Themis: Research Journal of Justice Studies and Forensic Science

Volume 6 Article 14

5-21-2018

Lacking Regulated Policy for DNA Evidence

Maia Lister
San Jose State University

Lacking Regulated Policy for DNA Evidence

Abstract

Despite its strong presence in criminal justice, DNA analysis is still a minimally regulated area. This minimal regulation devalues DNA evidence through the inconsistencies in these areas. The analysis methods of low template DNA lack a uniform method resulting in varying levels of reliability. Utilizing familial searches to assist in criminal investigations can potentially violate citizen rights. Such violations can also be found in the collection of DNA samples before an arrestee is tried or convicted. There are, however, regulations that could be applied universally to combat the problems that were discussed.

Keywords

DNA analysis, familial searches, Fourth Amendment

Lacking Regulated Policy for DNA Evidence

Maia Lister

Abstract

Despite its strong presence in criminal justice, DNA analysis is still a minimally regulated area. This minimal regulation devalues DNA evidence through the inconsistencies in these areas. The analysis methods of low template DNA lack a uniform method resulting in varying levels of reliability. Utilizing familial searches to assist in criminal investigations can potentially violate citizen rights. Such violations can also be found in the collection of DNA samples before an arrestee is tried or convicted. There are, however, regulations that could be applied universally to combat the problems that were discussed.

Lacking Regulated Policy for DNA Evidence

In recent years, the use of forensic evidence in criminal cases has increased as techniques of analysis developed. One area of forensic analysis that has been thoroughly studied and continually improved is DNA fingerprinting, which is also referred to as DNA typing and DNA profiling. As methods used to analyze DNA samples have improved, it has become possible to solve old cases and exonerate those who have been falsely convicted. New techniques have reduced the time it takes to analyze a sample and increased the sensitivity, thus requiring less initial DNA. Despite the significant improvements to the field, there has been a lack of appropriate policies to help regulate these new techniques. One such area that needs a uniform policy is low template, or low copy number, DNA. Low template DNA is the analysis of a sample that has less DNA than is ideal for analysis or has highly degraded DNA (Schulz & Terry, 2015). The acceptance of this DNA profile is greatly debated, resulting in an inability to determine if this evidence is sufficiently reliable for a court.

Another area in need of a uniform policy is the collection of samples. Collecting a DNA sample has the potential to violate a person's Fourth Amendment rights—specifically, protection against unreasonable searches and seizures—as demonstrated in the court case Maryland v. King (2013). King's DNA was taken before his trial for assault and matched to a sample from an unsolved rape without probable cause for the search (Maryland v. King, 2013). The use of the DNA database in an attempt to find a partial match, which is also referred to as a familial search, to an unknown sample also has the potential to violate the Fourth Amendment rights of those who are innocent.

https://scholarworks.sjsu.edu/themis/vol6/iss1/14
DOI: 10.31979/THEMIS.2018.0614

Preventing these inconsistencies and violations requires uniform policies that can be applied to all cases across the country. This paper will evaluate the problems associated with a lack of uniform policy on the topics of new methods of DNA analysis and the Fourth Amendment rights of citizens. The procedures relating to citizen rights include the collection and analysis of DNA samples before trials and the use of familial searches.

Literature Review

The use of DNA typing in criminal investigations has become an integral part of the justice system. Despite the research conducted since its inception, there are still aspects of DNA analysis that lack regulation. Varying methods of analysis for samples with small quantities of DNA can result in the questioning of every aspect of the sample (Lawless, 2013). Once analyzed, an officer may search for a partial or familial match within an existing database, potentially infringing on an innocent citizen's Fourth Amendment rights (Murphy, 2010). The potential to violate a person's Fourth Amendment rights can also manifest when a DNA sample is collected as demonstrated in the court case Maryland v. King (Hall, 2014).

Low Template DNA

Low template DNA samples, also referred to as low copy number DNA, are samples that contain under 200 picograms of DNA, this number is lower than what is normally accepted for analysis (Schulz & Terry, 2015). The small amount of DNA recovered brings forth various questions about whether the sample can provide valid evidence. While this technique is acceptable for anthropological purposes, its use in criminal investigations is a source of debate (Schulz & Terry, 2015). These debates are a result of low copy number DNA samples' tendency to be incorrectly amplified due to the small amount of

DNA. Additionally, the credibility of low template DNA may be questioned because the method employed lacks validation (Lawless, 2013).

The sample's credibility is made more uncertain because labs use varying techniques to analyze a sample. Grisedale and van Daal (2012) compare the two primary methods used: one analyzes the sample as a whole and the other separates the sample into smaller aliquots before analysis. The study concluded that analyzing the sample as a whole yielded a higher number of the correct loci and that initially separating the sample often produced a profile where alleles and loci disappeared (Grisedale & van Daal, 2012). Loci disappearing indicates that DNA is not completely detected in certain places and disappearing alleles indicates that some, but not all DNA, is detected at one location. Although this study exhibits which method is preferable, low template samples collected from a crime scene are less pristine than the samples in this study. No regulations requiring that one method be used over another have been implemented, leaving room for inaccuracies.

Familial Searches

Once a DNA profile has been produced from a sample, it is run through a verified database in search of an exact match. Databases, however, do not contain profiles from the entire population and when a match cannot be found investigators may search for a possible relative of the sample's source (Ge, Chakraborty, Eisenberg, & Budowle, 2011). The source of the partial match is someone who has been convicted, therefore their profile is in the database. This method, while helpful, often produces false leads. The likelihood of finding a familial match depends on whether the database has the profile of a family member and the number of common alleles an investigator is

https://scholarworks.sjsu.edu/themis/vol6/iss1/14
DOI: 10.31979/THEMIS.2018.0614

attempting to match (Murphy, 2010). Additionally, how an investigator determines whether or not the samples are related affects the ability to find a true familial match.

There are two methods utilized when conducting a familial search. The Identity-By-State method merely compares the number of shared alleles between the two profiles and the likelihood ratio-based method utilizes probabilities to determine whether the samples are related and how (Ge, Chakraborty, Eisenberg, & Budowle, 2011). Ge et al. (2011) compares the two methods' effectiveness in yielding accurate results and concluded that employing a combination of both techniques provided the fewest false inclusions and false exclusions. Regardless, these searches only provide possible relations and following these leads will likely result in innocent citizens becoming involved in a criminal investigation (Murphy, 2010). The questioning of the innocent demonstrates the violation of a citizen's Fourth Amendment rights, as the search can be characterized as unreasonable. A familial search allows for the opportunity to abuse the legal power of collecting information from a criminal offender and to violate the privacy of an uninvolved party through conjectures about a partial match to the offender's DNA (Murphy, 2010). Employing both methods for every search can protect citizens from such investigative techniques.

DNA Sample Collection

The timing of when officers collect a DNA sample from an arrestee or felon as well as the search methods have an important role in a successful trial. In Maryland v. King, King's DNA sample was collected before being tried for assault and matched to an unsolved rape (Murphy, 2013). Before being charged with assault, King was not a convicted felon, therefore,

the early collection and analysis of his DNA demonstrated law enforcement's potential to violate the Fourth Amendment. However, the collection of King's DNA was justified because of the Maryland DNA Collection Act, or Maryland Act. This act permits the collection of DNA samples from those charged and arrested for a violent crime, burglary, attempted burglary, or attempted violent crime (Hall, 2014). The act requires that a person be arrested as well as charged, implying that there is evidence against the arrestee that may result in a conviction. The Maryland Act also states that if the charged party is not convicted, the DNA profile is to be destroyed (Hall, 2014). This creates a fair balance between justice and citizen rights.

Implementing this Act across the nation could be beneficial in controlling the manipulations of law enforcement to attain a DNA sample. It would also protect those who have committed the lighter crimes, unlike in California where DNA samples are collected from any person who committed a felony (Iyengar, 2014). Additionally, it would prevent the oversimplification of Fourth Amendment rights as they apply to convicted offenders, who have lowered protections (Murphy, 2013).

Summary

DNA profiles as evidence in a criminal investigation have many different areas in need of regulation. Unfortunately, there are very few uniform policies in these areas. Analyzing DNA with methods that have small variations in their processes can have a large impact on the resulting profile. Allowing law enforcement to utilize the DNA profiles of convicted felons to investigate their relatives can be a manipulation of power. In addition to this manipulation, justice for victims may become secondary to policy when questioning the validity of how a DNA

https://scholarworks.sjsu.edu/themis/vol6/iss1/14
DOI: 10.31979/THEMIS.2018.0614

sample is collected from someone who is likely to be convicted. Uniform policies for each of these areas can provide maximum protection of citizens as well as the use of DNA evidence at its full potential to ensure justice for victims.

Discussion

Forensic science is a significant area of the criminal justice system, especially DNA evidence. Unfortunately, there is a lack of uniform policy regarding DNA evidence regarding its intersection with the legal protection of citizens. The absence of consensus regulations prevents DNA evidence from being utilized to its full potential. Low template DNA samples have the potential to, at the very least, provide a lead for investigators to pursue. However, the lack of uniform requirements for low template DNA in determining its reliability in a court prevents the use of such evidence (Schulz & Terry, 2015). Additionally, the inability of the scientific community to agree on a single method of analysis limits the help it can offer. Implementing a single method to analyze a low template DNA sample with the establishment of a threshold to regulate whether the sample could be used as evidence would assist in limiting debates about the reliability of the sample (Grisedale & van Daal, 2012). An additional threshold to determine if the profile could be evidence on its own or requires support from other evidence would also be beneficial for low template DNA.

Additionally, there are times when an element of DNA analysis or collection fails to yield to citizen rights. Using a profile obtained from a criminal offender to find a partial match to a profile obtained from a crime scene can potentially violate the rights of innocent citizens. Discovering a partial match encourages suspicion to fall on innocent citizens. This method of searching also lacks regulation, producing many false positive

matches. The use of both Identity-By-State and likelihood ratio-based methods to search for partial matches would eliminate many of these false positives (Ge, Chakraborty, Eisenberg, & Budowle, 2011). Furthermore, requiring a minimal number of alleles to match would also help minimize false positives. Citizen rights may also be violated in the collection of DNA samples as shown in the Maryland v. King court case. King, however, had fewer rights as a citizen because he was arrested and convicted of a violent crime (Murphy, 2013). Applying the Maryland Act across the nation would allow for the collection of DNA samples from an individual that has been arrested and charged with a crime, without violating their rights as a citizen.

Conclusion

Implementing such policy changes would require the endorsement of the scientific community that controls the regulation of analysis methods within the United States. When referring to low template DNA analysis, further research is required on the reliability of the DNA in various situations as well as its potential as stand-alone evidence or supporting evidence. The research conducted by Ge, Chakraborty, Eisenberg, & Budowle (2011) requires validation before any regulatory policies regarding familial searches could be employed. Expanding the Maryland Act to operate on a national level would demand further research on the effective expungement method of a DNA profile. According to Murphy (2013), it is difficult to eradicate a DNA profile that has been analyzed and uploaded to a DNA database. All of these potential changes require funding for research to maximize each policy's effectiveness and prevent new problems from occurring due to the change. Their implementation, however, would increase the

https://scholarworks.sjsu.edu/themis/vol6/iss1/14
DOI: 10.31979/THEMIS.2018.0614

reliability of DNA evidence and help prevent wrongful convictions of innocent citizens.

References

Ge, J., Chakraborty, R., Eisenberg, A., & Budowle, B. (2011). Comparisons of familial DNA database searching strategies. *Journal of Forensic Sciences, 56*(6), 1448-1456.

Grisedale, K. D. & van Daal, A. (2012). Comparison of STR profiling from low template DNA extracts with and without the consensus profiling method. Investigative *Genetics, 3*(1), 14-22.

Hall, L. A. (2014). Arrestee number two, who are you? Suspicionless DNA testing of pre-trial arrestees and the Fourth Amendment implications. *Missouri Law Review, 79*(3), 755-782.

Iyengar, V. (2014). Maryland v. King: The case for uniform, nationwide DNA collection and DNA database laws in the United States. *Information & Communications Technology Law, 23*(1), 77-80.

Lawless, J. C. (2013). The low template DNA profiling controversy: Biolegality and boundary work among forensic scientists. *Social Studies of Science, 43*(2), 191-214.

Maryland v. King 569 U.S. __ (2013).

Murphy, E. (2010). Relative doubt: Familial searches of DNA databases. *Michigan Law Review, 109*(3), 291-348.

Murphy, E. (2013). License, registration, cheek swab: DNA testing and the divided court. *Harvard Law Review, 127*(1), 161-196.

Schulz, R. & Terry, S. F. (2015). The science, applications, and ethical concerns surrounding low copy number DNA analysis. *Genetic Testing & Molecular Biomarkers, 19*(6), 281-282.

Maia Lister will be graduating from San Jose State University with a bachelor's degree in Forensic Science in 2018. She is currently an officer for the Forensic Science Students club and is pursuing an internship with the Sacramento County District Attorney's Crime Lab for the upcoming summer. Maia plans to pursue a job in a crime lab and hopes to return to school for her master's degree in the future. When she isn't studying, Maia can be found listening to music, reading, and painting.

https://scholarworks.sjsu.edu/themis/vol6/iss1/14
DOI: 10.31979/THEMIS.2018.0614