

## **NOVEL COLORIMETRIC ISOTHERMAL AMPLIFICATION METHOD FOR COST-EFFECTIVE, RAPID BODY FLUID AND MALE IDENTIFICATION**

Tiffany Layne, Anchi Tsuei, James Landers

University of Virginia, Department of Chemistry

Loop-mediated isothermal amplification (i.e., LAMP) is ideal for qualitative assays because of its high specificity using 2-3 pairs of primers, generates multi-sized amplicon, and successful amplification can be read out colorimetrically. We show this technique can be directly applied to an important forensic application – male and body fluid identification (bfID). Accurate presumptive and confirmatory tests are essential for gaining contextual information for crime scene investigators. False positives results are not uncommon with biochemical-based tests demonstrating a lack in specificity. In addition, many methods are known to be destructive to the sample and/or inhibit downstream procedures. Here, we demonstrate data on the LAMP method that can rapidly identify body fluids with a male screening marker. The panel includes venous blood, menstrual blood, semen, saliva, vaginal fluid, and a Y-marker, with a colorimetric indicator and automated image analysis. The method is designed for easy implementation into the current forensic case workflow. Using mRNA for bfID and DNA for Y-screening, a high level of tissue- and human-specific targets are derived from the use of multiple primer sets in the LAMP assay. The simplicity of this analytical method will minimally disrupt forensic labs performing DNA analysis, and the nature of the isothermal amplification massively reduces the complexity of instrumentation needed. In addition to an identification method, we have built a simple integrated instrument that allows for minimal hands-on time. Together the method and instrument show high promise as a forensic identification method.