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Science & Technology 6/23/03

## Getting DNA to bear witness

Genetic tests can reveal ancestry, giving police a new source of clues

By Dana Hawkins Simons

Police were desperately hunting a serial killer who had murdered five women in Louisiana. Leads were turning cold. DNA analysis of tissue shed at a crime scene did not match profiles in the FBI's database of DNA from known felons. Then investigators sent the tissue to a private lab in Sarasota, Fla., for further analysis. In a conference call in March with the Louisiana investigators, Tony Frudakis, the founder and chief scientific officer of DNAPrint Genomics, reported his lab's results: The suspect was a black male. The phone line fell silent. After all, eyewitnesses had described the suspect as white, and, historically, few serial killers are black. When Frudakis was asked if he was sure, he replied: "I'm positive. You're wasting your time dragnetting Caucasians; your killer is African-American."

Investigators refocused their search and last month arrested the alleged killer, Derrick Todd Lee. The first reported successful use of DNA in the United States to provide clues about a suspect's ancestry has impressed some experts and unsettled others. "It's logical to use these technologies to identify leads in criminal cases--I have no qualms with that," says Barry Scheck, an expert on the use of



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DNA in criminal investigations. "But there are potential dangers as well," he says, citing risks to a suspect's privacy. Others are concerned that ancestry is often a poor guide to appearance.

**Roots.** Behind the controversy are recent studies showing it's possible to identify people's likely ancestral roots by looking for tiny variants in the sequence of DNA "letters" found most often in specific groups. "Races do exist, and they have some biological meaning," says Mark Batzer, a human geneticist at Louisiana State University and an author of one such study. DNAPrint, which offers its service to both police and genealogy buffs, extracts and analyzes DNA from tissue left at crime scenes or cells swabbed from inside the cheek. It estimates a person's "biogeographical ancestry admixture"--an ethnic recipe giving the person's fraction of African, East Asian, Indo-European, and American Indian ancestry. No one has independently studied the accuracy of DNAPrint tests, but Frudakis says that in over 3,000 trials, "we've yet to confirm an error."

Louisiana police aren't the first to use what's known as "DNA photofitting" technology to narrow a list of suspects. Last year, Britain's Forensic Science Service started making rough estimates of suspects' likely ethnicity. It compares markers in crime-scene DNA with its own database of DNA sequences that are more common in one ethnic group than another. The FSS also tests the DNA of suspects for a gene associated with red hair--a useful clue for police in a country where red hair is more common than in the United States.

But DNA analysis of any kind raises concerns about genetic privacy--for example, the possibility that a suspect's DNA will reveal not just ancestral markers but clues to the person's health. And the test may not always be as helpful as it seemed in the Louisiana investigation, say some experts. "Ancestry doesn't necessarily correlate with appearance, so this isn't going to be very useful," says Pilar Ossorio, an expert on bioethics. The University of Wisconsin-Madison professor cites herself as an example. Her mother is of Russian and German ancestry, her father is Mexican, and she says she's often mistaken as being from the Indian subcontinent. "Race is not something you can define in genetic terms," she says.

The very idea of measuring race--an effort long associated with bad science and bigotry--makes many people uncomfortable. DNAPrint, however, argues that the biogeographical ancestry its test measures is different from "race" and that the results confirm how little racial categories actually mean. "By showing the continuum of genetic variation among people, our test dispels race as a scientific way of categorizing people," says Mark Shriver, an expert on human population genetics at Pennsylvania State University and the developer of the DNAPrint test. And in response to worries about medical privacy, the company says the sequences it analyzes for ancestry are not known to be linked to disease-related genes.

The controversy is about to heat up as more criminal investigators turn to the technology and it becomes more powerful. "We'd like to push the limits," says Frudakis. His lab and others are closing in on genes that affect traits including skin pigmentation and iris and hair color. Tests for those genes might give better clues to suspects' appearance, and Frudakis projects that they could be available later this year. On the horizon are screens for genetic variations that affect height and the shape of facial features. Frudakis says these are all fair game for DNA testing. He points out that they are, after all, the same traits police ask about when they have a human eyewitness.

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