

**STORAGE OF DNA SAMPLES AT AMBIENT TEMPERATURE USING  
DNA-SAMPLEMATRIX®**

**Kimberly Clabaugh<sup>1</sup>, Brie Silva<sup>1</sup>, Kingsley Odigie<sup>1</sup>, Ron Fournay<sup>2</sup>, Jesse Stevens<sup>2</sup>, George Carmody<sup>3</sup>, Mike Coble<sup>4</sup>, Odile Loreille<sup>4</sup>, Melissa Scheible<sup>4</sup>, Margaret Kline<sup>5</sup>, Thomas Parsons<sup>6</sup>, Arijana Pozder<sup>6</sup>, Arthur Eisenberg<sup>7</sup>, Bruce Budowle<sup>8</sup> and Steven B. Lee<sup>1</sup>**

<sup>1</sup>*Forensic Science Program, Justice Studies, San Jose State University, San Jose, CA, 95192.*

<sup>2</sup>*Royal Canadian Mounted Police, Central Forensic Laboratory, Biology Research and Development Support Unit, P.O. Box 8885, 1200 Vanier Parkway, Ottawa, Ontario, Canada, K1G3M8.*

<sup>3</sup>*Department of Biology, Carleton University, 1125 Colonel By Drive, Ottawa, Ontario, Canada, K1S 5B6.*

<sup>4</sup>*Research Section, Armed Forces DNA Identification Laboratory, Armed Forces Institute of Pathology, 1413 Research Blvd., Bldg 101, Rockville, MD 20850.*

<sup>5</sup>*National Institute of Standards and Technology, 100 Bureau Drive Stop 8311, Gaithersburg, MD 20899-8311, U.S.A.*

<sup>6</sup>*Forensic Sciences Division, International Commission on Missing Persons, Sarajevo, Bosnia and Herzegovina.*

<sup>7</sup>*Department of Pathology and Anatomy, University of North Texas Health Science Center at Fort Worth 3500 Camp Bowie Blvd., Fort Worth, Texas 76107.*

<sup>8</sup>*FBI Laboratory, Quantico, VA 22135*

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Biological samples collected and stored for diagnostic and research purposes include cells, viruses, and DNA/RNA. Advances in PCR technology have enabled successful analysis of minute quantities of these samples, including low quality and quantity DNA, which is commonly encountered in forensics. For example, DNA samples from bone and teeth recovered following large scale mass disasters and terrorist acts, as well as crime scene samples from sexual assault and touch evidence, such as fingerprints, can yield less than 100 pg of DNA.

The ability to re-test samples is a critical component of forensic work, where trace evidence can lead to exoneration of the innocent or the identification of a suspect. Thus, proper storage of samples containing small amounts of DNA is important for maintaining sample integrity over time. The objective of this study is to develop an efficient, long-term storage strategy for DNA samples. The current work focuses on forensic samples; however this technology is applicable to all DNA laboratories.

The ability to consistently recover and re-test forensic DNA samples may be affected by variables such as storage temperatures and repeated freeze-thaw cycles. Biomatrix, Inc. has developed a technology that allows for the stable, dry storage of biological materials at ambient temperatures. DNA-SampleMatrix® works by forming a protective shield around the sample that prevents further damage and degradation over time.

An international consortium of leading forensic, academic and government laboratories has been formed to evaluate DNA-SampleMatrix® as an alternative to conventional freezer storage. In one study, the quality of control DNA (K562) recovered from room temperature dry storage in DNA-SampleMatrix® at various time intervals is being assessed. A comparison of samples stored in standard microfuge tubes at room temperature also is being conducted. Experiments comparing storage at -20°C of samples maintained either in DNA-SampleMatrix® in a 96-well plate format (SampleGard®) or microfuge tubes is ongoing. Recovered samples will be quantified using qPCR and agarose gel electrophoresis. Preliminary results indicate that the integrity is maintained of DNA samples stored dry in DNA-SampleMatrix® over 3 months as compared to samples stored in standard microfuge tubes.

Samples stored in DNA-SampleMatrix® were amplified using a variety of STR multiplexes including PowerPlex® 16, Identifiler and Profiler Plus. No detectable inhibition to PCR amplification of the STR multiplexes was observed even in the presence of high concentrations of the DNA-SampleMatrix®.

Preliminary results also will be presented from additional consortium studies evaluating the ability of DNA-SampleMatrix® to store and protect samples previously extracted and typed from proficiency tests, degraded DNA samples, DNA extracted from bones and teeth, low copy number samples, samples that have been sent through the US mail, and sample stability following multiple freeze-thaw cycles.