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PHARMACOLOGY

PHA 210

ASSIGNMENT: EXPLAIN THE APPLICATION OF DNA FINGERPRINTING IN MEDICAL BIOTECHNOLOGY

**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).

USES

Since it was invented in 1984, DNA fingerprinting most often has been used in court cases and legal matters. It can:

* Physically connect a piece of evidence to a person or rule out someone as a suspect.
* Show that your parents, siblings, and other relatives may be.
* Identify a dead body that’s too old or damaged to be recognizable.

DNA fingerprinting is extremely accurate. Most countries now keep DNA records on file in much the same way police keep copies of actual fingerprints.

It also has medical uses. 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.

FINGERPRINT TEST

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.

The techniques used in **DNA fingerprinting** also have **applications** in paleontology, archaeology, various fields of biology, and medical diagnostics

DNA’S MANY APPLICATION

**DNA technology** is an exciting field these days. This is the study and manipulation of genetic material, and scientists are using DNA technology for a wide variety of purposes and products. A major component of DNA technology is **cloning**, which is the process of making multiple, identical copies of a gene. Cloning may bring to mind interesting sci-fi movies, but cloning also gives us pest-resistant plants, vaccines, heart attack treatments and even entirely new organisms.

DNA technology has also had a major impact on the pharmaceutical industry, agriculture, disease therapy and even crime scene investigations. Let's take a closer look at the effects DNA technology has had on our world and the applications of such an important field of study.

**Pharmaceuticals and Medicine**

DNA technology and gene cloning are essential to the pharmaceutical industry and medicine. DNA technology is being used to help diagnose genetic diseases, such as sickle-cell disease and Huntington's disease. Since these diseases are transferred genetically from one generation to the next, those who have such diseases can be identified (sometimes even before birth) and be treated before symptoms appear.

DNA technology is also critical to developing vaccines. **Vaccines** are harmless versions of a pathogen, such as a bacterium or virus. Vaccines can be used to 'trick' your body into fighting the harmless version so that if you are exposed to a harmful version of the pathogen, you have already built up defenses. There are many ways that DNA technology is used to make vaccines, such as altering the pathogen's genes and mimicking surface proteins of harmful pathogens.

Therapeutic hormones, such as insulin and human growth hormone, are also the result of DNA technology in medicine. Millions of people with diabetes depend on insulin treatments, and human growth hormone is used to help children who suffer from dwarfism, because they produce inadequate amounts of the hormone in their body.

**Agriculture**

You have likely heard of **genetically modified organisms**, or GMOs. These are organisms that have genes from artificial means. GMOs are used for a variety of agricultural purposes, such as growing larger plants with higher yields, creating pest-resistant crops and improving the nutritional value of crops.

DNA technology doesn’t just make bigger, better food, through. It’s also being used to create food products that have medical benefits.