PROTEOS

PROTEIN-BASED HUMAN IDENTIFICATION METHODS

INTELLIGENCE VALUE

Proteos is developing protein-based forensic approaches to augment DNA identification methodologies and provide an alternative when DNA fails in challenging forensic cases.

DNA is widely used for forensic identification, but analysis of DNA can fail in some cases due to degradation, the presence of multiple contributors, or because the DNA is not present in sufficient quantities for Short Tandem Repeat (STR) forensic analysis. Moreover, there are substrates from which DNA is difficult to extract, such as brass shell casings.

Proteins are more stable than DNA and can be extracted from trace forensic evidence that contains shed skin cells in touch samples. Genetically Variant Peptides (GVPs) of proteins are mapped to DNA single nucleotide polymorphisms (SNPs) for individual identification, thereby providing a unique signature of the contributor. Proteos is developing novel approaches for discovering and leveraging GVPs to augment existing laboratory workflows for forensic identification from relevant touch samples.

To date, Proteos researchers have successfully identified an individual from a single fingerprint and discovered over 200 GVPs for identification panels. These researchers also developed extraction methodologies to recover both DNA and proteins from fingerprints, so that STR analysis using DNA, and GVP analysis using proteins, can both be performed on a single sample of collected evidence.

The program continues to optimize protocols for mixed contributor samples, extracting GVPs among confounders and from different substrates under variable environmental conditions. Proteos will further explore the applicability of the technology to other sample types, such as bone.

PRIME PERFORMERS

- Signature Science
- University of Washington
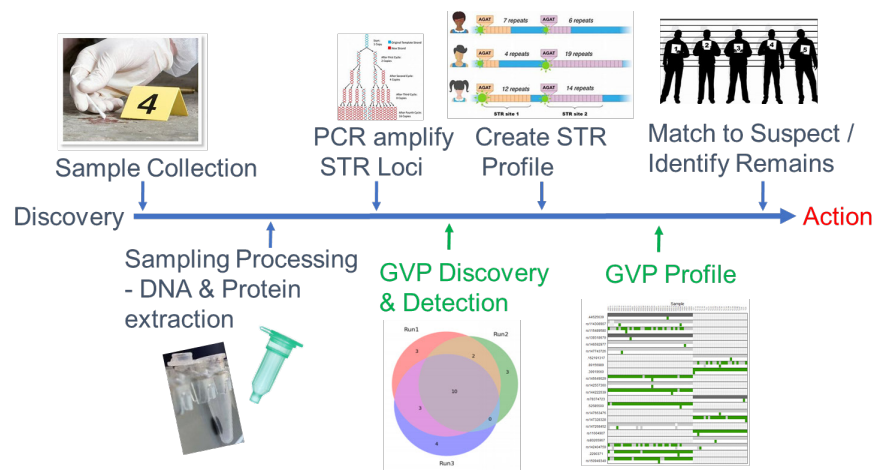- GE Healthcare Life Sciences

TESTING AND EVALUATION PARTNERS

- Lawrence Livermore National Laboratory
- National Institute of Standards and Technology
- Johns Hopkins University Applied Physics Laboratory

KEYWORDS

- Forensics
- Proteomics
- DNA identification
- GVPs

Figure: DNA-based forensics approach with the integration of proteomic-based Proteos capabilities, in green.

Sample Collection

PCR amplify STR Loci

Create STR Profile

Match to Suspect / Identify Remains

Discovery ——————————————————————————→ Action

Sampling Processing - DNA & Protein extraction

GVP Discovery & Detection

GVP Profile

PROGRAM MANAGER
Michael Patterson, Ph.D.
Phone: (301) 243-1812
michael.patterson@iarpa.gov

www.iarpa.gov

@IARPAnews