**NAME: IFUNANYA ANNETTE ORAKA**

**DEPARTMENT: PHARMACHOLOGY**

**MATRIC NO: I8/MHS07/045**

**DNA fingerprinting**, also called **DNA typing, DNA profiling, genetic fingerprinting, genotyping,** or **identity testing**, in [genetics](https://www.britannica.com/science/genetics), method of isolating and identifying variable elements within the base-pair sequence of [DNA](https://www.britannica.com/science/DNA) (deoxyribonucleic acid). The technique was developed in 1984 by British geneticist **Alec Jeffrey’s**, after he noticed that certain sequences of highly variable DNA (known as [minisatellites](https://www.britannica.com/science/minisatellite-DNA)), which do not contribute to the functions of [genes](https://www.britannica.com/science/gene), are repeated within genes. Jeffrey’s recognized that each individual has a unique pattern of minisatellites (the only exceptions being multiple individuals from a single [zygote](https://www.britannica.com/science/zygote), such as identical twins). The procedure for creating a DNA [fingerprint](https://www.britannica.com/topic/fingerprint) consists of first obtaining a sample of [cells](https://www.britannica.com/science/cell-biology), such as skin, hair, or [blood](https://www.britannica.com/science/blood-biochemistry) cells, which contain DNA. The DNA is extracted from the cells and purified. In Jeffrey’s original approach, which was based on [restriction fragment length polymorphism](https://www.britannica.com/science/restriction-fragment-length-polymorphism) (RFLP) technology, the DNA was then cut at specific points along the strand with [proteins](https://www.britannica.com/science/protein) known as [restriction enzymes](https://www.britannica.com/science/restriction-enzyme). The enzymes produced fragments of varying lengths that were sorted by placing them on a gel and then subjecting the gel to an [electric current](https://www.britannica.com/science/electric-current) ([electrophoresis](https://www.britannica.com/science/electrophoresis)): the shorter the fragment, the more quickly it moved toward the positive pole (anode). The sorted double-stranded DNA fragments were then subjected to a blotting technique in which they were split into single strands and transferred to a nylon sheet. The fragments underwent autoradiography in which they were exposed to DNA probes—pieces of [synthetic](https://www.merriam-webster.com/dictionary/synthetic) DNA that were made radioactive and that bound to the minisatellites. A piece of [X-ray](https://www.britannica.com/science/X-ray) film was then exposed to the fragments, and a dark mark was produced at any point where a radioactive probe had become attached. The resultant pattern of marks could then be analyzed.

The assay developed by Jeffrey’s has been supplanted by approaches that are based on the use of the [polymerase chain reaction](https://www.britannica.com/science/polymerase-chain-reaction) (PCR) and so-called microsatellites (or short tandem repeats, STRs), which have shorter repeat units (typically 2 to 4 base pairs in length) than minisatellites (10 to more than 100 base pairs in length). PCR amplifies the desired fragment of DNA (e.g., a specific STR) many times over, creating thousands of copies of the fragment. It is an automated procedure that requires only small amounts of DNA as starting material and works even with partially degraded DNA. Once an adequate amount of DNA has been produced with PCR, the exact sequence of nucleotide pairs in a segment of DNA can be determined by using one of several biomolecular sequencing methods. Automated equipment has greatly increased the speed of [DNA sequencing](https://www.britannica.com/science/DNA-sequencing) and has made available many new practical applications, including pinpointing segments of genes that cause [genetic diseases](https://www.britannica.com/science/human-genetic-disease), mapping the [human genome](https://www.britannica.com/science/human-genome), engineering drought-resistant [plants](https://www.britannica.com/plant/plant), and producing biological [drugs](https://www.britannica.com/science/drug-chemical-agent) from genetically altered [bacteria](https://www.britannica.com/science/bacteria).

DNA fingerprinting can be applied in medical biotechnology in the following ways;

**Identification of TWINS:** One of its main uses is to tell if twins are identical or fraternal at birth. Sometimes parents don't know for sure if infant twins are identical or fraternal. Babies look similar when they're first born, especially twins, even if they're aren't identical. So parents can choose to take a DNA test to see if the children's DNA is the same, clarifying if twin are identical or fraternal.

**Paternity TESTING:** Paternity testing has become highly demanded in today's society. Mothers get accused of cheating and their partner's demand a paternity test to make sure their supposed "child" is actually theirs. As well some women may have just come out of a relationship and can't figure out the timing of their pregnancy, whether or not it's their old partner or their new one. Also there are many people that go their whole life without knowing who their father is. Paternity testing can see if parts of the parent's DNA is present in the child, which would prove the relationship to the child, father or not.

**Engrafting Bone MARROW:** Some people need to have an en-graft (replace) a portion of bone marrow, sometimes from donors or from another part of their body. DNA fingerprinting is used to identify if the donor's donated bone marrow is a right match for the patient. It's also used to monitor the condition of the en-grafted bone marrow, to see if the body is okay with the foreign object or if it's rejecting the donated marrow.