Unmixing the Mixture with Next Generation Sequencing

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Cybergenetics

Ohio v. Slater Howell

On April 7, 2014, gas station clerk Babul Kumer Saha was killed before the store was robbed.

DNA Evidence

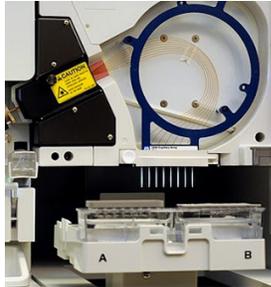DNA samples were collected from a gas pump button, a plastic bag, and a lottery cash register slot.

Capillary Electrophoresis (CE)

- Fragment analysis
- PCR based
- STR multiplex

TrueAllele on CE

Quantitative STR data at locus D10
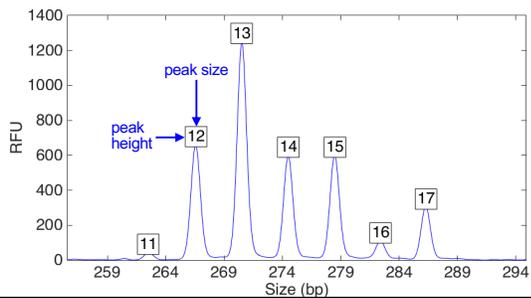
Explaining the CE data

Seven-person DNA mixture
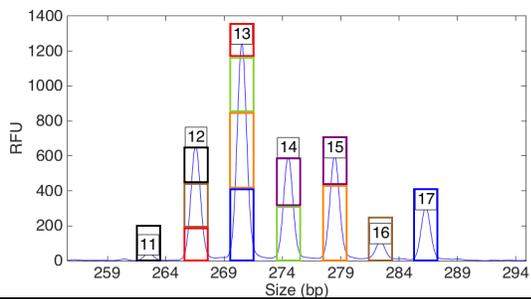
CE Likelihood Ratio (22 loci)
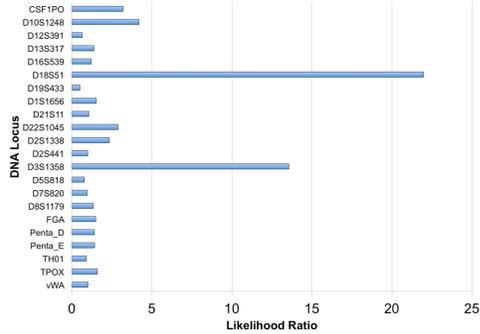
CE LR and error rate

A match between the **plastic bag**
and **Slater Howell** is:

98 thousand times more probable than a coincidental match.

For a match strength of 98 thousand,
only 1 in 119 million people would match as strongly.

Case outcome

In 2017, the jury found Howell guilty.

He was sentenced to life in prison.

TrueAllele Reliability

- Over 40 validation studies
  - 8 peer-reviewed publications
- Validated for up 10 unknown contributors
- 49 successful US admissibility rulings
  - 16 different states
  - 3 Ohio *Daubert* hearings
  - Federal court acceptance
  - Appellate precedent in 8 states

Next Generation Sequencing (NGS)

- Sequence analysis
- Bridge amplification
- STR & SNP multiplex

TrueAllele® Casework Validation of the Verogen ForenSeq DNA Signature Prep Kit Primer Set B and the MiSeq FGx™

Concordance (CE & NGS)

TrueAllele on NGS

Quantitative STR data at locus D12
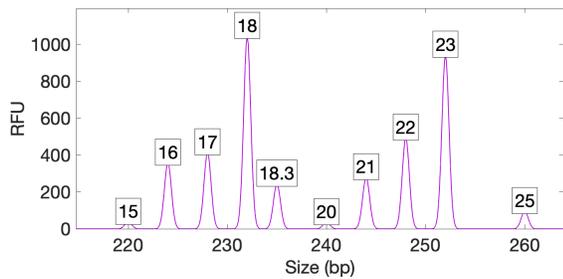
Explaining the NGS data

Seven-person DNA mixture
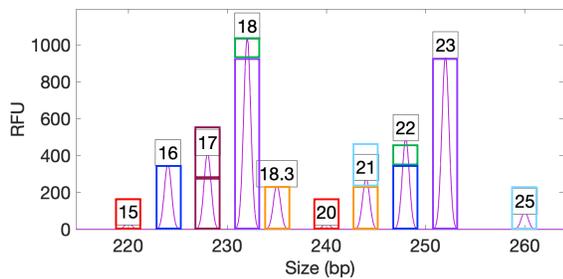
NGS Likelihood Ratio (27 loci)
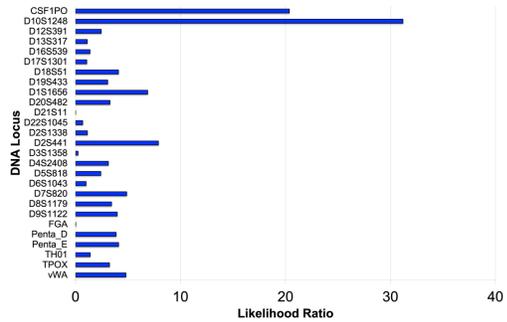
NGS LR and error rate

A match between the **evidence item**
and **the defendant** is:

29 million times more probable than a coincidental match.

For a match strength of 29 million,
only 1 in 12.4 billion people would match as strongly.

CE vs. NGS
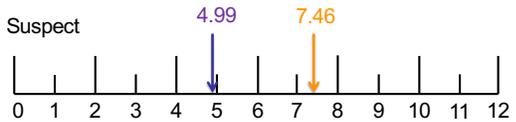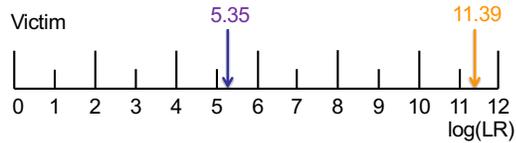

More loci, more information
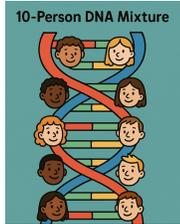
Conclusions

- TrueAllele inputs CE and NGS data
- TrueAllele solves 10-person mixtures
- NGS validation completed (2024)

10-Person DNA Mixture

More information

http://www.cybgen.com/information

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http://www.youtube.com/user/TrueAllele

TrueAllele YouTube channel

You Tube

Cybergenetics

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