNA samples cannot be tampered with and that those who provide them are who they claim to be. Are You Looking to Confirm a Relationship? WE'RE HERE TO HELP! DNA RELATIONSHIP testing CAN PROVIDE ANSWERS AND GIVE YOU THE PEACE OF MIND THAT YOU NEED. Call us at 800-929-0847. Hair samples are used in DNA testing and forensic analysis. DNA is extracted from the hair for the purpose of parental DNA testing and criminal investigations. Let us dig down deeper as to why hair is one of the parameters for checking DNA. Hair has two parts - shaft and follicle. The shaft is the one you see above the surface of the skin. The follicle or hair root is underneath the skin surface. In the hair, there is keratin, a special type of protein. The same protein is found on the nails, skin, and animal hoofs. (1, 2, and 3) Image 1: The hair and the different layers. Picture Source: res.cloudinary.com Medulla - It is the innermost layer. It consists of soft structures of rounded cells.Cortex - It is the middle part of the hair, which contains the pigment that gives the hair its color and elasticity.Hair cuticle - It is the scaly layer, which is hard and transparent that serves as a protective covering of the inner parts of the hair. It is also the one responsible for giving the hair its lustrous sheen. (2, 3, and 4) Image 2: Hair is used in DNA testing and forensic analysis. Picture Source: abm-website-assets.s3.amazonaws.com Can you get DNA from hair? Is DNA always available in a hair sample? The answer is no! (4, 5) Hair DNA testing is carried out to check for paternity and forensic investigation. In a forensic laboratory, the governing bodies have their way of extracting the DNA successfully in a given hair sample. They have the best testing techniques and resources. Usually, in a crime scene, the hair sample does not have the roots attached to it. What the testing personnel does is perform extensive and thorough DNA analysis to check for DNA despite the very low chances of success. For paternity testing, hair is used provided the hairs have roots attached. Without the roots attached the chances of success are low. Identifying the hair follicle can be done under close observation of the hair using the naked eye. The root of the hair or follicle is a gray-white tiny ball at the tip of the hair shaft. (5, 6, and 7) When performing a hair DNA test for the purpose of paternity, it is a must to have a complete hair sample - with hair shaft and hair follicle. On the other hand, if the purpose of hair DNA testing is for forensic use, a cut hair sample even with no follicle can still be of use. However, a complex procedure has to be made. The hair needs to undergo a specific test called the MtDNA test or Mitochondrial DNA test. The MtDNA test is a parameter used to find out if two people share the same maternal line. (2, 5, and 7) Image 3: Hair samples should be collected properly to keep the DNA intact which makes testing pretty easy. Picture Source: progressivedairy.com The first thing you should do is to make sure you have a solid hair sample. If you have ripped or plucked from the scalp, then you can immediately send the hair sample to the DNA hair testing facility. A minimum of five hairs is required. It is a must to use a freshly plucked hair sample. If the hair is old, an advanced testing method is required at an additional cost. Put the hair sample in a dry paper envelope ensuring you do not touch the hair with your bare hands. A thorough analysis of nuclear DNA has to be made for proper genetic identification and profiling. An electron microscope is used to check for the hair's nuclear content as it is the only way to visualize the small fragments of DNA due to partial breakdown during the process of cornification. Another way to test DNA in hair samples is through mitochondrial DNA, it is found in the cell's mitochondria, which is a type of cell organelle found in the cytoplasm. Its function is to supply the cell with energy. The mitochondrial DNA is more abundant than nuclear DNA. In a human cell, there are thousands of copies of MtDNA. It is a huge difference in number considering that there is only a single copy of nuclear DNA. The government of some countries has access to DNA databases. It is where the profiles of prosecuted criminals are stored. However, the database profile contains nuclear DNA, which increases its power and usability in solving crimes. More so, mitochondrial DNA cannot differentiate individuals as people share a common maternal blood line will also share the same mitochondrial DNA profile. So, if the two persons are of the same maternal line, you cannot distinguish which one of them is responsible for a particular crime. So, this explains why forensics prefer to use nuclear DNA over mitochondrial DNA. (7, 8, and 9) There are various factors that can significantly affect the success rate of DNA identification using hair samples. Some of them include the following: Dye - the cuticle of the hair can be altered by chemical treatments such as when a dye is used. Dyes can penetrate the spaces between the scaly cells that form the hair cuticle. Hair dye usually contains peroxides which can contribute to the degradation of DNA in the hair. What peroxides do is they break the phosphodiester bonds in DNA.Exposure of hair samples to water - Washing of the hair sample can greatly affect the integrity of DNA. It can easily be washed out of the hair fiber. So, the more the hair sample is exposed to water the more DNA is lost. The loss of DNA is because of the degradation and break down of phosphodiester bonds in DNA as well as the damage incurred by frequent washing of the hair.Other factors that could affect the success of DNA identification in a hair sample include the age of the sample, the manner the sample was collected, storage, and other external factors such as exposure to chemicals like soaps and cleaning agents and temperature extreme. (1, 5, 9, and 10) Hair analysis is not only intended for DNA identification. It is also used to detect the use of illegal drugs, the presence of heavy metals in the body, and to check for nutritional deficiencies. The presence of hair can also be linked to a suspect or victim in a crime scene primarily because the hair can be moved from one location to another. It is said that about 100 head hairs are naturally shed per person every day. Hair analysis also helps determine whether the hair is being studied is from humans or animals. If it is from an animal, the examiner can check the species from which it originated. If the hair sample is from a human, the examiner can check as to where particular body parts the hair came from. The examiner will check the hair for: LengthShapeStiffnessColorPigmentationCurlinessAppearance of the medulla In a forensic examination, the majority of the hair being examined originated either from the head or pubic areas. Hair analysis can also help in differentiating racial groups - Asian ancestry, European ancestry, and African ancestry. (2, 5, and 8) European ancestry - The hair is typically straight or wavy with fine to medium-sized pigment granules.Asian ancestry - The hair is straight and with medium-sized pigment granules. The cuticle is thicker when compared to the hair of other races.African ancestry - They have kinky to curly hair with oval-cross section. They also have large pigment granules. The hair plays a vital role in determining DNA, which helps in paternity identification and forensic investigation. Examining bodies use various hair examining methods to thoroughly check the sample. For DNA identification and forensic purpose, it is a must to use the most ideal hair sample - the one with the roots attached to the hair. In the case of hair DNA identification, it is easy to secure a solid hair sample. However, in forensic cases, the integrity of the hair sample is not always guaranteed. Which is why forensic experts use a more advanced hair analysis method. 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