

The Technology

In order to test someone's DNA for base pair substitutions, we must first obtain a sample of DNA. A DNA-containing nucleus exists in virtually every cell of the body except red blood cells. This means that the white blood cells, skin, hair and other tissues and even the few cells in spit or tears each contain a complete copy of an individual's DNA. At Molecular Testing Labs®, we have elected to use the few cells that get stuck to a swab when rubbed against the inside of the cheek. Since it does not involve a blood draw, it is quick, easy and painless to obtain and can be self-collected. The dried swab is quite stable at room temperature and easy to ship through standard mail.

When the swab arrives at Molecular Testing Labs®'s state-of-the-art molecular genetic testing facility, it is first put through a series of solutions to extract the DNA from the cells stuck to the swab. At this point, the amount of DNA in the specimen is too little to analyze directly, so through a process such as polymerase chain reaction (PCR), we can increase the amount of the specific DNA segments on the gene that we want to test.

The process involves heating the solution with the DNA to the temperature at which the two sides of the DNA molecule separate. We then add specific primers, which have been designed to stick to the single strands of DNA at the beginning of the MTL Genetic analyzer and at the end of the specific segment we want to analyze. The temperature is then lowered so the two chains can recombine. We then add a DNA polymerase to the solution, which attaches to the strands of DNA at the sites where the primer has attached. Then a solution containing an abundance of the four base pairs, G, C, A and T, is added to the vessel and the DNA polymerase starts building a complementary DNA chain to the targeted area on the DNA. Time is allowed for the reaction to complete. The temperature is then raised again to separate these segments and the process is repeated. One cycle last about four minutes and is this repeated 20 to 30 times, yielding billions of copies of the targeted DNA sequence, all from the few cells that were contained on the cheek swab.

Now that there is a significant amount of DNA with the target sequence, it can be put into an analyzer to determine what substitutions might be present in the sequence. Current equipment allows multiple different segments and different genes to be analyzed simultaneously. What was no more than science fiction a few short years ago is rapidly becoming a vital and indispensable tool, not just in medicine, but in so many other areas, including that of training, fitness and nutrition.

MyDNAFitnessTest.com has contracted with Molecular Testing Labs® for certain services and products, which it resells and receives a fee.