Panel OKs DNA fingerprints in court cases

As currently practiced by a handful of laboratories, the genetic identification technique known as DNA fingerprinting offers a valid and useful way to collar criminals and exonerate innocent people, a panel of scientists and legal experts stated last week. However, the panel recommended stricter standards to ensure the accuracy and proper interpretation of DNA fingerprints as the technology becomes more widely used.

Courts around the world have admitted DNA fingerprinting – more properly known as DNA typing – as evidence in hundreds of rape and murder cases (SN: 4/23/88, p.262; 7/29/89, p.74). Forensic scientists use DNA isolated from blood, semen or hair left at the scene of a crime to identify an assailant.

The technique relies on the fact that, except for identical twins, everyone's DNA is unique. In a common method of DNA fingerprinting, a laboratory technician uses enzymes to chop DNA samples taken from a suspect, the victim and the evidence. After sorting the resulting DNA pieces by size on a gel, the technician washes the gel with a solution containing four types of tiny DNA segments, or probes. The probes, which are labeled with radioactive compounds, show up as a characteristic ladder of black smears on photographic film. By matching the smears from a suspect's or victim's sample with those from the evidence, the technician can determine with a high degree of accuracy whether the suspect could be guilty of the crime.

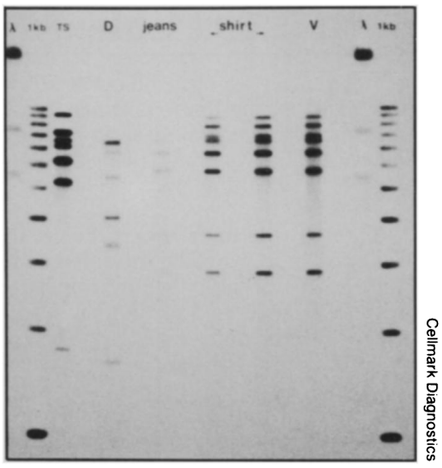
Researchers calculate that only two or three people in the entire world share the same smear pattern that emerges using four probes. But because people tend to marry within their race, ethnic group or hometown, defense attorneys have argued that the frequency of a random match might be higher if an innocent suspect and the criminal were of the same race or came from the same city. Accordingly, a handful of courts have rejected DNA fingerprinting evidence because scientists could not agree on the likelihood of a false match in these instances.

To settle this controversy, the panel – which was convened by the National Academy of Sciences – endorses a so-called "ceiling principle" for interpreting DNA fingerprints. Until scientists can perform studies to get firm estimates of the exact frequency of a random match within small populations, the panel recommends using a more cautious statistical technique that they calculate should yield results with a 1-in-6.25-million chance of an erroneous match.

"The committee succeeded in . . . coming up with a very conservative, but still very workable solution that would allow you to put a frequency on these patterns without going into gory detail about someone's ethnic background," says panel member Eric S. Lander of the Whitehead Institute for Biomedical Research in Cambridge, Mass. "It is our hope that . . . the debates over population genetics can indeed be put to rest."

The panel also calls for a laboratory accreditation program administered by the Department of Health and Human Services in consultation with the Department of Justice in order to prevent mistaken identifications due to lab sloppiness. In addition, the panel recommends the formation of a National Committee on Forensic DNA Typing to keep up with innovations in DNA fingerprinting methods, and the creation of a nationwide DNA fingerprint database if current pilot studies prove its usefulness in tracking criminals. Panel members also requested federal and state governments to develop policies for sharing DNA samples and information.

Because of the number of the panel's recommendations, a front-page story that appeared in the *New York Times* last week mistakenly concluded that the panel advocated a moratorium on the use of DNA fingerprinting. The story, which appeared before the report was released, was corrected in a second story the following day. In a hastily called press conference in reaction to the *New York Times'* error, panel chairman Victor A. McKusick of the Johns Hopkins University Hospital in Baltimore stated, "Our report emphasizes the need for a high level of quality control in collecting, analyzing and interpreting [DNA fingerprinting] data. We did not say, however, that courts should cease to admit this evidence." – *C. Ezzell*



Cellmark Diagnostics

A DNA fingerprint matching a stabbing victim's DNA profile (V) to DNA from blood on a defendant's (D) jeans and shirt. The other lanes contain size markers.

Microwaving can lower breast milk benefits

Women who work outside the home can express and store breast milk for feedings when they're away. But parents and caregivers should be careful how they rewarm this milk. A new study shows that microwaving human milk – even at a low setting – can destroy some of its important disease-fighting capabilities.

Breast milk can be refrigerated safely for a few days or frozen for up to a month; however, studies have shown that heating the milk well above body temperature – 37° C – can break down not only its antibodies to infectious agents, but also its lysozymes, or bacteria-digesting enzymes. So when pediatrician John A. Kerner Jr. witnessed neonatal nurses routinely thawing or reheating breast milk with the microwave oven in their lounge, he became concerned.

In the April PEDIATRICS (Part 1), he and his Stanford University co-workers report finding that compared to unheated breast milk, microwaved milk lost lysozyme activity, lost antibodies and fostered the growth of more potentially pathogenic bacteria. Milk heated at a high setting (72° to 98° C) lost 96 percent of its lysozyme activity and 98 percent of its immunoglobulin-A antibodies, agents that fend off invading microbes.

What really surprised him, Kerner says, was finding some loss of anti-infective properties in the milk microwaved at a low setting – and to a mean of just 33.5° C. Adverse changes at such low temperatures suggest "microwaving itself may in fact cause some injury to the [milk] above and beyond the heating," he says.

But Randall M. Goldblum of the University of Texas Medical Branch in Galveston disagrees, saying, "I don't see any compelling evidence that the microwaves did any harm. It was the heating." Lysozyme and antibody degradation in the coolest samples may simply reflect the development of small hot spots – potentially 60° C or above – during microwaving, notes Madeleine Sigman-Grant, of Pennsylvania State University in University Park. And that's to be expected, she says, because microwave heating is inherently uneven – and quite unpredictable when volumes less than 4 milliliters are involved, as they were in Kerner's study.

Goldblum considers use of a microwave to thaw milk an especially bad idea, since it is likely to boil some of the milk before all has even liquefied. Stanford University Medical Center no longer microwaves any breast milk, Kerner notes. And that's appropriate, Sigman-Grant believes, because of the small volumes of milk that hospitals typically serve newborns – especially premature infants. – *J. Raloff*