Questioning DNA Evidence

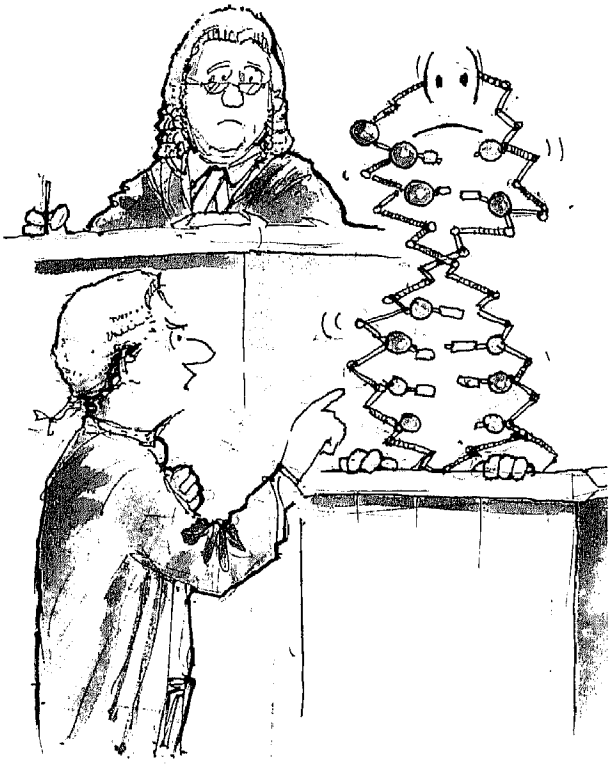
J.T. Kearney points out some flaws in the emerging criminal investigation technique of DNA profiling.

DNA Profiling has been hailed as the most important new criminal investigation technique of this century. It may prove to be so, but recent experience in America indicates that despite the praise, the technique is far from infallible and is still in its infancy in terms of standardisation. DNA evidence, whether produced by the prosecution or defence can be open to challenge and readers might appreciate some ideas as to how to go about doing this.

Background

The technique essentially focuses upon the human cell and the genetic information contained in the DNA molecule. Certain parts of that molecule are unique to the individual, or at least to a very small proportion of the population, and by comparing biological samples from different places and times the testing laboratory is able to "match" the samples as being from the same human being. For example, the semen from a rape victim can be compared to the blood of a suspect.

The advantage of this technique over traditional blood typing is that the result can be declared with near certainty. This involves some complex experiments and afterwards statistical analysis based upon data banks of information.



Limitations

The technique has its limitations. It finds its main application in paternity matters. Otherwise in criminal matters, such evidence will usually only arise where identification is in issue. Investigating authorities need to have a certain quantity of biological material left behind at the scene of the crime. A single drop of blood is sufficient. Alternately semen, hair roots or skin can also be employed. Problems can arise when the sample is contaminated and in this regard it should be noted that air or sunlight are potential contaminants. Further, the technique is expensive and time consuming. Although the test itself involves well accepted technology, it requires rigorous management and the employment of a variety of cross experimentation to ensure accuracy, particularly where the sample is small in quantity, old or degraded.

Another primary problem is that some aspects of the test are not yet in the public domain. That is, some of the steps involved have been patented by various companies, who in reliance on the same theory, employ differing techniques to achieve the same end. Being left to private enterprise has naturally led to some vigorous promotion with possibly inflated claims as to accuracy. For the same reason, standardisation has not been achieved and some aspects are subject to differing opinions in the scientific community. A seminar was held by the Australian Institute of Criminology last year (DNA and Criminal Justice, 30-31 October 1989, Canberra) and the papers are available from the Institute for those wishing to obtain reading lists or further information.

Castro's Case

The People of the State of New York v. Castro (unreported) Supreme Court of State of New York, Sheindlin JSC, 14 August 1989 (a copy is available in the Bar Library), was the first serious challenge to the reliability of DNA profiling evidence. Castro had been accused of a double murder. His wristwatch was found to have drops of blood on it. Castro claimed that it was his own blood. DNA profiling evidence indicated it was blood from one of the victims. What came to light in the course of the 12 week pre-trial hearing relating to the expert evidence, was that the theory and techniques of DNA profiling are capable of producing reliable results. However, the actual testing of the samples in this case failed to use the generally accepted scientific techniques for obtaining reliable results and the evidence was ruled to be not sufficiently reliable to go before the jury. In other words the tests are potentially reliable but were sloppily done in this instance. To reach that conclusion Sheindlin JSC employed the American doctrine known as the Frye test to determine the admissibility of the expert evidence. That test arises from Frye v. United States 293 F1013 (1923D.C.Cir) where the Court laid down a test, applied generally in America since, that expert scientific evidence will be admissible only if the new theory and technique have gained general acceptance in the relevant scientific community. Although such an approach is known in Australia see R. v. Carroll (1985) 19 A Crim R; R. v. Lewis (1987) 29 A Crim R 267) at this stage it could not be said to be the law in Australia. If such an issue arose it would probably be decided by the discretion to exclude otherwise admissible evidence if it would operate unfairly against the accused, see Ireland v. The Queen (1970) ALR 727; Bunning v. Cross (1977) 141 CLR 54, and Cleland v. The Queen (1983) 57 ALJR 15. A tactical decision would have to be made as to whether to employ the pre-trial applications

procedure in Part 53 of the District Court Rules, to challenge such evidence or on a voir dire in the course of the trial or failing those avenues to challenge the evidence before the jury as was done in Chamberlain v. The Queen (1984) 153 CLR 521. The controversy surrounding the latter case and a quick read of Castro's case might suggest that it would take careful thought and preparation before trying to challenge such complex evidence before a jury.

For the same reason, lawyers have virtually no hope of mastering this specialised field and will require the services of one or more consulting experts to examine the DNA profiling evidence and results to make a decision as to whether a challenge is warranted. Certainly, suspicion should be aroused when the original sample was small in quantity, was not fresh or has been exposed to sunlight, water or other contaminants. Further, in each test there are subjective elements, particularly where the scientist visually "matches" bands produced on an autoradiograph (similar to an x-ray). This is a critical step and Castro's case shows how the testing laboratory can be overzealous in looking for similarities between the bands rather than the opposite. Sheindlin JSC suggested that the party proposing to use DNA evidence should give discovery of the following to the opposing party, and it is suggested that the following list should be obtained from the opposing party, hopefully by consent, or by employing one or more of the procedures under Part 53 of the District Court Rules. The relevant information is:

1. Copies of the autoradiographs, with the opportunity to examine the originals;
2. copies of laboratory books;
3. copies of reports by the testing laboratory;
4. a written report by the testing laboratory setting forth the method used to declare a match or non-match, with all relevant criteria;
5. a statement by the laboratory setting out the method used to calculate the allele frequency in the relevant population;
6. a copy of the data pool for each locus examined;
7. a certification by the testing laboratory that the same rule used to declare a match was used to determine the allele frequency in the population;
8. a statement setting forth observed contaminants, the reasons for them, and tests performed to determine their origin and the result of the tests;
9. if the sample is degraded, a statement of tests performed and the reasons for them;
10. a statement setting forth any other observed defects or laboratory errors, the reasons for them and their results;
11. a chain of custody of the document.

It is to be hoped that prosecution authorities will co-operate in providing such material upon request.

Conclusion

DNA profiling has the potential to become a standard technique in criminal investigation. At the moment it suffers from lack of standardisation and the Castro case has called into question the professionalism of some of the laboratories employing DNA technology, in the same way that the Chamberlain case and its aftermath have brought expert evidence into question. For DNA profiling, it is early days and it is suggested that by obtaining the above information and one or more consulting experts opinions, the client can be advised accordingly and in some cases a challenge to the reliability of the testing laboratory may be warranted.

Further Reading

A. Coelli " One Chance in 165 Million"
Australian Law News September 1989 p.22

P. Macalister "From Fingerprints to Genetic Codes" NSW Law Society Journal April 1989 p.43

W.C. Thompson and S. Ford "DNA Typing" Trial September 1988 p.56

C. Freckleton "DNA Profiling, Optimism and Realism" Law Institute Journal May 1989 p.360

B.S. Lander "DNA Fingerprinting on Trial" Nature 15.6.89 Vol.339 p.501. ❑

Many more references are to be found in the conference papers from The Australian Institute of Criminology.