

**CRIMINAL LAWYERS ASSOCIATION OF
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DON'T PLEAD GUILTY....YET!
***a practical science-free checklist to
consider before you enter a plea in a
cold-hit case***

by

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DON'T PLEAD GUILTY ... yet: a practical, science-free checklist to consider before you enter a plea in a DNA 'cold hit' case.

This paper is directed towards a narrow scenario but one increasingly faced by practicing criminal defence lawyers: your client has been linked to a crime because of a DNA link on a database. The DNA 'hit' is the sole or major piece of evidence pointing towards your client. Your client tells you that they have no recollection of the crime or in fact, the time period involved – either because the crime is from a long time ago or because they were seriously abusing drugs or alcohol during that time. The client is keen to plead guilty and 'get it over with' but is also open to taking your advice.

In serious cases like murder and sexual assault, no matter what the inclination of the client, it is generally advisable to strongly recommend that the client wait until a full brief is subpoenaed from the lab and possibly an expert is retained. But with less serious offences – particularly 'high volume' offences like break and enter offences – the time that this will take, and the realistic benefits to your client of an early plea, might not make this the appropriate course. Lawyers with high volume practices, like Legal Aid duty lawyers, will also be under considerable time pressure and battling external and internal forces pushing them to dispose of the case quickly.

But cold hits can be wrong. Every lawyer's worst nightmare is to have quickly pleaded out a case when the client is later proved innocent. How can the strength of a DNA cold hit case be quickly and efficiently evaluated so that the client's interests are protected but the lawyer's time is not squandered?

This paper is structured in three parts:

Part 1 "Things to look out for" is aimed at broadening the horizons of lawyers and exposing the weaknesses of DNA database evidence. It gives practical examples of flawed DNA database links from Australia and all over the world. It also contains legal and practical suggestions for arguments that can be mounted in some cases against database DNA evidence.

Part 2 "A quick checklist" is a memory trigger for the now educated lawyer to take with them into the cells and quickly run through before deciding to enter a plea on the spot.

Part 3 "Where to learn more" cites some good and accessible articles about DNA for future study.

What is a DNA cold hit?

A tiny bit of science (I lied)

A standard complete DNA profile in Australia looks like a list of 18 numbers. These numbers represent the measured length of repeating DNA sequences at 9 different regions of DNA that are tested. The nine regions are called loci (the singular is locus). Each loci has two numbers attached to it (the two numbers might be the same i.e. 15, 15). The numbers are called "alleles". So a DNA profile has 18 alleles, 2 at each of the nine loci. One allele is inherited from the mother and one from the father of a person. A DNA profile will also indicate whether the donor is male or female. While criminal lawyers should endeavour to understand as much about DNA if possible this is all they need to know about the science to have a basic understanding of DNA cold hits.

When DNA is recovered from a crime scene (sometimes called a "crime stain") the 18 numbers (or less if only a partial profile is recovered) are put on a database called "the crime scene index". If a person is suspected of an offence their DNA might be obtained and compared against the crime scene profile, if all 18 numbers at each loci match up it will be called "a warm hit". Sometimes profiles obtained from convicted offenders are run against all the profiles in the crime scene index via computer cross-referencing. If a match occurs between an offender profile and a crime scene profile then police will be notified. Because the offender was not a suspect until the "database trawl" the link is known as a "cold hit". Most states have programs to take compulsory DNA samples from convicted offenders. Because of the backlog in testing these samples and entering them into a database it is not uncommon for DNA links to be to crime scenes from offences which occurred several years ago.

PART 1 - THINGS TO LOOK OUT FOR

(1) Fact sheets ("It's a dodgy fact sheet")

This paper is designed for people who might be weighing the merits of a plea without a full police brief let alone a full DNA file. Often lawyers are initially only given a one to two page fact sheet written by the investigating officer detailing the offence. In high volume offences with a DNA "hit" the fact sheet may only be a paragraph long. I think most defence lawyers take police fact sheets with a grain of salt. I am not suggesting that they are deliberately misleading but they are often written in a hurry and can be imprecise to an extent that they are misleading. They are also by definition subjective and stating the prosecution case at its highest. For example, in my own experience the phrase "the defendant made full admissions" may not always mean he has admitted to all the essential legal elements of the offence. Similarly, "surveillance footage clearly showing the defendant committing the offence" may just show on viewing what to me looks like a fuzzy grey blob moving around a screen. I have learned not to assume my case is doomed just by the presence of those phrases. Carefully parsing what a fact sheet does or does not say can be especially important in DNA cases - do not take "DNA taken from the crime scene matches the suspect" at face value.

Selective testing - did they test all the samples?

It is very common for a lab to only test one biological sample when multiple samples from the same case are sent to the lab. The sample that is tested for a DNA profile may not be the one that was in the most incriminating position. A Legal Aid colleague of mine represented a defendant in a break and enter case where three bloodstains were found inside commercial premises. Two stains were large pools of blood found inside the property, one near the broken window entry point. The third sample was on a pane of glass on the outside face. Examination of the full police brief revealed that only the sample from the glass pane had undergone DNA testing. Furthermore, it had only been tested for biological material after it had been sent away for repairs. There were clearly many more explanations consistent with innocence for this particular stain than the other two. If my colleague had read the fact sheet too quickly she might have noted two large bloodstains were found inside the property and that a DNA match to her client had occurred - facts strongly suggesting a guilty plea was necessary. Because the fact sheet did not specify which stain had been tested she investigated further, her discovery led to charges not proceeding against her client.

Presumptive testing – is it really blood?

In all DNA cases the probative value of a match greatly depends on what kind of biological material is the source of the DNA. In break and enter offences often the most incriminatory piece of evidence is a blood stain found on or near a pane of glass near the entry point. "A brownish stain consistent with blood" is a phrase that is commonly used in fact sheets that I have seen. Don't be too quick to substitute this elaborate wording with "blood". Descriptions of substances can be based on quick on the spot subjective assessments and may be incorrect. Be skeptical even if the fact sheet states that "scientific testing" has found the substance to be blood. The standard preliminary test for blood - "otol" - can also test positive for substances containing iron like bleach and some types of paint. Preliminary tests for semen can test positive for a range of substances including hair gel, contraceptive foam and vaginal secretions. Presumptive tests for saliva can also be incorrect. If DNA is extracted from sources other than blood, semen or saliva it is much easier to argue that it has been detected as a result of secondary transference or contamination (these issues are discussed below).

What is not in the fact sheet?

One of the most difficult tasks facing a stressed lawyer quickly reading a fact sheet is to imagine what critical facts might have been left out altogether. Frank Button was charged with a rape of a young girl in Queensland in 1997. The victim named him as the perpetrator. Vaginal swabs taken from the victim had been tested by the Queensland lab but no DNA result could be obtained. Mr Button was convicted. It is not clear if Mr Button's trial lawyer was ever informed that bedding from the rape scene was transported to the lab but not tested for DNA material. When Mr Button's appeal lawyer asked for the bedding to be tested a semen stain was detected and DNA profile was obtained. The profile did not match Mr Button. Further testing on the vaginal swabs revealed a DNA profile which matched the stain on the bedding. When the profile was run through the Queensland convicted offenders database it matched a convicted rapist who had been living in the area at the time of the rape. Frank Button was released after serving almost a year in jail.

Frank Button's case shows that you always need to ask yourself – what else at the scene could have been tested and was not? What could further testing show? If a different DNA profile was obtained from other material, and that profile matched another offender on the database how would that assist your case? It may be a strategic decision as to whether you raise these possibilities hypothetically or if you actively require further testing on untested material.

Another colleague of mine working on a break and enter case found that only one of two blood stains found at the crime scene had been tested. That sample matched his client. Further testing requested by my colleague revealed a profile on the second stain matching another convicted offender with a similarly long history of like offences. While his case eventually ended in a guilty plea the revelation could have had a number of forensic advantages if he had been instructed to take the case to trial. Assumptions can sometimes be drawn based on the degradation of material but it is actually not possible to reliably date how long DNA has been present at a crime scene. While it is not 'conclusive proof of innocence', placing another convicted offender at the scene can lead to the suggestion of a number of possible scenarios which the crown may struggle to refute beyond reasonable doubt. Of course further testing may only further incriminate your client and reduce his or her plea discount; it is a decision that should be taken with clear instructions.

Is the date wrong?

I have been involved in a number of local court hearings where the date nominated for the incident has been found to be incorrectly recorded on a fact sheet. Sometimes it is wrong by a few days, sometimes the month is wrong. The police contemporaneous entry into a notebook is probably the most reliable source of dates but I have seen mistakes in recording entries there. Keep this in mind.

Tip: Carefully re-read the fact sheet, does it say exactly where each stain was found, what material it was and whether all the samples returned a positive match to your client? If in doubt call the investigating officer.

Consider the possibility of untested material. How would it change your case if one stain matched a convicted offender?

Alibi checks: Always do an alibi check. Ask your client where they were at the time of the incident. Prompt their memory: ask about birthdays and funerals of the major people in their life at that time, ask about any interstate trips. Check your bail report to see if it was possible they were in custody. Call the Department of Corrections to check if they were not in custody. If they were in custody at any time during that year (assuming the year on the fact sheet is correct) make some calls to check the offence date is correct.

(2) Innocent explanations ("But I can explain")

No matter what they say on CSI, DNA can never really conclusively prove guilt or innocence. DNA provides biological evidence of a link between a defendant and a crime scene. The strength of the evidence against the defendant depends on the existence of alternative explanations consistent with innocence. This means you always need to think if there is any innocent reason why your client's DNA was found at the scene. I am not suggesting putting words in a client's mouth but when they frequently don't remember the offence, or in my experience even the entire year, you need to be aware of the realistic scientific possibilities of potential innocent explanations. You also need to be sufficiently educated to advise clients on the credibility of alternative explanations they may offer to you. I was involved in a case where a client instructed that he had been engaged in an innocent visit to a property when passion had overcome him and his girlfriend and his DNA was found at the crime scene from the product of their resulting sexual encounter. This may or may not have been true but he was advised of the potential scientific and legal weaknesses of his explanation including the fact that the source of the DNA i.e. if it was from blood or semen, is usually able to be discovered.

In some cases alternative explanations can be obvious, for example where the DNA link has been derived from saliva on a cigarette butt found inside the property the defence could argue that the butt was innocently outside the house on the street and inadvertently transported into the property on the shoe of a different offender, or on the shoe of a crime scene investigator; that the butt blew into the house through an open door or window before or during investigation; that another perpetrator planted the butt; that a corrupt police officer planted the butt; or that the defendant left the butt at the house during an innocent visit long before the incident, perhaps when different tenants resided there.

Remember DNA can not be accurately and reliably dated so you can't say with scientific certainty how long a stain has been there. Ask your client if he or she has ever had an innocent reason to be in the vicinity. Remember also that it is not always possible to determine the source of a DNA profile. For example a DNA extract

from a hair soaked in blood might generate a profile from the hair, or from the blood, or show a mixture of the two profiles. This fact is very important as DNA testing becomes more sensitive. Profiles can be obtained from surfaces that have been touched by a person through minute, invisible to the human eye particles that contain skin cells. This is called "trace DNA". These cells could come from skin shed during sweat or even from dandruff. The cells could fall onto a pool of blood and DNA could be extracted from the skin cells instead of from the blood (there are ways of checking if this is likely from DNA data with an expert).

Trace DNA and secondary transference

Trace DNA is now being submitted to labs for testing by high volume crime scene investigators and the profiles derived from trace DNA are going onto the crime scene database. The most common form of trace DNA at high volume crimes is from food items or drink containers given the surprisingly common habit amongst perpetrators of breaking into a house, robbing it and then enjoying a snack. If your fact sheet is vague as how the DNA was sourced eg "a DNA profile was obtained from material sent to the lab" then there is a possibility that the crime scene profile is from trace DNA. Trace DNA is so tiny that it is very easy for it to be moved from person to person without anyone knowing eg through a handshake. This is called "secondary transference".

The possibility of alternative explanations for the presence of this material is almost endless. This was demonstrated by a creative experiment conducted at the suggestion of a defence team in a US murder case. A DNA profile belonging to the defendant, the husband of the murdered woman, was found on a glove believed to have been discarded by her attacker. The defence wanted to argue that the profile could have been transferred when the gloved hand of the attacker touched the cheek of the woman and that the husband's DNA was on her cheek because they shared a bathroom towel. The experiment involved taking a towel that a man had used and having a woman wipe her face on the towel. A glove was then used on the woman's face in a way to simulate an attack. The experiment found that DNA from the man who used the towel was found on the glove.

Knowing the sensitivity of trace DNA to secondary transference is valuable combined with what has been discussed above about selective lab testing. If the DNA that matches your client is from trace DNA and a DNA profile from an untested larger sample could match a different potential offender you could argue that your client's DNA at the scene is the result of secondary transference eg a handshake with the actual perpetrator. The potential for "secondary transference" goes beyond immediate and recent contact. Lab workers in New Zealand discovered an unknown profile in a sample that they traced back to a worker from a factory in Germany that provided the plastic containers used by the labs for storing samples.

Keep in mind also the possibility of secondary transference when evaluating the probative value of the location of the DNA stain. Particles can easily be inadvertently picked up and removed from one location to another by crime investigators. For example, investigators might dust for fingerprints at the site of break and enter offence. They might then take samples for DNA testing from areas which gave indications that fingerprints might be present. This is because fingerprints often contain DNA from skin cells (called "epithelial cells") that are shed when hands sweat. Some research has suggested that it is possible for fingerprint brushes used by crime scene investigators to pick up DNA from one scene and deposit it at another

site. The original site of the DNA might be far less inculpatory than its eventual location.

It requires vigilance on the part of defence lawyer to determine which cases involve trace DNA. An expert can usually determine this from the lab data (as can a lawyer after reading some of the recommended articles below). If you are not planning to subpoena the DNA file read the fact sheet carefully to see if the source material is described and how. A phone call to the investigating officer might also be worthwhile (although the delay in DNA notifications may mean they have no more memory of the case than your client).

Legal arguments against trace DNA

It is arguable that where the amount of DNA is tiny, and the source of the DNA can not be stated with sufficient scientific certainty, the evidence should be inadmissible. The possibilities of transference are just too high and the evidence could be unfairly prejudicial, particularly when juries have come to regard "DNA evidence" so highly. If there is a trend towards bolstering briefs with non-probative DNA to impress judges and juries, as I have heard some people suggest, it should be fought. A useful piece of authority is *R v Joyce* [2002] NTSC 70. In that case a man was charged with committing sexual offences against a teenage boy while the boy was staying in his house. Evidence was produced that the man's DNA was found on the boy's clothes. It was not disputed that the boy had stayed at his house whilst wearing the clothes, so the evidence proved little because the possibility of secondary transference was so high. There were any number of ways the man's DNA could have innocently got onto the boy's clothes, even his underwear, for example the boy could have sat on a couch belonging to the man to transfer DNA onto his pants, and then stored his pants and underwear in the same bag. The evidence was excluded because it was more prejudicial than probative. Given the aura of certainty that surrounds DNA and its new TV glamour with shows like 'CSI' it is probably better to try and seek to exclude DNA evidence than argue about its weight.

Tip: Does the fact sheet specify how much DNA was found and what the source was? Could it be trace DNA?

Be creative – what innocent explanations could there be for presence of the client – were they ever at the scene for an innocent reason?

(3) Planting ("It's a stitch up")

Planted evidence is a reality. For example, the NSW Police Integrity Commission 'Operation Florida' report in 2002 revealed that there had been a cabinet at Manly Police Station containing a cache of guns, balaclavas and ammunition for the purpose of planting evidence on suspects. It would be naïve to assume that planting was eliminated by PIC or any other police probe. Some forms of DNA evidence are easier to plant than others. Large pools of blood for example, or semen, are considerably less likely to be planted than a cigarette butt or a hair.

Cigarette butts should be regarded with particular suspicion because I have heard a number of anecdotal reports from police in NSW that it is common for investigators to save cigarette butts from convicted offenders and suspects to obtain DNA profiles for "intelligence purposes". The practice has also attracted newspaper reports in Victoria. This means that cigarette butts with profiles belonging to those who have attracted police attention are floating around unaccounted for. I am also told by a forensic scientist who practiced in Europe that a serial offender was apprehended in,

I believe, France with a cigarette packet full of butts with profiles of other offenders and he would leave those butts at the scene of his crimes.

There are both scientific and straight-forward investigative ways to detect the possibility of some planting. In the OJ Simpson case it was argued that a crime scene blood stain consistent with OJ's DNA profile had been planted from a reference blood sample from OJ because the blood was found to contain EDTA, a preservative used in test tubes. This suggested that the blood had been spilt (or poured) from a test-tube and was not freshly spilled during a struggle¹. In *R v Lisoff* [1999] NSWCCA 364 the defence argued that blood found on a suspect's pants which matched the victim of an assault was planted. It was suggested a corrupt police officer could have used a syringe filled with the victim's blood using a reference sample that was obtained after the victim had undergone a post-assault blood transfusion. This argument was possible because there were no notes that blood was detected on the pants in initial checks; the reference blood samples and pants had not been left in a properly secured location; and a defence DNA expert testified that there were indications that the blood could be post-transfusion blood. A careful check of contemporaneous notes of the times, dates and locations of discovered evidence and cross-referencing the times and dates on labels that were sent to the lab could guard against some planting. A chain of custody date check will also meet a common client claim that their compulsory DNA swab was used to plant evidence against them.

While it is unlikely that large pools of blood have been planted is possible to manufacture DNA and spray it directly onto blood stains in a way that is undetectable. We can only hope that perpetrators are yet to reach that level of scientific sophistication.

Tip: Pay special attention to sources of DNA that could be easily planted including cigarette butts, tissues, hairs and food and drink containers. Ask your client if their DNA could have been covertly collected in this way and when. If planting is a possibility order a brief and carefully document the chain of custody.

(4) The database sample was collected illegally or improperly (*"There's a technicality"*)

In Victoria a newspaper report stated that police have acknowledged that covertly collected samples (eg secretly retrieving discarded cigarette butts and tissues used by suspects) were being tested by the state lab and the profiles were placed on the state's DNA database². You should check to see if your client's DNA profile was originally on the database for a permitted reason and, if he was compulsorily sampled, if your client meets the statutory criteria for offenders in that category. In NSW s91 of the *Crimes (Forensic Procedures) Act 2000* provides that it is an offence to supply forensic material for the purposes of deriving a profile to be placed on the database unless statutory provisions for collecting that sample have been complied with. If your client's profile was obtained from a covertly collected sample then you might be able to argue it was "illegally or improperly" obtained and that the prosecution has to satisfy the test in s138 of the *Evidence Act* (or the common law equivalent) to admit the evidence.

¹ In another US an expert testified that the enzymes had degraded on a blood stain in way that suggested that the blood was sourced from an autopsy reference sample rather than spilled during a struggle.

² Tanya Giles "Secret DNA Tests:" *The Herald Sun* (Australia) November 22, 2004

(5) Mistakes ("It's a mistake")

Error – Lab notifications

When I was working at Legal Aid in Parramatta I was told about a man who claimed that he had been incorrectly linked by DNA database link to a crime he did not commit. I found it hard to believe but asked around and was told by lawyers and police prosecutors at Parramatta that in fact it was true: the man had been correctly linked via DNA to five break and enter offences but police had misread a notification from the NSW lab DAL and also charged him with a sixth break and enter offence. All six offences appeared on the same fact sheet, the sixth offence stating incorrectly that a DNA sample obtained from the scene had been matched to the defendant. The defendant was apparently unrepresented and had a poor memory of the time and plead guilty to all the offences. The police discovered their own error and lodged an application to annul the conviction.

While I was impressed by the honesty and courage of the police in this case the capacity for such an error was thought provoking. What about cases where police don't detect their own errors in reading notifications or don't take steps to correct discovered errors? Had I entered a guilty plea for a client in an incorrect DNA link case? It was a sobering thought.

The possibilities of error in DNA database cases are quite numerous. There are many levels of data entry involved and anyone who has used a spreadsheet knows that these errors are very easy to make.

Switching names

There is at least one reported case where data entry has led to a wrongful imprisonment. In Las Vegas the names attached to the DNA profiles of two men sharing a cell were switched around before both profiles were run against a crime scene database. The wrong man was then charged with two rapes that matched "his" (in fact the other man's) profile. He spent a year in custody before the error was discovered by a lawyer cross-referencing data. There are also at least two known cases in the US where lab technicians have accidentally switched the victim's and the perpetrator's names when recording DNA profiles. This meant that a man was incorrectly suspected of raping a woman because "his" DNA (it was actually hers) was detected on a vaginal swab.

Data entry

Lawyers need to think about every time that a profile is entered into the system and what the consequences would be if just one of those entries contained a mistake. In Chicago a woman was nominated by a DNA database link to a break and enter offence. Prison and court records conclusively established that she was in custody at the time of the burglary. An eye-opening number of different possibilities were mooted to explain the curious match including:

- That prison officials had written the wrong name on the inmate's sample when it was taken for entry into the database as part of the compulsory convicted offender swabbing
- That the profile was not entered correctly onto the database by lab technicians
- That a label on the crime scene bloodstain was incorrect (due to either lab or police error) and the stain was in fact not connected to that particular burglary
- That the police data entry about the date of the offence was incorrect.

None of these possibilities are far fetched in the Australian context. NSW has had its own data entry scandal when a NSW Ombudsman report noted numerous errors when cross-referencing DNA database information and police COPS entry information. I doubt any of these errors could have led to a wrongful conviction but the report showed how commonly data errors occur. In a US media profile of DNA expert Prof Bill Thompson a casual reference was made to his discovery of "trends toward double entry of profiles and erroneous data entries" on the Victorian DNA database³. The risk of many of these mistakes is eliminated by what should be standard practice in DNA cold hit cases: obtaining a second reference DNA sample from a suspect and ensuring that it too matches the crime scene profile and the original database profile. It is worth a quick double check to ensure this was done if the fact sheet leaves it open.

In fact, data entry was probably not the culprit in the Chicago case. It was discovered that the DNA profile recovered from the crime scene was only a partial one - 7 loci. The match was reported to the police in the same way as if it were a complete match. It was concluded that the woman had coincidentally the same 7 loci profile as the offender ie they both shared the same 14 alleles. In the US 13 loci (regions of DNA) are tested and entered onto a database. In Australia only 9 loci are tested. I have been told (but have not verified) that police in NSW are informed if a suspect's profile matches a crime scene profile at 16 out of 18 alleles. If true, there are sound reasons for this practice but I hope that police are informed of the different significance of the "match" and that this is always recorded faithfully on fact sheets. My concern is that it might sometimes be reflected in the statistical odds but not spelt out specifically that the crime scene profile was partial and that the match is therefore partial. Again it might be worth confirming with a phone call if the notification related to a full or partial match. (a guide is if the probability statistic is less than *360 million to one* then it is likely to be a partial match only, in such cases I would always recommend ordering a proper brief).

Tip: Subpoena the DNA file. Unfortunately there is no real way to properly guard against data entry error without a full DNA file to cross-check all the underlying data. This can easily be done without an expert having read some of the articles below.

Tip without a brief: do an alibi check and call to ensure that a reference sample was taken to confirm the match and that it was a complete 9 loci match.

(6) Cross-Contamination ("It's a lab stuff-up")

There have been a number of scandals in the US concerning contamination of biological samples. It is very easy to contaminate biological samples during testing, this can occur by failing to change gloves or clean instruments properly, failing to wipe down benches properly between testing or by sneezing or even talking over a sample. Failure to strictly adhere to protocols could mean that DNA from a technician gets mixed up in a sample or that DNA from other unrelated crime scenes that are also being tested in the lab could get mixed up in a sample (this is known as "cross-

³ Apparently Professor Thompson was provided with the database as part of his work as an expert witness in the Jaidyn Leskie inquest, the quote reads: "He and some colleagues have the DNA database from Victoria, Australia, on their computers. It allowed Thompson and his colleagues to discover trends toward double entry of profiles and erroneous data entries. Bobbi Murray "Death Row Defender UC Irvine's William Thompson exposes the soft underbelly of ironclad DNA evidence"
<http://www.ocweekly.com/ink/05/06/cover-murray.php>

contamination"). Most labs keep staff DNA profiles on file to make sure that a technician has not contaminated a sample with their own DNA. In the US sometimes these double checks have failed and contaminated samples have been admitted into evidence. Police officers have resisted having their DNA taken for elimination purposes; this means that unidentified profiles in crime stains may belong to investigating police officers. If your case involves a mixed profile of any sort you should order a full DNA file and discuss the possibilities of contamination and interpretation with an expert.

If your case just involves a single full profile which matches your clients profile there is still the chance that cross-contamination placed the profile on the material. In Victoria the DNA profile of a rape victim was found on clothes belonging to murdered toddler Jaidyn Leskie. In New Zealand, an elderly man who was an assault victim was linked by his DNA profile to two unsolved murders. In both cases the victim's DNA had been undergoing testing in the lab at the same time that crime scene material was being tested. There was no hint of contamination in the lab data - the only reason the victims were not pursued as suspects is because neither victim had motive or opportunity to commit the crime, in fact the New Zealand man had an extremely strong alibi. Further investigation revealed that the testing of their material had overlapped with testing the crime scene material⁴.

Could your client's DNA be in the lab for another reason?

You should have on the fact sheet the date that the offence occurred and, often, the date that material was originally sent to the lab. The match on the database will probably occur at least 2 years later. After notification of the match police will usually obtain a reference sample from your client and have that tested at the lab. If there is a possibility that material from your client was being tested in a lab during a time when crime scene material was also being tested you should think seriously about cross-contamination. Usually the delay in notification means that analysis of the crime scene material and your client's reference sample will be years apart. But material from your client might have been in the lab for another reason eg he was involved in a bloody fight the same week that the crime scene material was sent to the lab. Your client might remember this if asked, their charge sheets may also shed light on possibilities. Sometimes labs retest crime scene material for a fresh DNA comparison - see if there is any overlap with this testing your client's material.

Collection, transportation and storage possibilities

Cross-contamination can potentially occur if there is any overlap between your client or material from your client and crime scene material being collected, stored and transported to labs. Contamination also can occur if people overlap. For example, a man in the US had his conviction vacated after an investigator conceded he did not have a specific memory of changing his latex gloves between assisting the defendant get out of a car and handling a gun found at the crime scene. Exhaustively eliminating all the possibilities is time-consuming but there are short-cuts. You need to find out what connection your client has to the crime scene and to the officers who

⁴ In the US a man is contesting forensic evidence linking him to a murder because the DNA of another man (who is suspected of murdering his mother) was also found on the material. It is highly likely that the case is one of cross-contamination because the second man was only 4 years old at the time of the offence and material from both their cases was being tested by the same lab on the same day. The lab has vigorously denied error. Maryanne George "Murder Case Mystery Deepens DNA From 2 People Was Found On Body From '69" *Detroit Free Press* January 15, 2005.

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investigated the crime scene to work out if there could be any overlap. These details will be on the fact sheet.

Tip: Have a quick look at their charge sheet; are there cases that might have involved biological material from your client being sent to the lab at a similar time to the offence or to any more recent testing?

Ask your client if they have been a victim of a violent crime at the key times (initial and subsequent testing).

Is there any reason why material from your client might have been stored with crime scene material or handled by the same police officer?

Do the alibi check.

Make some quick inquiries from the police or the lab about if there were other unidentified profiles in the sample.

Legal arguments about contamination

Defending against database hits is really difficult because your client is likely to have a poor memory of any incidents which could give rise to an innocent explanation. The upside of challenging these cases is that the lab may not be able to provide sufficient material to refute a challenge. The issue of whether aspects of DNA evidence could be considered hearsay was left open in the NSW CCA case of *R v Sing* (2002) 54 NSWLR 31. That case did make clear that if the defence wants to specifically challenge certain aspects of DNA testing it is insufficient for a supervising forensic scientist to offer testimony on the basis of computer printouts to the effect of "this is how testing usually works". I would argue that the case stands for the proposition that if a phase of testing is put in issue by the defence the crown has a duty to produce the actual technician who performed that testing to give evidence and face cross-examination. A similar case is the Victorian Supreme Court decision of *R v Ryan* [2002] VSCA 176 where a man's sexual assault conviction was quashed because the only expert available to testify concerning the DNA evidence was a supervising scientist who had not personally conducted the tests and was relying on computer printouts of the testing for his evidence. The delay between the original testing and trial put the prosecution at a disadvantage in this case because certain paperwork and samples had already been destroyed.

(7) Relatives (*"It's their evil twin"*)

It is a common misapprehension that because the composition of our DNA is unique (except for identical twins) that therefore our DNA profiles are unique. This is incorrect. The statistics presented to lawyers which may indicate that the chances of a random match exceed the population of Australia, or even the whole world, are misleading. Some sources on how to understand how these statistics are calculated are provided below. What you need to know is that the chances of a coincidental match do exist and that they increase when:

- databases are large;
- the number of loci compared are small;
- if there is any possibility of the involvement of relatives.

Currently the Australian database is small and only 9 loci are tested; in the USA profiles must have 13 loci to even be entered onto the national database. The inventor of DNA profiling believes that the 10 loci tested as part of the enormous UK database are insufficient to prevent coincidental (sometimes called "adventitious") matches.

If you have concerns about coincidental matching you can always request that additional loci are tested using a different testing kit.

Kinship

Identical twins will have the same DNA profile. The simple possibility that your client has a twin should not be discounted. Apparently one in 150 people in Australia is a twin. I jokingly ask clients "do you have an evil twin?". It's a simple and quick check which can break the ice. DNA is inherited from each of your parents - every child inherits one allele that matches their father at each loci and one allele that matches their mother. This means that brothers and sisters will have very similar profiles and may match exactly at a number of loci.

I have heard that an aboriginal brother and sister in a remote community in the Northern Territory matched at 9 loci. In Sicily, Italy a man was charged with three murders on the basis of a DNA match. Later charges against him were dropped and his brother was charged with the offence. The brother's DNA profiles matched at 8 loci. These cases demonstrate two important concepts: the first is that siblings can have very similar DNA profiles; the second is that certain ethnic communities share very similar DNA profiles.

The chances of a coincidental match are calculated assuming a population that mates randomly. The more insular the community is, the more likely it is that breeding occurs within the community and outside influences are not often added to the gene pool. This leads to certain allele combinations being very common in certain communities.

Space does not permit a more detailed explanation, what you need to know is that if your client is aboriginal; a Pacific Islander or from an insular ethnic community there is some possibility, albeit slight, of a coincidental match. If you have less than a full 9 loci match you should take this possibility very seriously. Lawyers who represent aboriginal clients should be familiar with the decision of *R v Bropho*.*****

Odds are calculated differently for the chance of a match with a relative and for certain ethnic groups. Labs should provide you with these different calculations. The adjusted numbers will still be large and may not adequately reflect the chances of a coincidental match.

Tip: You should always be prepared to discuss the ethnic background and family history of your client and see if a close relative is realistically an alternative offender. If the profile is not a full 9 loci profile you should order a brief and a DNA file before entering a plea.

(8) Coincidence ("*It's a horrible coincidence*")

Coincidental matches are only really likely with mixed or partial profiles, within certain ethnic communities or between relatives. If your client is caucasian with no close relatives of a crime-committing age and the profile is a full 9 loci one it is highly unlikely that the match is a coincidence. But do not be too quick to assume that the possibility of coincidence is absurd. These stories illustrate the dangers of complacency and can be useful as dinner party material when people say "but its not like DNA can be wrong is it?" or "what do innocent people have to fear from DNA databases?".

The wheelchair bound cat burglar

In the UK a man with Advanced Parkinson's disease was arrested and charged with a second floor break-in over 200 miles from his home. The man could not drive or

even dress himself without assistance but his DNA profile coincidentally matched the crime stain at 6 loci. He was detained for seven hours and eventually cleared using another testing kit. The random match odds were 37 million to one.

The iron-clad alibi

In the UK, US and Germany people have been matched to crime scene stains when they were serving jail sentences at the time of the incident. The matches were to 6, 7 and 8 loci respectively. It is unknown if a relative was responsible for the stain.

The poor pint puller

A bartender in London was arrested and charged with a murder in Italy after his 6 loci DNA profile matched a DNA profile from the crime scene placed on an Interpol database. He had never been to Italy or even left the UK. He was cleared when additional loci were tested.

The stats

A study of Australian state databases in 2002 (when the databases were much smaller) found 28 nine loci matches across the databases but concluded that the matches were duplicates, ie the same person was profiled in two states. It found two profiles that matched at least eight loci and 13 profiles which matched at least seven loci. A review of the NZ database of almost 11,000 six loci profiles found ten matching pairs: eight were brothers, two were not even related.

Tip: Always do an alibi check. Always check that the match is a full 9 loci match.

(9) What sentence are they looking at if they plead today?

("What am I gonna get?")

Working on DNA cold hit cases as part of a high volume practice is hard. Lawyers must carefully navigate the path between being zealous and being realistic. In NSW the delay between offence date and notification is only the first of many delays that can be anticipated. If you decide to order a full brief of DNA material the delay in getting reports and results back from the lab could take up to six months, the average time from request to delivery is 180 days. Your client should not legally be penalised for this delay but in real life that is how it may pan out.

Your client might be serving an unrelated sentence and have a good chance of obtaining a concurrent sentence if they plead guilty on the day the charge is presented. If you order a full brief your client might be refused bail and be in custody waiting for DNA results for longer than if he or she just plead guilty originally. You need to weigh these considerations, and be aware of case law about cold hit delay and its impact on sentences⁵, and advise your client accordingly.

Conclusion

This paper has sought to document the numerous ways in which a DNA cold hit can be far more fallible than it seems. Despite all these possibilities, I suspect that the majority of the people nominated by a cold hit will in fact be guilty. But the job of a defence lawyer is not just to protect the innocent but to ensure the integrity of the system. If we don't scrutinise and challenge strong prosecution cases complacency

⁵ Cases in NSW include *R v Newman* [2004] NSWCCA 113, *R v Kay* [2004] NSWCCA 130, *R v Henry* [2004] NSWCCA 306.

will develop amongst crime scene investigators, forensic scientists and police officers. This aura of complacency allows shoddy practices to flourish, and that is when innocent people do become in danger. Just two months ago in the USA reports surfaced of a practice called "dry-labbing" where lab technicians would write reports that supported prosecution theories without ever testing the actual evidence. This practice could only emerge in an environment where technicians were confident that defence lawyers would never subpoena lab data which would usually include technician's bench notes. Competent scrutiny of DNA database evidence by defence lawyers may lead to only a few acquittals but, perhaps more importantly, it has the potential to keep all the players in the system honest.

**PART 2- CHECKLIST OF THINGS TO CONSIDER WHEN CONSIDERING A PLEA
WITHOUT A BRIEF (IE GOING OFF THE FACT SHEET)**

What date is the offence? Is it correct?
Do the facts specify what kind of biological material (eg blood, semen, saliva) it was and how much?
Is the source easily plantable?
Could it be trace DNA?
Where was the sample found?
Did every sample match? Does the fact sheet say this specifically?
Is there an explanation consistent with innocence for the material?
Do they know anyone who lives there or visits the area?
Do they know the investigators in the case- did they have dealings with them at around the time of the offence?
Was it a complete match or a partial match?
Could a relative of the offender been involved ie twin, brother?
Is the suspect an aboriginal or pacific islander?
Has the cold hit been confirmed with a reference sample?
[may need to contact informant directly if not in fact sheet or brief]
Does your client deny/not recall the offence?
Alibi check – birthdays, funerals, trips. Were they in custody or somewhere else at the time of some of the offences? (check records and call sentence admin do NOT rely on client recollection)
Is it the sort of offence they commit/ that kind of area?
Is there a chance that their DNA profile was in the lab for a different reason at the time of the offence?
 Were they the victim of a crime where samples sent to lab around same time?
 Were they perpetrators of crime sent to lab around same time?
 Was compulsory swab in the lab at the same time?
Why is their profile on the database? Do they meet the statutory criteria?

In client's language

It's a dodgy fact sheet
But I can explain
It's a stitch up
There's a technicality
It's a mistake
It's a lab stuff-up
It's my evil twin
It's a horrible coincidence

What am I going to get?

PART 3 - WHERE TO GO TO KNOW MORE

Introductory Materials

Go to www.bioforensics.com

This is a great and really accessible site that is worth spending a day or so on just exploring.

In "download articles" in the side bar you can find:

- William C. Thompson, Simon Ford, Travis Doom, Michael Raymer, and Dan E. Krane. "Evaluating forensic DNA evidence: Essential elements of a competent defence review. Part 1." *The Champlon*, 27(3):16-25, April 2003. PDF Download
- William C. Thompson, Simon Ford, Travis Doom, Michael Raymer, and Dan E. Krane. "Evaluating forensic DNA evidence: Essential elements of a competent defence review. Part 2." *The Champlon*, 27(4):24-28, May 2003.

These two articles are essential reading. They have pictures, are relatively easy to understand and every lawyer and student I know who has read them has felt more confident about lab data. You should feel comfortable with reading and interpreting electropherograms and cross-referencing with allele charts. These articles will show you how.

- Thompson, W. and Krane, D. (2003). Chapter 11: DNA in the courtroom. *Psychological and Scientific Evidence in Criminal Trials*. West Group.

This is a very detailed book chapter. It is really good and very practical. It is long, however and hard to navigate around and I can't work out how to print it.

- Useful chart of DNA terms, information on commonly-used testing kits, how to identify some specific problems with DNA evidence, and twelve important questions that always need to be asked about DNA evidence. PDF Download

You will love this; it's short, easy to understand and can be printed and kept in the office. At the Innocence Project New York all lawyers have laminated copies in their office.

On the sidebar there is also a "discovery request" which lists material that you could subpoena.

Statistical calculation links

These weblinks give an introduction to the statistical issues

Re: Ethnic communities

http://home.iprimus.com.au/dna_info/dna/JA_DNA_LinkEq_eg.html

http://anthro.palomar.edu/synthetic/synth_2.htm

<http://www.woodrow.org/teachers/bi/1994/easy.html>

(don't feel embarrassed that the "high school science is so hard")

Contamination

Kirsten Edwards "10 things about DNA contamination that lawyers should know" (2005) *29 Criminal Law Journal* 1.

This gives more detail about contamination possibilities; there is also a very detailed checklist for evaluating a full DNA file.