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FAL INFORMATION SHEET 2: WHAT IS DNA?

DNA stands for Deoxyribo-Nucleic Acid. It is the chemical that is found in virtually every cell in our bodies and which carries genetic information from one generation to the next and determines our physical characteristics like hair and eye colour.

This genetic information is in the form of a chemical code or language.

Except for identical twins, each person's DNA is unique. Half of the DNA is inherited from our father and the other half from our mother. Siblings (brothers or sisters) inherit different combinations of DNA from the same parents and are therefore different from each other but can have quite similar profiles.

The technology of DNA profiling does not yet allow the examination of every single difference between people's DNA. However, the techniques used by forensic science providers, including FSS when operational, look at specific areas of nuclear DNA, which are known to vary widely between people. These areas vary in length between different people's DNA. DNA profiling analyses and measures these differences in length.

DNA can be extracted from any cells that contain a structure called the nucleus. This includes blood, semen, saliva or hair samples.

Glossary of terms

DNA A complex chemical in most cells of the body. It codes for all characteristics of life, e.g. hair and eye colour.

Locus/Loci This is the name given to the area(s) of DNA that is analysed when generating a DNA profile.

MLP Multi locus profiling was the original technique devised in the UK in 1985. The MLP DNA profile had the appearance of a supermarket barcode. However, it needed a large amount of biological material to produce a result and they were unsuitable for use in a database.

SLP It was replaced in 1990 by the more sensitive single locus profiling. This method builds up the 'barcode' in a number of stages and was more suitable for crimestains where the DNA is often damaged or degraded.

STR Introduced in 1994, Short Tandem Repeat is the name of the type of loci used to generate a DNA profile for the National DNA Database® (NDNAD).

PCR Polymerase chain reaction is the technique that produces millions of copies of a particular area or sequence of DNA so that there is sufficient material to analyse – like a biological photocopier.

SGM Second Generation Multiplex is a DNA profiling system, which looks at seven areas (six areas plus a sex indicator area) to give a DNA profile. The average discrimination potential for an SGM profile is one in fifty million.

SGM Plus® The technique employed by FSS from June 1999 until the cessation of its operational forensic services in March 2012, for profiling DNA samples was SGM Plus®. It looks at 11 areas (10 areas plus a sex indicator area) to give a DNA profile. The average discrimination potential for an SGM Plus is one in a billion.

DNA LCN DNA Low Copy Number is an extension of the SGM Plus profiling technique. It is more sensitive and enables scientists to produce DNA profiles from samples containing very few cells even if they are too small to be visible to the naked eye.

SNPs Single nucleotide polymorphisms are differences in the DNA code that are found throughout the human genome including on the Y chromosome. Most occurred far back in human history so they can be used to study the major human ethnic groups.

Mitochondrial DNA Mitochondrial DNA is inherited only from your mother. Brothers and sisters will have the same mitochondrial DNA type as their mother, as will any relative linked through the female line. This feature of mitochondrial DNA can be used for body identification.

Y-chromosome The Y chromosome is present only in men and will remain largely unchanged as it passes through the male line of a family. Different changes on the Y chromosome can help with research into the evolution and movement of human populations.