B15 A Method for Determining the Age of a Bloodstain

Kristin N. Nestor, BS, Stacey Anderson, BS, Brandi Howard, BS, Regina Trott, Gerry Hobbs, and Clifton Bishop, PhD, West Virginia University, Department of Statistics, PO Box 6057, Morgantown, WV 26506-6057*

The goal of this presentation is to show how RNA can also be used in the forensic community as an indicator for the age of a bloodstain. As a result, the age of a bloodstain could act as information in relevance to the time a crime occured. In addition, this information could also be useful for the exclusion or inclusion of a suspect.

This presentation will impact the forensic community and/or humanity by informing the forensic science community about new research and technology that can be useful in investigations. In addition, this presentation may bring further interest to this area of study.

DNA allows for the unambiguous identification of the person from whom a biological sample was derived but provides little information about when the sample was deposited. This information only indicates that the biological sample was deposited at the crime scene prior to the collection of evidence. The ability to determine the age of a biological sample would greatly benefit the forensic science community, providing a temporal linkage of biological evidence to the time a crime was committed. Conversely, if the sample were deposited at a different time, then value resources might not be wasted pursuing an innocent person. The authors have used real-time reverse transcriptase PCR (RT-PCR) to show that the ratio between different types of RNA (mRNA versus rRNA) changes over time in a linear fashion when dried human blood was examined over the course of 180 days. One study focused on the comparison of individuals from three ethnic groupings: European-American, Asian-American, and African-American. Additional studies demonstrated how environmental conditions, specifically temperature as well as humidity, changes the rate of RNA decay. Although other approaches have been used in the past to estimate the age of a biological sample, this approach offers the following advantages: enhanced detectability of small samples, simultaneous isolation of DNA and RNA from the same sample, species-specific probes, and an increased window of usefulness.

Forensics, Real-Time PCR, RNA Decay

 ** Presenting Author*