Forensic Genetics

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One aspect of the Applied Genetics group is focused on forensic genetics. Using DNA–based technologies, the AG group develops standards and assesses emerging forensic methods in support of the human identity community.

These activities provide a foundation to ensure accurate measurements and validations performed by the forensic DNA typing community.
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Standard Reference Materials

SRM 2372a: Human DNA Quantitation Standard (March 2018)

Under production SRM 2391d PCR-based DNA Standard

Five components

- A-C three single-source components
- D one mixture; approximately 3:1 (F:M)
- E one component: cells spotted on FTA paper (from cell lines)

- Components A-D are DNA extracted from blood (not cell lines)
- Certified allele calls for U.S. core STR loci
- Characterized by CE- and NGS-based methods (SNPs, mitochondrial genome)
- Supports the FBI Quality Assurance Standards
Next Generation Sequencing

Allele frequencies from NIST population samples enable the use of sequence-based methods for typing STR markers.

89 alleles
24 alleles
Providing STR nomenclature support
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STRBase 2.0

https://strbase-b.nist.gov/

Under construction
Enhanced searching, sorting, downloading

Introduction

STRBase is a resource for Short Tandem Repeat and other human identification markers. Within this site, users can navigate, search, and download locus information such as reported variant alleles, tri-allele, and general information including genomic coordinates, allele size ranges, sequence motifs. Information is also available by kit or core set. Registered users can upload newly observed length-based variant alleles and receive alerts of new information on pages of interest.

Additionally, STRBase hosts content produced by NIST Applied Genetics: publications, presentations, population data, sample data sets, and information regarding Standard Reference Materials of interest to the Forensic DNA community.

STR data produced via next generation sequencing is cataloged separately in the STRSeq BioProject at NCBI, with sequence-specific tools and resources forthcoming at strseq.nist.gov.

Learn More →

News:

15 - 18 Oct-18 - STRBase 2.0 Launches beta test site!
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Other projects/activities

• Assessing DNA extraction efficiency

• Digital PCR for quantifying DNA
  • Understanding bias in qPCR measurements

• Use of probabilistic genotyping software for mixture analysis

• The use of SNP markers for ancestry and eye/hair color prediction

• IARPA – **Proteos** project - QC of DNA materials and eval. of extraction procedures
  • The use of proteins for human identification

• Various group member participating in forensic working groups
  • FBI-SWGDAM, OSAC, Forensic Laboratory Needs-TWG, NIJ-TWG, FBI RDNA task force
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Today

Characterization of noise in targeted sequencing of STR markers: Sarah Riman

Results from the 2018 Rapid DNA Maturity Assessment: Erica Romsos

Sequencing and standards for characterization of the mitochondrial genome: Kevin Kiesler

Funding

NIST Special Programs Office: Forensic DNA
FBI Biometrics Center of Excellence: Forensic DNA Typing as a Biometric tool.
NIJ: STRSeq and Nomenclature

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