

## **FORENSIC BIOLOGY UNDER THE MICROSCOPE**

Brandt Cassidy, Ph.D., James Anstead, Ph.D., Kelsy Lowther, MS., Erica Reynaga, MS., Elizabeth O'Bannon, MS., and Sherri Deaton, MS., DNA Solutions, Inc.

The recovery of biological material, with samples merely millimeters in size, presents unique challenges in DNA processing. Biological material from physical evidence may be difficult to access, potentially wedged in the cracks of the piece of evidence or trapped in the weave of a fabric. Somewhere between the analysis of DNA from a single cell and large quantities of blood, bone, or tissue lays the realm of biological evidence that can be visualized and recovered using a dissecting microscope. Over the last 17 years, DNA Solutions has developed tools and techniques that allow enough biological material to be recovered from these types of difficult samples for screening and DNA analysis. We will present case work examples ranging from the processing and recovery of residual biological evidence from medical trocars that were used in surgery to the successful production of a DNA profile from a tiny speck of blood identified on a pill from a large chain pharmacy. We will outline the processes used to successfully perform DNA analysis from traces of dried mucus on a handkerchief that had been recovered from within a commercial food product as well as the determination of the wearer of a set of clothes covered in the victim's blood following a brutal murder. Lastly, we will describe how we were able to obtain a DNA profile from hollow point bullets even after the bullets had been cleaned for ballistics matching and stored for over 4 years. We were able to match the DNA profile to the victim confirming their origin. Each of these cases highlights the tools (micromanipulators) and techniques (vacuum systems) developed at DNA Solutions and used to successfully recover minute amounts of biological evidence and produce data critical to the investigations surrounding each case.