OPTIMIZATION OF FRONT-END TOUCH SAMPLE PROCESSING TECHNIQUES

Driscoll, R., Bathrick, A., and Bever, R.
Bode Technology, 10430 Furnace Rd, Suite 107, Lorton, VA 33079

The generation of clean, interpretable genetic profiles from touch evidence cellular samples continually proves to be a difficult challenge in the field of forensics. Multiple improvements in touch sample and Laser Microdissection (LM) front-end operations are currently under assessment in order to determine the benefits of single tube extraction methods, the direct placement of samples into amplification reactions, PCR additives/alterations, and post-PCR cleanup procedures as alternative options to commonly utilized forensic processing techniques. ZyGEM™ *forensic*GEM extraction kits have undergone evaluation as an effective single tube extraction method. These kits provide a purified DNA template in 20 minutes without any tube transfers. Critical amounts of touch sample template DNA could be conserved by eliminating the multiple transfers of sample witnessed during standard DNA extraction methods.

An approach that is also being utilized in an effort minimize the critical sample loss witnessed during the extraction of touch samples is the elimination of the extraction step altogether. Within the past few years, several STR amplification kits (PowerPlex® 16 HS, PowerPlex® S5, and MiniFiler™) which include hot start *Taq* DNA polymerases in their reaction buffers have appeared on the commercial markets. The inclusion of the hot start *Taq* in the buffers has allowed these kits to generate more informative profiles from more challenging samples. With the advancements made with these updated amplification systems, it is possible that collected touch sample cells could directly enter the amplification step of processing following collection. PCRboost™ and STRboost™ are reagents that enhance PCR performance by improving sensitivity and specificity during amplification of genomic DNA templates. These reagents are undergoing evaluation for presence of enhanced yield, specificity, and consistency when used during touch sample processing. Post-PCR purification techniques, such as Qiagen MinElute columns, will also be evaluated in attempt to enhance final profile output. If successful, the incorporation of all of the above mentioned procedures into one operational protocol that would provide alternative methods of sample processing for those labs processing touch evidence and/or utilizing LM technologies.