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Assignment : Explain the application of DNA fingerprinting in medical biotechnology

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 in their DNA. It is also known as genetic fingerprinting, DNA typing, and DNA profiling.

When used for forensic science, DNA fingerprinting makes use of probes that target regions of DNA specific to humans, thus eliminating any possibility of contamination by extraneous DNA from bacteria, plants, insects, or other sources. Genetic fingerprinting can be used in criminal forensic investigations. A very small quantity of DNA is reliable enough in identifying individuals involved in a crime. Similarly, DNA fingerprinting can and does exonerate innocent people of crimes—sometimes even crimes committed years ago. DNA fingerprinting can also be used to identify a decomposing body.

DNA fingerprinting can answer the question of the relationship to another person quickly and accurately. In addition to adopted children finding their birth parents or settling paternity suits, DNA fingerprinting has been used to establish a relationship in cases of inheritance.

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.

Application of DNA in medical biotechnology ;

Diagnosis of Inherited Disorders

DNA fingerprinting is used to diagnose inherited disorders in both prenatal and newborn babies in hospitals around the world. These disorders may include cystic fibrosis, hemophilia, sickle cell anemia, thalassemia, and many others.

Early detection of such disorders enables the medical staff to prepare themselves and the parents for proper treatment of the child. In some programs, genetic counselors use DNA fingerprint information to help prospective parents understand the risk of having an affected child. In other programs, prospective parents use DNA fingerprint information in their decisions concerning affected pregnancies.

Developing Cures for Inherited Disorders

Research programs to locate inherited disorders on the chromosomes depend on the information contained in DNA fingerprints. By studying the DNA fingerprints of relatives who have a history of some particular disorder, or by comparing large groups of people with and without the disorder, it is possible to identify DNA patterns associated with the disease in question. This work is a necessary first step in designing an eventual genetic cure for these disorders.

Personal Identification

Because every organ or tissue of an individual contains the same DNA fingerprint, the U.S. armed services have just begun a program to collect DNA fingerprints from all personnel for use later, in case they are needed to identify casualties or persons missing in action. The DNA method will be far superior to the dogtags, dental records, and blood typing strategies currently in use.

Biological Evidence

Another important use of DNA fingerprints in the court system is to establish paternity in custody and child support litigation. In these applications, DNA fingerprints bring an unprecedented, nearly perfect accuracy to the determination.