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DNA Becomes Routine in Crime-Solving

By *John Buntin* | April 2010

Police and prosecutors in Denver use DNA to close cases that once seemed unsolvable. But is the forensic tool too efficient?

It was as if, Detective Phil Stanford sometimes thought, Washington Park was being burglarized by ghosts.

Most burglaries follow a pattern. Typically they occur during daytime hours: In this country, you are most likely to be burgled between 11 a.m. and 2 p.m. But Washington Park--a rapidly gentrifying neighborhood south of downtown Denver where modest ranch houses mix with lovingly restored, million dollar bungalows--was being victimized day and night. That worried Stanford. Nighttime break-ins were reckless. The men who burglarized--and burglars are usually men--were the sort who might graduate to sexual assault or worse.

Then there was the volume of offenses: It is quite common for a burglar to commit many break-ins. Criminologists estimate that for every burglary conviction, 10 others go undetected. But since the incidents began in October 2004, Washington Park had been hit almost daily through March 2005. At that point, the greater Washington Park area had experienced more than 120 burglaries--but no one had seen anything. Patrol officers responding to the break-ins talked to neighbors and asked the questions police ask in these situations: Do you have any neighbors who might be involved? Did you see an unfamiliar car?

But as he reviewed the patrol officers' reports, Stanford, a property crimes detective in district three at the time, could find nothing.

"For all we knew, it was a ghost on all of these burglaries," says Stanford. "We had literally nothing."

Except intense pressure. District Attorney Mitchell Morrissey and Police Chief Gerald Whitman had recently appeared together at a neighborhood gathering and were grilled about the crime wave. Now both the DA's office and police headquarters were turning up the pressure on districts three and four, which shared responsibility for policing the Washington Park area, to end the crime spree. But in the absence of any sort of lead, how were the police to proceed?

That's when Stanford got an idea. It was spring 2005, and Denver was riveted by the trial of a serial rapist. The case against him was based in part on DNA, the analysis of which added about \$4,500 to an investigation's cost. As such, it was used mainly for homicides or sex crimes, cases worked out of the police administration building downtown. But Stanford wondered if it might not be helpful here too. He recalled that patrol officers located a cigarette butt at one of the first Washington Park break-in scenes three months earlier. They'd bagged it because the homeowner insisted she didn't smoke. There'd been something at the most recent break-in too--a bloodstain from a broken window. That at least proved the burglar wasn't a ghost. Could DNA be collected from either of these crime scenes and used to aid Stanford's investigation? He decided to call the crime lab to find out.

DNA--deoxyribonucleic acid--is the double-helix-shaped molecule that contains the genetic instructions by which every organism develops and functions. The best known and most important part of DNA are the segments that carry the genetic code--the genes. However, genes make up only a small part of the much larger chromosome. Much of the rest consists of repeating sequences of nucleotides like short variable number of tandem repeat (VNTR) minisatellites. These patterned repeats are unique to each individual, yet these variations' significance on organism function (if any) is unclear. As a result, geneticists tended to ignore them.

That changed in September 1984, when a British scientist examining an X-ray of DNA samples from his lab technicians had a flash of insight. He realized that the VNTR minisatellites he was examining were very much like the "minutiae" of a fingerprint, and that they could be used for a similar purpose: to identify people. Three years later, the geneticist in question, Sir Alec Jeffreys, helped Scotland Yard use DNA to identify the murderer of two teenagers. With that case, forensic DNA analysis was born.

In 1988, forensic DNA analysis came to Denver after Morrissey tried a case involving a burglar/rapist. Early in the trial, the defense approached Morrissey with a request: Though virtually untried in U.S. criminal prosecutions, the defense wanted to use DNA to show that the defendant didn't commit the rape. Intrigued, Morrissey agreed. The two sides would split the test's cost.

The first step was determining whether there was sufficient DNA in the semen sample to establish a match. There was, but at that point, the defense tried to back out. Morrissey, however, already had a sample and received permission from his superiors to proceed. The sample matched. At the time, DNA was so new that it wasn't admissible in court. Morrissey had to bring in a doctor from the University of Colorado Hospital to explain why the matches were tantamount to a smoking gun. The man was convicted.

The use of DNA in homicide and rape cases quickly caught fire. In the mid-1990s, the federal government created the Combined DNA Index System (CODIS), a software program linked to state and local databases that allowed authorities in possession of DNA evidence to search nationwide for a suspect match. CODIS went live in 1998; today it links to nearly 8 million DNA profiles, which are housed in federal, state and local databases. Every state--save New Hampshire--now routinely enters DNA profiles of convicted felons into their databases. Most law enforcement agencies, however, continued to run DNA offenses on only the most serious violent crimes.

By 2005, when Stanford was wrestling with his "ghost" burglar (or burglars), a growing number of officials in Denver--and at the National Institute of Justice (NIJ) in Washington, D.C.--were interested in changing that. Officials wondered what would happen if police responding to routine criminal acts--like commercial and residential burglaries, and auto theft--started looking for and analyzing DNA evidence. That year, the NIJ announced a five-site grant project to find out. When Morrissey and Whiteman heard about the grant, they leapt at the opportunity. Denver's grant application was successful, so when Stanford called the crime lab and explained what he had, he soon found himself with an appointment to see crime lab Director Gregory LaBerge.

If forensic law enforcement in Denver were a DNA double helix, with the DA's office as one strand and the police department as the other, LaBerge would be its mitochondria--its energy source. A statistician by training, LaBerge started at the crime lab as a volunteer in 1995 as a hair and fiber technician. He quickly talked himself into a job as a DNA technician, and in 1998, he helped tie Denver's local DNA database to the national CODIS system. That was his eureka moment.

"We got 30 or so matches the day we turned it on," LaBerge says. It was clear at once that "this was a powerful technology."

When LaBerge started working at the crime lab, a police commander ran the unit. Because police commanders typically served for a two-year rotation, this frequent turnover, says Whiteman, resulted in a lack of focused attention on lab operations. In 2005, Whiteman changed that by making LaBerge the crime lab's first civilian director. Denver's NIJ grant allowed the lab to purchase a robotic DNA extraction machine and hire a new DNA technician devoted wholly to property crimes. LaBerge was happy to test Stanford's samples.

Stanford had two DNA samples and one very lucky lead. One of the burglar's victims had spotted her stolen earrings, purely by chance, at the Denver Merchandise Mart. The victim called the police, and Stanford contacted the jewelry vendor, who referred the detective to a gold coin store where he'd procured the earrings. The store's paperwork was, in Stanford's words, "loose," but when the detective pushed for more information, he got a name--Dina Weller.

"That was a red flag for me," Stanford says, "because I don't get a lot of female burglars." Of course, Stanford didn't really know that Weller was the burglar. Not only was she a woman, she also lived on the opposite side of town from Washington Park. (Most burglars select areas close by.) Then, the next morning, Sanford got a second break when a patrol officer walked into the district three stationhouse and told Stanford they just stopped a man in an alley down the street--he had an outstanding warrant and a bag containing assorted property. The man's name was David Weller; he was Dina's husband.

Several days later, the DNA results came back. Investigators found co-mingled DNA on the first cigarette--a finding that can greatly complicate an investigation. In this instance, however, the two people turned out to be Dina and David Weller, both of whom had DNA profiles in Denver's local database. The two apparently shared a cigarette at the scene of the first crime. The crime lab's computers found a match with the blood sample too--David Weller.

Denver's experience with the Wellers wasn't unusual. When the police started looking, they found biological evidence at about 400 of the 6,538 reported burglaries--about 7 percent. Almost all of the biological evidence collected--86 percent--yielded a DNA profile. Half of the hits produced a CODIS match, pointing police toward a previously convicted felon. As a result, the police doubled their arrest rate, tripled the number of cases accepted by the DA's office for prosecution, and took many professional criminals off the street.

The four other localities in the NIJ's DNA field study--Topeka, Kan.; Orange County, Calif.; Phoenix; and Los Angeles--had similar results. The FBI estimates that nationwide, fewer than 13 percent of burglary cases are cleared. But in the five cities that began processing DNA evidence in property crime cases, the burglary clearance rate soared to 31 percent. Moreover, the police were arresting dangerous people: at least twice as many felony arrests and convictions as those identified in more traditional investigations. Not surprisingly, when the NIJ grant expired, the Denver Police Department scrambled to keep funding for a dedicated property crimes DNA analyst in place. Patrol officers in the department now routinely search for and bag biological evidence, from soda pop cans to half-eaten sandwiches.

Morrissey believes that the property crime crackdown played a significant role in Denver's crime drop over the past four years. Not everyone shares this enthusiasm for the broader use of DNA evidence, however.

"There is a public perception that DNA profiles are black and white," says Wright State University molecular biologist Dan Krane. "The reality is that easily in half of all cases--namely, those where the samples are mixed or degraded--there is the potential for subjectivity."

Krane's quote is exemplified by a California conviction based solely on a degraded DNA example, which the Washington Monthly and the Los Angeles Times have questioned. Though Denver police rely heavily on DNA evidence, they are among the first to concede that criminal investigations shouldn't be based solely on it.

"DNA is everywhere; it is omnipresent in this world," says Division Chief David Fisher. "The presence or absence of detectable DNA does not mean someone did or did not do a crime. It is not a magic bullet. ... This is a very powerful tool that has to be used by highly trained people with restraint."

Shoddy collection methods and faulty analysis are clearly appropriate concerns. However, the biggest problem likely to emerge from wider use of DNA evidence in property crime prosecutions isn't an increase in false positives--it's the problem of success.

In Denver, police found biological evidence in only about 7 percent of their cases. But in the United Kingdom, where DNA testing in property crimes is now routine, authorities find biological evidence at 15 percent of all crime scenes.

Even so, the impact of broader DNA testing in property crime cases quickly becomes evident when you consider the numbers involved. According to the FBI, there were 9.7 million property crimes in 2008, including 2.2 million burglaries. John Roman, an Urban Institute criminologist who led the evaluation of the DNA field study, estimates that if U.S.

police departments expanded the use of DNA collection aggressively, they could arrest another 200,000 people per year.

"That's 200,000 potential felons entering the criminal justice system, where we only send 700,000 people to prison a year on felony convictions now," he notes. "That would put enormous pressure on the criminal justice system."

Nonetheless, in Denver, police and prosecutors alike say the focus on property crimes and the police department's reliance on its crime lab is appropriate. A departmental cost-benefit analysis found that for every dollar spent on DNA analysis--analyzing DNA adds about \$4,500 to most cases in Denver--\$90 in additional costs are avoided. That number is inflated. (It doesn't include the cost of incarceration.) But when confronted by criminals like the Wellers, it's easy to understand police enthusiasm for the new approach.

By the time Stanford caught up with David Weller, he was already in custody on another warrant. Stanford went to swab him to confirm the match. Several days later, Weller's wife and accomplice, Dina, was arrested.

It was Dina who confessed, blurring out at the end of the interview, "He told me we wouldn't be caught." The Wellers had indeed been careful. Instead of using a car that someone might recognize, they took the bus. They stole only small items that couldn't be traced--jewelry, prescription drugs and cash--and after their robberies, they took the stolen items to a fence (someone who knowingly buys stolen material) downtown, avoiding the pawnshops of south Denver. But it wasn't what they took that got them caught. It was what they left--their blood and saliva.

"How many did you do?" Stanford asked.

Dina didn't answer.

"Did you do more than 25?"

She nodded.

"More than 50?"

"Yes."

"More than 100?"

"Yes."

"More than 125?"

"Yes."

"More than 150?"

"No."

The "ghosts" of Washington Park had been found. Under Colorado's habitual offender law, Dina and David were sentenced to 36 years in the state penitentiary. In the aftermath, burglary rates in districts three and four fell by 40 percent.