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**MATRIC NO: 18/MHS07/003**

**Assignment Title:** DNA fingerprinting

**Course Title:** Introduction to Biotechnology

**Course Code:** PHA 210

**Question**

Explain the applications of DNA fingerprinting in Medical Biotechnology.

**Answer**

**DNA fingerprinting: Applications in Medical biotechnology**

DNA fingerprinting is a chemical test that shows the genetic makeup of a person or other living things. It’s used as evidence in courts, to identify bodies, track down blood relatives (**paternity**), and to look for cures for disease.

DNA fingerprinting is a molecular genetic method that enables the identification of individuals using hair, blood, or other biological fluids or samples. This is able to be accomplished due to unique patterns (polymorphisms) in their DNA. It is also known as genetic fingerprinting, DNA typing, and DNA profiling.

**Medical Uses of DNA Fingerprinting; it can**

* Match tissues of organ donors with those of people who need transplants.
* Identify diseases that are passed down through your family.
* Help find cures for those diseases, called hereditary conditions.

**Process**

To get your DNA fingerprint, you would give a sample of cells from your body. This can come from a swab inside your mouth, from your skin, the roots of your hair, or your saliva, sweat, or other body fluids. Blood is usually the easiest way. Lab workers treat the sample with chemicals to separate the DNA, which is then dissolved in water.

Your DNA is cut into smaller segments with another chemical process to get sections of 5 to10 base pairs that repeat themselves. Technicians copy those tiny sections millions of times to make the samples longer for easier study.

Lab workers take those strips of DNA and mix them into a gel. Then they run an electric current through the gel, which separates smaller strands of DNA from the larger ones. A dye added to the gel makes the DNA strips stand out when they’re placed against an ultraviolet light or lit up with a laser.

The more these short segments are tested, the more accurate the DNA profile will be. The strips will show a barcode-like pattern that can then be compared to the results from another sample of DNA to find a match.

1. **Paternity Testing:** Testing paternity samples requires the collection of cells and comparison of DNA fingerprints from and between children and potential parents. Children will have a mix of DNA fingerprints inherited from each parent. When a child is conceived, each parent provides half of the genetic information. Most often the test is performed when the mother of the child is known but the father is in question. Since it is highly unlikely that any two people will have the same genetic fingerprint, paternity testing using DNA fingerprints is a reliable way to determine the parentage of a child.
2. **Plants and Animals:** DNA fingerprinting of plants and animals is performed for food security, food safety, identification and parentage. In food animals, DNA fingerprinting can be used to trace meat to the source animal. The technique can be used to identify endangered and non-endangered fish species, while the sources of plants can be verified to prevent counterfeiting of seeds and stock. Pathogenic food organisms can be quickly identified by their DNA fingerprints, allowing doctors to provide timely, targeted treatment.

The techniques used in DNA fingerprinting also have applications in paleontology, archaeology, various fields of biology, and medical diagnostics. It has, for example, been used to match the goatskin fragments of the Dead Sea Scrolls. In biological classification , it can help to show evolutionary change and relationships on the molecular level, and it has the advantage of being able to be used even when only very small samples, such as tiny pieces of preserved tissue from extinct animals, are available.

DNA fingerprinting serves several uses in medicine. One important instance is identifying good genetic matches for organ or marrow donation. Doctors are beginning to use DNA fingerprinting as a tool for designing personalized medical treatments for cancer patients. Moreover, the process has been used to ensure that a tissue sample has been correctly labeled with the patient's name.