
DNA Fingerprinting: A Powerful Law-Enforcement Tool with Serious Social Implications

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DNA fingerprinting has been hailed by law-enforcement officials as the 20th century's most important breakthrough in forensic science. They are eager to use the new technology to identify and prosecute violent criminals as well as to exonerate innocent persons who are suspects in criminal cases. Although DNA fingerprinting has not yet been adequately tested in the courts, the State Attorney General of California recently proposed creating a computerized data base of genetic information on violent criminals. However, transferring DNA fingerprinting from the lab bench to the bar may not be as easy as it seems. The legal application of this new technology raises serious and controversial issues of interest to scientists and the general public.

The term "DNA fingerprinting" was coined by geneticist Alec J. Jeffreys, University of Leicester, U.K., who developed the method in 1985. Several of Jeffreys' "hot" papers were identified in a recent issue of *The Scientist* (January 23, 1989, p.12).

Briefly described, Jeffreys' method produces a complex pattern of bands from particular regions of the DNA molecule called minisatel-

lites. Experts claim that the patterns are as unique to an individual as his or her fingerprints.

These individual-specific genetic fingerprints can be obtained from minute samples of blood, skin cells, semen, or even a single hair. The condition or age of these biological samples does not affect the ability of the method to produce DNA fingerprints. The specificity and flexibility of genetic fingerprinting make it an ideal tool for forensic investigations and criminal prosecutions.

The legal application of DNA fingerprinting raises the interesting question of how scientific evidence is evaluated and ruled admissible in court. The first legal hurdle any new scientific technology must overcome is the so-called Kelly-Frye rule, a precedent established in 1923. The rule states that a new technique must be generally accepted as valid by a consensus of expert opinion before it can be used as evidence.

But expert testimony on the complex genetic and statistical assumptions underlying DNA fingerprinting may confuse nonscientific judges, attorneys, and juries. As a result, they might reject the evidence

despite expert consensus that these assumptions are valid.

Questions about U.S. constitutional law might also block genetic fingerprints from the court. For example, obtaining biological samples from suspects for comparison with evidence at the scene of a crime may conflict with the Fourth Amendment freedom from unreasonable search and seizure. The Fifth Amendment freedom from self-incrimination might also prevent the use of such evidence, however it is obtained.

Serious concerns about fundamental civil liberties are raised by the prospect of creating computerized databases of genetic information on individuals. Pending legislative approval, California plans to require that all convicted violent criminals provide blood and saliva samples for DNA fingerprinting. Biological evidence from the scene of future crimes would be compared against the genetic database to identify alleged per-

petrators. Similar plans are now being considered in Colorado, Virginia, and Washington state.

Also, the Federal Bureau of Investigation is planning a national genetic database. The FBI sees other potential uses for its database, such as to help identify missing persons. But to do this, the database would require DNA fingerprints from all citizens, not just convicted violent criminals.

The risk of potential abuses, such as the invasion of privacy, might outweigh the benefits of a statewide or national genetic database on all citizens.

Clearly, DNA fingerprinting is a powerful new tool for law-enforcement officials. But like most new technologies, it also has serious social implications, which must be addressed by the scientific and legal communities before society can realize the benefits of DNA fingerprinting. ■