

ITS TIME

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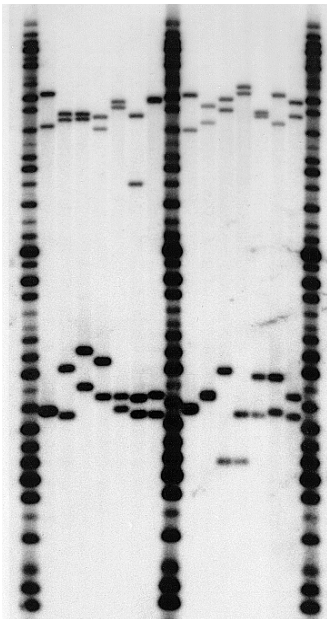
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It is a good time to review where the DNA identification field has been and look into the future and see where it is we need to go. This is not however a time to review time lines, validation studies and implementation dates. Looking at the field of DNA Identification it is time to assess the societal impact and whether or not DNA typing and the current technologies employed can meet the challenge that it created for itself.

The Good News circa 1987

Restriction Fragment Length Polymorphism (RFLP) was the first DNA typing technology introduced in the mid 1980s. The technology itself required a lot of DNA (1 g), required a lot of labor (6-8 weeks to



complete a case), and had non-discrete allele sizes. Nonetheless, the technology was quickly embraced by the legal community as a real advance in the ability to fight crime and free the innocent. Two states, Florida and Virginia began doing casework using outsourced capabilities and the results of these cases quickly provided the motivation for other states and agencies to use the technology. The acceptance was not without its critics. The critics largely complained that non-police agencies (read profit hungry corporations) could not address the needs of the justice system and produce quality results at the same time.

History has shown however that the critics, no matter what the motivation were wrong.

History Lesson 1 - The Commonwealth of Virginia v. Timothy Wilson Spencer

Timothy Spencer, also known as the South Side Strangler terrorized Richmond Virginia in the mid 1980s. Aside from the specifics of his crimes, which were horrific rape murders, his case formed the basis for DNA testing and its subsequent acceptance throughout the United States.

1. The capital murder cases against Spencer were made largely on the basis of DNA matches to evidence from the crime scenes. DNA matches formed the strongest evidence of Spencer's guilt.
2. Case to case linkages were made using DNA.
3. A wrongfully accused suspect was exonerated using the DNA results that implicated Spencer.
4. State and Supreme Court review of the cases occurred.

It should be obvious that the cases of Timothy Spencer were prescient in the use of DNA and how the science of DNA identification is practiced in 2001.

It would seem that based on the total success of the use of DNA in Spencer that the critics would have been silenced and that the eyes of progress would be turned to advancing the technology, increasing laboratory capacities and finding a set of standards that all laboratories would follow. In fact, many of us

who participated in the Spencer cases and who were testifying in court believed, naively as it turned out, that the need for expert testimony was all but over.

History Lesson 2 - State of New York v. Jose Castro

Simply known as the “Castro Case” many of the detractors of DNA technology thought they saw the demise of DNA typing in a single stroke. In fact the Defense Bar used the Castro defense as a blueprint for years in the hope that it was the magic shield that would remove the deadly DNA sword from the Prosecution arsenal. Again, history has shown that what really happened is that the badly wanted standards were formulated in Castro and since honed to reality in the subsequent years. In fact, Castro really codified use of DNA in ways that complemented the Spencer cases. The Castro court found:

1. The underlying theory of DNA typing was generally accepted,
2. The technology of RFLP was generally accepted,
3. That there needed to be three prongs of judicial review.

It is not the intent of this talk to review the specificities of the Castro ruling but rather to put them into perspective with the way in which we practice DNA typing now. First and foremost, the Castro court agreed with the Spencer court, to wit, the general theory of DNA typing was valid and acceptable. With only slightly less importance the Castro court agreed with Spencer in that the technology of DNA typing was generally accepted. Given these two rulings how is that the defense bar saw Castro as a ruling that provided the sacred shield against DNA?

The answer lies in the third ruling. The need for three prongs of judicial review. Arguably the work done in Castro was not DNA's finest hour. Here again perspective is warranted. The DNA typing work in Castro was accomplished in the earliest days of actual laboratory testing. The actual testimony occurred after many other cases had gone to court and a clearer perspective of what constituted acceptable results was at hand. Most importantly, Castro established that even when practice did not meet standard, the actual theory and technology were acceptable. Other attempts were made to challenge this but they were clearly unsuccessful as witnessed by the fact that this is the Twelfth International Symposium.

A short digression is warranted here. Without informing the voluntary defense counsel, but rather the appointed counsel, Mr. Castro plead guilty to the murder of which he was accused. The DNA results indicated that the victim's blood was on the watch of Mr. Castro. In addition the results were less than pretty because there were extra bands in the evidence that did not match the victim. This provided the defense the needed chink in the armor to suggest that unless all was explainable, nothing was acceptable. In hindsight, the results were probably best explained as a mixture, but the case was never approached in that way. The victim was pregnant when she was murdered, and at autopsy there was evidence that the fetus had been stabbed. No reference for the fetus was available and therefore the explanation would forever remain a mystery from a purely scientific point of view. Mr. Castro however, having been present for all of the DNA testimony was asked directly by Judge Scheindlin (Judge Judy's husband!) if in fact he agreed with the results. That is, did the DNA results fit the facts? Mr. Castro said in open court that in fact the DNA results were correct.

Even in DNA's worst performance, DNA got it right.

In fact, the use of the Castro case by the defense bar was a dismal failure. However, all of the defendants that were tried using DNA evidence and the Castro defense did share a commonality with Mr. Castro – they were all in jail.

DNA Typing circa 1987 – The Bad News

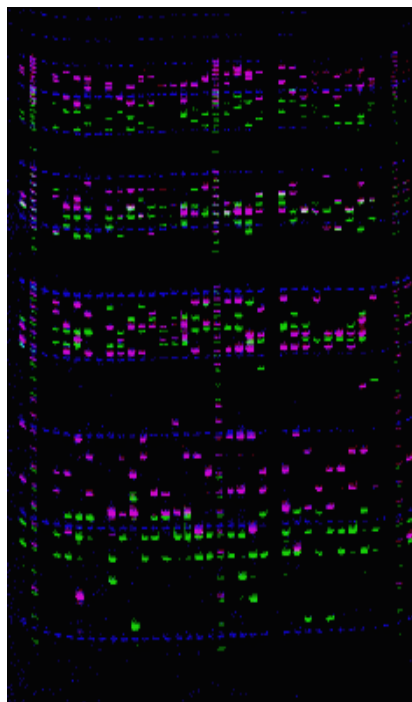
So how is it that given the success of DNA typing that things did not settle into a solid decade of performance? For the most part they did. However, there was a very serious problem that DNA typing

was not meeting. The number of cases that needed processing. Based on the uniform crime report there are 1.7 million offenses each year that would most likely require that some form of biological evidence be typed. A DNA typing process that required 1 g of DNA and 8 weeks to generate an answer just wasn't going to get the job done.

The DNA typing community responded with a simple answer – Case Acceptance Policies. Case acceptance policies accomplished two things: they limited the number of cases that would be processed and they generated huge case backlogs. All of the labs that today are staggering under the cloud of backlogs can thank the case acceptance policies of the 1980's and 90's. It should also be clear that case acceptance policies are of course, completely unacceptable.

It was also painfully clear that the other technological limitations of RFLP were going to make a solution based on the technology unfeasible. Even though the RFLP wars were largely over and there was a significant and growing body of case law to support its use – the societal needs had clearly defined RFLP's demise. In part the acceptance of the demise of RFLP by the scientific community was driven by the need to meet the demands of society. Perhaps the final part of the acceptance was the fact that PCR was clearly an important tool that solved many of the technological issues associated with RFLP.

The first incarnation of PCR technology lost complete sight of the one absolutely necessary requirement for a DNA test – statistical power. While the DQ/PM test was sensitive, that is it required much less sample than RFLP, and it was fast, it was also statistically useless. Prosecutors had come to expect that the results of a DNA typing test would provide a solid base on which the jury could make a decision i.e. a match statistic of 1 in billions. When presented with a test that was sensitive, fast and had matching probabilities of 1 in 1 thousand, almost universally the response was negative. In fact at Bode Technology, having decided to use Short Tandem Repeat (STR) polymorphism technology much of our early casework was the processing of cases that had been done with DQ/PM so that we could “get the numbers up”. Mercifully, DQ/PM was short lived. The technology was incapable of meeting societal demand and was quickly discarded.



Again the willingness to discard the technology was driven by the fact that there was a clear alternative – STR. So, armed with a fast, sensitive and statistically powerful technology all would seem to be right at last. Perhaps scientifically, but not from a judicial point of view. There were still standards, and accreditation. These in fact followed shortly after STRs became common practice at least in the commercial and some of the more forward thinking state and local labs.

Finally it seemed that there was a universal acceptance of DNA and the standards by which it should be practiced. Two cases however, brought the national spotlight back to DNA typing and the needs of society. First, although not an STR case, the Tomb of the Unknown still focused the attention of the world on DNA typing and its capability to find answers to questions that generally only get asked under the worst of the human conditions.

Second, an incredibly brave woman got up and publicly told her story of how DNA typing had brought her life back to her. Debbie Smith's rape and the solution of that crime using DNA databanks had focused the attention squarely where it belonged – on the solution of crime as a function of an integrated DNA typing program that included casework, databanks, and the processing of unsub cases and the associated backlogs. Ironically, Debbie Smith's case was an

RFLP case but this time it wasn't the technology, it was the needs of the society that the technology was devised to serve that received the much-needed focus.

Virginia was also once again the leader in the move to use DNA typing to its fullest. Virginia was the first state to adopt a comprehensive DNA databank program that included all felons. To be sure the program started by collecting from just sex offenders and murders but quickly moved to the collection of all offenders. Virginia also learned that it was not enough to just process the databank samples. Early on in the databank program there were samples that were being added to the databank but there were relatively few hits on the databank that solved a crime. Then Virginia began processing the backlogged cases and the unsub cases and almost instantly the hits began and currently the success of the Virginia databank is unparalleled in the United States.

Virginia also taught the US an invaluable lesson in terms of the samples that need to be in a felon databank. It sounds trite, but all felon samples need to be in a felon databank. An examination of the sources of samples that provide the largest percentage of hits clearly shows that the breaking and entering and similar offenses are more important to solving crime using a databank, than the rapes and murders. In hindsight this seems obvious. The B&E guys are beginning or in the middle of a criminal career headed for murder and rape while the criminals that have committed murder and rape, and been caught are likely to be in jail for a long time.

What may not be apparent is that there is a subtle but clear shift in the driving forces of DNA typing. Early on it was the technology that drove the acceptance and use. Now however the switch is complete. Sociological forces are driving and shaping DNA typing. This shift has caused some rather startling re-interpretations of the use of DNA.

For example, there is a general feeling that the number of samples in NDIS, the national version of the Combined DNA Index System or CODIS, is a testament to the good job of getting the samples typed. The National Institute of Justice has provided millions of dollars for the typing of backlogged databank samples and the number of crimes solved using databanks is growing each day. Given this funding and the needs of society however, it is not a job well done, it is a travesty, to have this few samples data banked.

Also, as you will see in Norm Gahn's paper, through his use of DNA to file a John Doe warrant, the courts have found a way to preserve the right to try criminals when we know biologically who they are, just not by name. In many ways, Debbie Smith is to thank for this acceptance of this use of DNA.

Finally, when RFLP was "king" everyone was keenly aware of the fact that the number of samples that could be processed in a case were limited given the labor and sensitivity of the technology. Now however, the number of samples per case is climbing and reaching heretofore unimagined heights.

Is it time to consider a new technology?

In a word. No. It is time to go to work and get the job done. We have the tools, the laws and the funding. The technology will meet the needs. We must find a way to say to the Debbie Smiths of the world that their cry will not go unheeded. We will not let another rapist take away the life of a woman when it could have been prevented. In fact, in a society in which we profess the equality of all people no matter their sex, society must demand it. Society has demanded much from us. We can meet the challenge.

Its time.

Its time that we get the work done.

Its time that no victim's case go unprocessed.