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### Evolution in forensic DNA analysis: Workflows for single source and evidence samples

Genotyping of biological samples for Short Tandem Repeats (STR) is now routinely performed in human identification and forensic laboratories. Recently, the European forensic community (ENFSI and EDNAP) expanded the number of autosomal STR loci from 10 to 16 for generating the database. Similarly, the Combined DNA Index System (CODIS) Core Loci working Group in the USA recommended expanding the required minimal core loci for the database from 13 autosomal STR loci to 19, with 3 optional loci and 1 Y-chromosome marker also specified. Global successes in the utility of STR markers as a means of resolving criminal cases has generated the need for high throughput workflows for single source samples for database generation and robust STR amplification systems that can generate profiles from small quantities of DNA that may originate from highly compromised samples. To meet these evolving needs, we developed optimized workflows for single source samples and evidence samples.

The AmpFISTR® Identifiler® Direct and NGM SElect™ Express PCR Amplification kits enable amplification of DNA from a punch of blood or buccal cells deposited onto a paper substrate thereby eliminating the need for extraction and isolation of DNA. The innovative Prep-N-Go™ buffer system acts as a facilitator of lysis and enables processing of buccal swab samples deposited onto plain filter paper substrates or swabs. The Identifiler® Plus and NGM SElect™ kits are designed for casework samples. These kits are capable of generating STR profiles from samples containing < 100 pg of DNA and can tolerate PCR inhibitors that are commonly present in forensic samples. In view of the importance of global database sharing, a multiplex STR amplification system is under development incorporating the recommendations of the CODIS Core Loci Working Group. It is estimated that the power of discrimination using this system is  $7.12E^{-26}$  compared to  $2.6E^{-17}$  for the commonly used Identifiler® kit that encompasses 15 STR loci. The presentation will cover the capabilities of these STR genotyping systems and share data generated from forensic type samples.

#### Biography

Jaiprakash G. Shewale received his Ph.D. in biochemistry from the University of Pune, India in 1980. Dr. Shewale is currently the Technical Director, in the Human Identification Division of Life Technologies Corporation, Foster City, CA. He has published over 100 research papers and filed 28 patents. He has received Meritorial Invention Award from the National Research and Development Corporation, Government of India. He is a Fellow of American Academy of Forensic Sciences, edited 3 special issues of forensic science Review and Editor-in-Chief of Journal of Forensic Research.

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