

18/ mhs07/001

Pharmacology

Introduction to biotechnology

Question: explain the application of DNA fingerprinting in medical biotechnology

Answer:

In criminal investigations, the DNA fingerprint of a suspect's blood or other body material is compared to that of the evidence from the crime scene to see how closely they match. The technique can also be used to establish paternity. First developed in 1984 by Alec Jeffreys, a British professor of genetics at the Univ. of Leicester, DNA fingerprinting has been accepted in most courts in the United States, and has in several notable instances been used to exonerate or free persons convicted of crimes, but the Supreme Court has ruled (2009) that convicted criminals do not have a constitutional right to DNA testing. All states have established DNA fingerprint databases and require the collection of DNA from convicted felons, and the Federal Bureau of Investigation has instituted a national DNA fingerprint database linking those of the states and including DNA collected in connection with federal offenses. DNA fingerprinting is generally regarded as a reliable forensic tool when properly done, but some scientists have called for wider sampling of human DNA to insure that the segments analyzed are indeed highly variable for all ethnic and racial groups. It is possible to create false genetic samples and use them to misdirect forensic investigators, but if those samples have been produced using gene amplification techniques they can be distinguished from normal DNA evidence.

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.