E9 Single Analyte Bioaffinity-Based Assays for Body Fluid Analysis

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After attending this presentation, attendees will understand that single analyte bioaffinity-based assays will expedite the process of identification for forensics investigations that involve body fluids such as sweat and blood. The use of the single analyte assays would not only hasten the process, but would allow for a narrowing of the suspect pool without needing a database for comparison and without the potential for compromised attributes. In addition, attendees will come to understand that blood and fingerprints can be more useful for forensic analyses by using methods other than DNA and profile/image comparisons.

This presentation will impact the forensic science community by demonstrating that single analyte bioaffinity-based assays are able to be used on body fluids for a quick response in the identification of the originator and would hopefully be able to be used for on-scene analysis requiring little to no scientific expertise.

Biomarkers are widely used for identification purposes in the field of forensic science. This is usually done with DNA from blood or fingerprints. Even though DNA analysis is incredibly accurate, there have been drawbacks to this method. The major drawback is that DNA analysis is a time-consuming process, leading to a long wait time for results and backlogs in criminal investigations. Another drawback to this process is that there needs to be a matching profile for a positive identification to be made since the method is comparative. Single analyte bioaffinity-based assays are able to analyze biological markers (biomarkers) in blood in order to identify attributes of a person to expedite the identification process during a criminal investigation. These assays are also able to be performed on certain analytes in fingerprints, since fingerprints are formed by sweat and sebum, which contain the biomarkers similar to those found in blood.

Fingerprints are also widely used for forensic purposes, albeit in a narrow role of pictorial comparison based on the ridge patterns of the print itself. Fingerprint analysis is also a lengthy process that causes (backlogs similar backlogs to blood) due to the need for highly trained personnel. In addition, similar to DNA, there needs to be a matching image since this is also performed in comparison to a database. This mindset causes fingerprints that would be usable for other analyses, being smudged or a partial, to be overlooked and not examined. The use of a single analyte bioaffinity-based assay allows the use of these prints and results that exhibit characteristics of the originator without the need for a database or a comparison.

By using single analyte assays, a major problem of multi-analyte cascades is eliminated: compromising results from multiple analytes affected by the same attribute. These attributes provide identification of the person or information about the blood spot or fingerprint itself. For example, the results determine age, race, biological sex, or other characteristics, leading to quicker and more efficient investigations. Ideally, these assays would be able to be a part of a field kit that would be used by law enforcement personnel directly at the crime scene to further simplify and accelerate the process of identification.

Identification, Biomarkers, Body Fluids