NIJ and Midwest Research Institute—Introducing New Methods for DNA Analysis

Ability to Determine if DNA ID for Victims at the Scene Could Reduce Sample Volume

Moving Knowledge from Research to Impact

"The importance of this work is in the ideas it brought forward. It opened up new ways for the forensics community to think about how to do rapid genotyping."

Micah Halpern, PhD
Principal Investigator
Formerly, Midwest Research Institute

Synopsis of Problem and Solution

Technological advances in DNA analysis have led to improved investigation and prosecution of crimes. However, there is still a need to eliminate downstream laboratory analysis of less probative or uninformative samples and provide on-site information to aid in investigations. While working at a crime scene, forensic investigators may encounter a variety of potential DNA evidence and then prioritize which samples will be collected for DNA analysis. The goal is to find samples from both the victim and perpetrator. However, finding the DNA of a perpetrator at a scene can be challenging. Rapidly producing DNA information on site could identify which source the DNA comes from and reduce lab work.

Dr. Micah Halpern, formerly of Midwest Research Institute, used National Institute of Justice (NIJ) research grants to develop a unique genotyping method that is capable of rapidly producing source identification of samples at a crime scene. The method has the potential to reduce the number of samples sent to the lab for processing by eliminating the samples derived from the victim, and could also provide immediate information to the investigator concerning the source of each sample.

Benefits

- The method developed was the first to successfully demonstrate that a Short Tandem Repeat (STR) melt analysis technique could simply, rapidly, and cost-effectively produce a source identification from samples for preliminary prescreening.
- The method allows for DNA archiving at the site, eliminating the need for lab extraction, while maintaining the chain of custody.

The Future

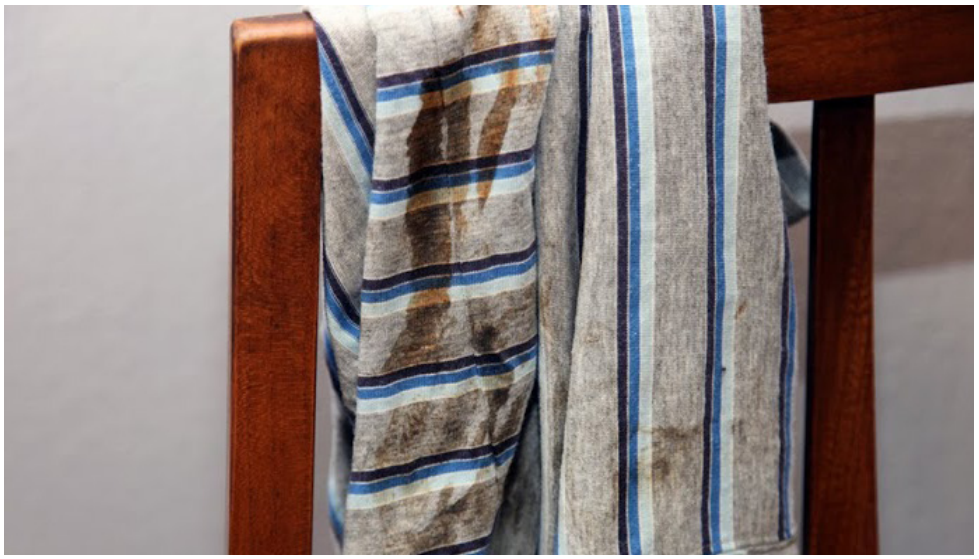
- The technology could be used to process multiple samples at the scene to determine the probative value of crime scene evidence (victim vs. nonvictim), which could potentially contribute to the effectiveness of the investigation.
- Because of the benefits it offers, the STR melt curve analysis method could be considered for applications in forensics beyond rapid DNA analysis at the crime scene.

NIJ-Funded Research

Dr. Micah Halpern, formerly of the Midwest Research Institute, was awarded NIJ grants to develop a unique melt-based approach to STR genotyping, integrate and test that approach for compatibility with existing technology, and determine applicability for forensic applications.

Bringing Research to Practice

- Dr. Halpern developed a melt-based approach to STR genotyping that provides the same information as traditional methods, but with no additional postamplification sample manipulation.
- Dr. Halpern worked with Micronics, Inc. to verify the feasibility of adapting its portable PanNAT® system to do the STR melting curve analysis technique developed in the project.
- Early research findings related to this work were first published in *Analytical Biochemistry* in January 2009. The results of this work were published in the *Journal of Forensic Sciences* in September 2010.
- Different stages of the research were presented at the NIJ 2009 and NIJ 2010 Annual Conferences. The work was also presented at the 20th International Symposium on Human Identification 2009 in Las Vegas, Nevada. A presentation about the project was given at the European Network of Forensic Science Institutes (ENFSI) DNA Working Group Meeting 2010 in the Hague, Netherlands.
- In 2011, Dr. Halpern presented his findings in an online workshop hosted by the National Forensic Science Technology Center to disseminate the information more widely to the forensics community.



The DNA analysis method, which was developed with support funding from NIJ, could help distinguish DNA on site samples from a piece of evidence that contains DNA from both the victim and perpetrator.

More Information

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