

science progress

GENOMICS

When Scientists Pick a Fight with the Law

Researchers Call for Access to the FBI's DNA Database



SOURCE: AP/Rogelio V. Solis

A DNA technician reviews genetic measurements on a monitor at the state Crime Laboratory in Jackson, MI.

By [Osagie K. Obasogie](#) | Wednesday, April 7th, 2010 | [Share This](#) | [Print](#)

Since the times of Galileo and as recently as climate change researchers' battles with the Bush administration, scientists have defended themselves against what they perceive to be undue intrusion into their research by government and other authorities. But rarely have scientists gone out of their way to start a fight with Johnny Law.

This dynamic seems to be changing in the field of DNA forensics. Two dozen scientists (along with several other scholars and practitioners) recently published an [open letter](#) in the prestigious journal *Science* that called out the Federal Bureau of Investigation for stonewalling research access to the federal DNA database. This database houses almost eight million DNA profiles used to identify unknown offenders who leave biological materials at crime scenes.

Why are scientists poking this bear with a stick? DNA evidence is particularly compelling because the chance that any two samples match coincidentally is slim to none; experts often express the probability as only one in several million. This is also why DNA is useful in exonerating individuals who are wrongly accused; testing can show that unknown samples either match or do not match any one individual with a high degree of certainty. But things become more complicated when forensic labs compare unknown samples with thousands or millions of stored profiles in search for a "cold hit"—an attempt to identify suspects solely on the basis that a stored profile matches the unidentified crime scene sample.

When forensic scientists make these comparisons, they examine 13 loci, or regions on a chromosome, to assess their similarity. Matches between two samples at all 13 points are considered a full match. But [some experts have argued](#) that 9-point partial matches are enough to identify someone. As a result, it has become increasingly common to prosecute and incarcerate individuals solely on evidence based on DNA database matches—even

when exculpatory evidence is available. But these types of DNA database matches may very well stand on shakier ground than the feds would like to admit.

For example, a [recent examination](#) of Arizona's 65,493 database profiles led to a surprising result: 122 pairs matched at 9 loci, 20 pairs matched at 10, and two pairs of siblings matched at 11 and 12. There are also reports that [other state databases](#) are experiencing similar oddities. Illinois' state databases reportedly showed that out of 220,000 profiles, 903 matched at 9 or more loci. And it has also been reported that Maryland's database had 32 pairs of profiles matching at 9 loci and 3 matched at 13. These figures call into question the motivating claim behind DNA database searches—that profiles are unique and coincidental matches are extremely rare—which opens up the possibility for false convictions.

How is it possible that so many ostensibly unique profiles are substantially similar? Well, it's not entirely clear. And this is precisely why scientists are flabbergasted by the federal government's refusal to allow them to take a closer look. Some explain these figures by the way in which matches were sought in examining these state databases; comparing database profiles to one another is not the same as assessing the probability that a particular profile randomly matches any one person. The bottom line, some researchers say, is that the one-in-several-million statistic that law enforcement routinely cites to describe the chance that an unknown sample matches a database profile isn't always the LeBron James slam dunk that they portray it to be.

Part of the problem is that the FBI and other law enforcement officials like to express the probability that an unknown sample matches a database profile in relation to the size of the general population. But doing so can significantly underestimate the likelihood of an erroneous "hit." When sifting databases for a match, the more relevant figure to express the probability of a coincidental match is the number of profiles *in the database*. This is why two esteemed committees—one convened by the [National Research Council](#), the other an [FBI advisory board](#)—have proposed that database size needs to be taken into account when calculating these probabilities. This suggestion, if implemented, would more accurately express the probabilities for a coincidental match and correct the seemingly astronomical odds often used by prosecutors to convince juries of defendants' guilt.

But not only has the FBI refused to adopt these recommendations, it has worked against efforts to bring more knowledge and transparency into the process—reportedly going so far as to [point out](#) that state forensic labs' access to the federal DNA database could be rescinded if they cooperate with scientists' requests to study their databases.

The FBI has offered two main reasons for refusing this access. First, they claim that doing so would jeopardize individuals' privacy. Second, they argue that granting such access would be administratively burdensome; allowing researchers to rummage through these databases might impede law enforcement's efforts to solve crimes.

But many scientists find this unconvincing. The government routinely releases similar information to researchers that is de-identified; the privacy threats are commonly thought to be negligible. As for the supposed burden, scientists have argued that the relevant files could probably be made available to them in a few short minutes. Moreover, as Krane et. al. note at the beginning of their *Science* letter, the [legislation creating the federal database](#) permits research access to the profiles so long as personal information is removed.

These less-than-convincing justifications for restricting research access to federal databases coupled with the FBI's attempts to disincentivize state cooperation with scientists' requests have raised ire among many in the research community. As University of California, Berkeley population geneticist [Montgomery Slatkin notes](#), "When the government works very hard to hide something, it suggests that they have something to hide."

In order for criminal justice to be accountable to the public, every aspect of its administration must be transparent. And as genetics and other new technologies become

a more central aspect of the criminal justice system—where the science fiction of films such as *GATTACA* is simply becoming plain science—this sentiment rings ever more true. It's past time for the FBI to open its DNA databases to scientific scrutiny. Sunlight is not only the best disinfectant, but it is also the cornerstone of any just society.

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