

Touch DNA in the Massereene Attack

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Continuing Legal Education
Allegheny County Courthouse
February, 2012



Cybergenetics

Cybergenetics © 2003-2012

Abandoned Burned Car



DNA Evidence



passenger side
safety belt buckle

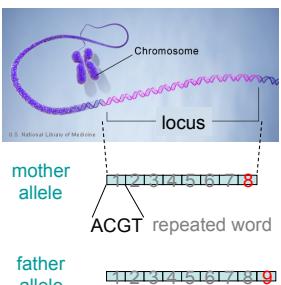


cell phone in
center console



match stick
at side of road

DNA Biology



A genetic locus has two DNA sentences, one from each parent.

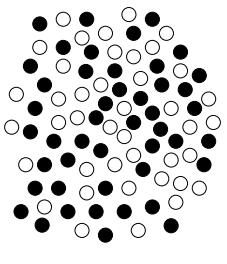
An **allele** is the number of repeated words.

A **genotype** at a locus is a pair of alleles.

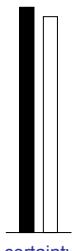
8, 9

Many alleles allow for many many allele pairs. A person's genotype is relatively unique.

Sample Alleles



many alleles



certainty

Touch DNA



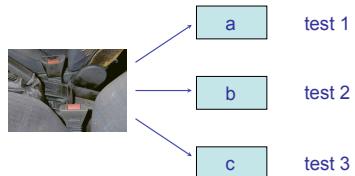
few alleles

realm of probability

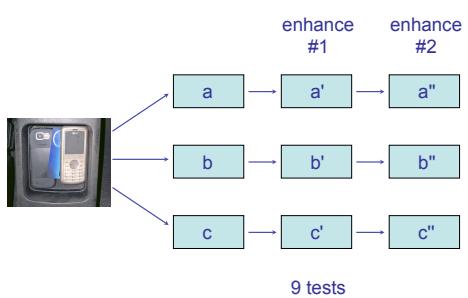


uncertainty

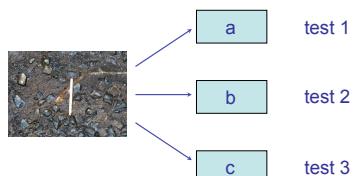
Cellmark Lab - Seat Buckle

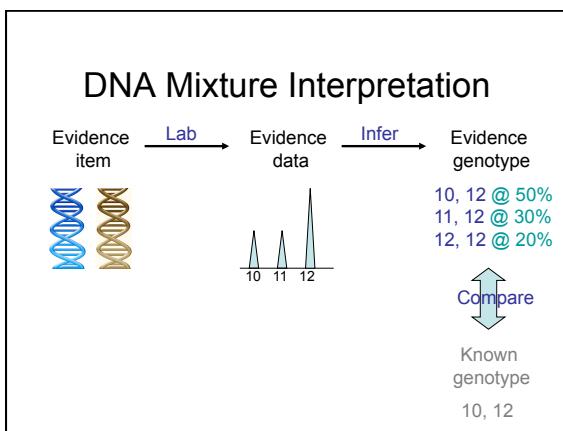


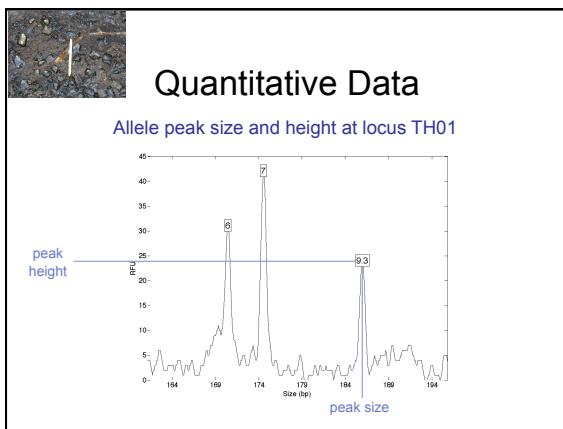
Cell Phone

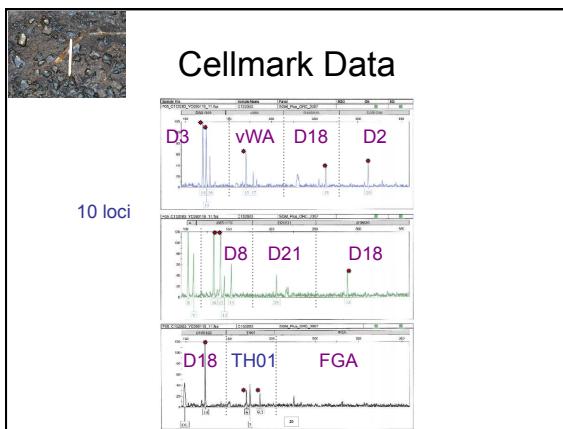


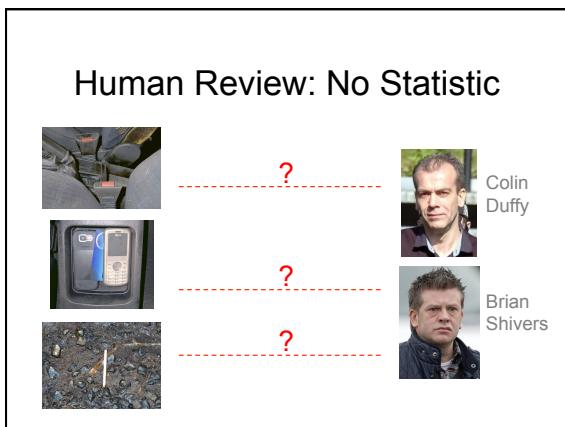
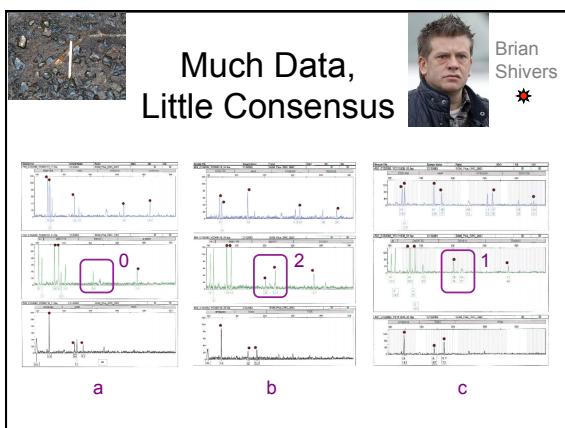
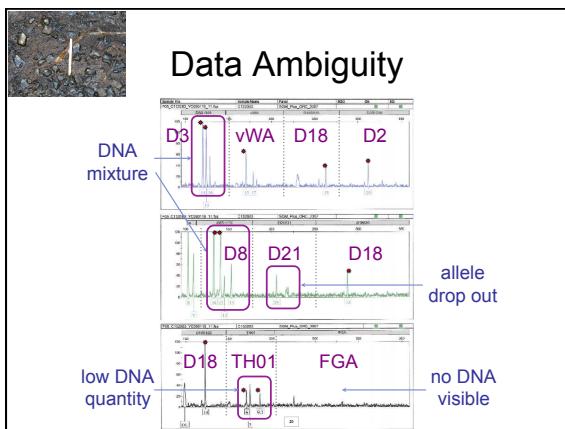
Match Stick





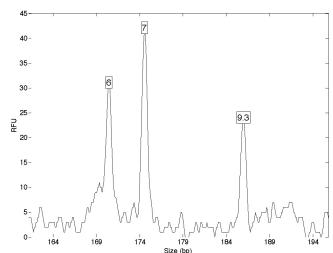






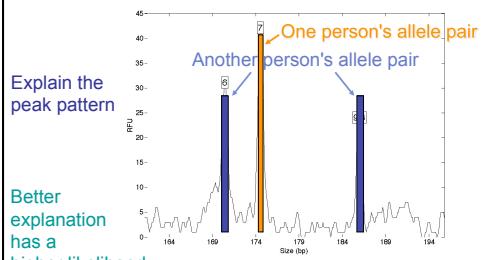
Computer Uses All the Data

Quantitative peak heights at locus TH01

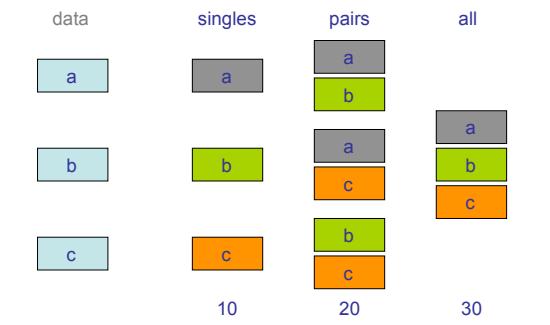


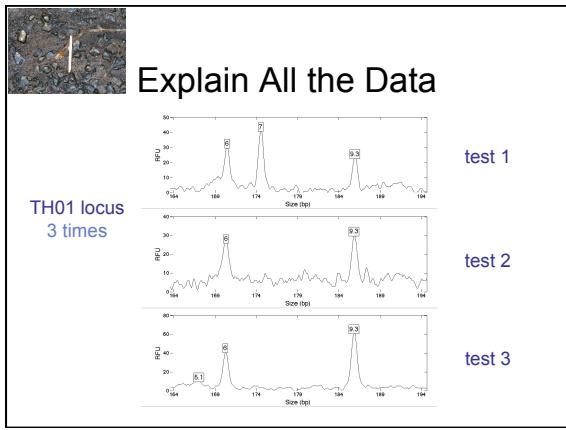
How the Computer Thinks

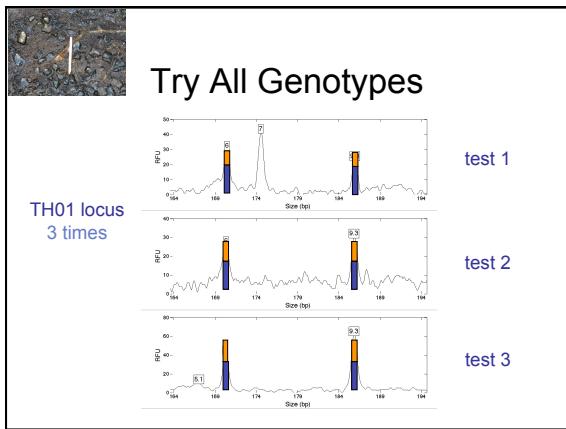
Consider every possible genotype solution

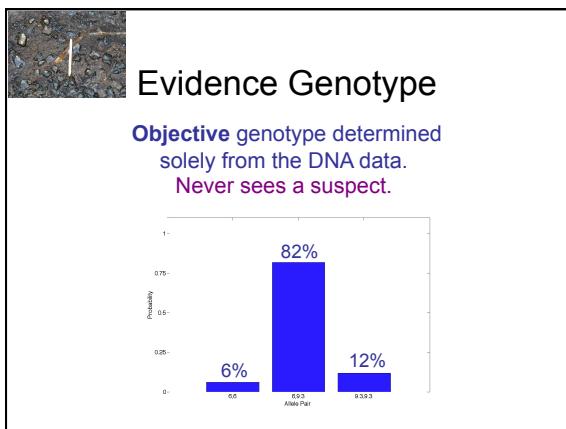


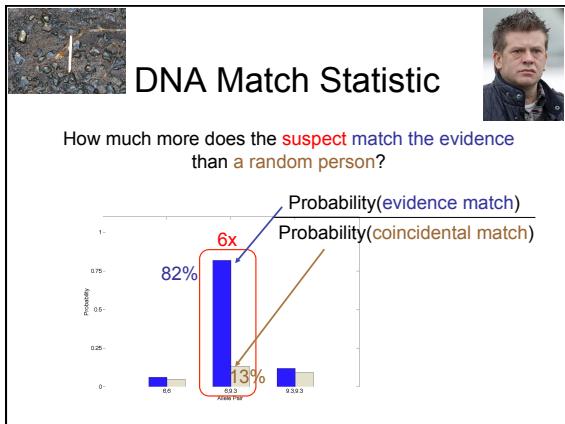
Cybergenetics Computing

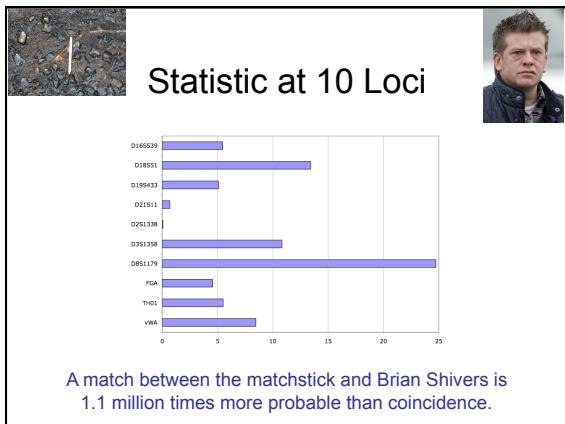


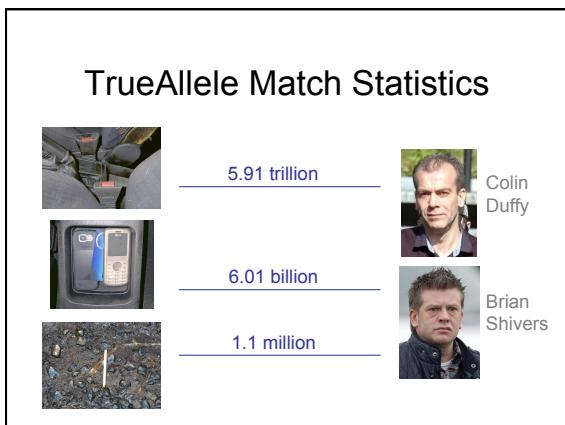












Direct Exam & Admissibility



- DNA Biology
- Mixture Evidence
- Human Review
- Probabilistic Genotypes
- TrueAllele Casework
- TrueAllele Validation
- Regulatory Approval
- Legal Precedent
- Published Method
- Readily Available
- Interpretation Admissibility
- Truth-Seeking Tool

Probabilistic Genotypes



- Probability - Laplace (1812)
- Genetics - Mendel (1865)
- Scientific Working Group on DNA Analysis Methods (2010)
- ANSI/NIST Forensic Data Interchange (2011)

TrueAllele Casework



- thorough
- objective
- informative
- relies on generally accepted scientific methods (articles)

TrueAllele Validation

- published peer-review validation papers
- ongoing studies in many DNA labs
- independent scientific presentations
- scientists rely on TrueAllele method
 - + NIST mixture standards
 - + laboratory instrument
 - + citation index

Regulatory Approval



May 26, 2011

Memorandum
For Reference: Mr. & Mrs. [redacted]
Re: DNA [redacted]
Commissioner, Mr. [redacted]

Sean Byrne, Acting Commissioner
Chair, Commission on Forensic Science
Division of State Police Services
1700 Park Ave., 10th Floor
Albany, NY 12247-0004
(518) 473-1000, ext. 2004
Dear Commissioners:

Pursuant to Executive Law § 89(9)(e) (1)(b) the DNA Subcommittee will assess and evaluate all DNA methodology proposed to be used for forensic purposes by law enforcement agencies.

At the May 20, 2011 meeting the DNA Subcommittee reviewed and evaluated the New York State Police TrueAllele® Validation developed by New York State Police and the University at Albany. The validation report is a leading benchmark for the TrueAllele® method. The validation report is available at the NYS Forensic Science Center by request for forensic use.

Very truly yours,

Jack Bellanca, Ph.D.
Chair, NYS DNA Subcommittee

cc: Gina L. Bianchi, Esq., Deputy Commissioner of Counsel, DCIS
NYS DNA Subcommittee Member
NYS Commission on Forensic Science Member

Legal Precedent

3/10/2008-11

2012 PA Super 31

COMMONWEALTH OF PENNSYLVANIA,
Appellee
v.
KEVIN JAMES FOLEY,
Appellant

No. 2039 HDA 2009

Appeal from the Judgment of Sentence of June 1, 2009
In the Court of Common Pleas of Indiana County
Criminal Division at No(s): CP-32-CB-0001170-2007

OPINION BY PANELLA, J. FILED: FEBRUARY 15, 2012
Appellant, Kevin James Foley, appeals from the judgment of sentence

entered on June 1, 2009, by the Honorable William J. Martin, President Judge of the Court of Common Pleas of Indiana County, Criminal Division.
After careful review, we affirm.

Because Foley has failed to establish the existence of a legitimate dispute over Dr. Perlin's methodology, he has failed to show that Dr. Perlin's testimony constituted "newer" scientific evidence. See *Betz*, 998 A.2d at 972. Therefore, we find that the trial court's decision to admit the testimony was not an abuse of discretion. Absent a legitimate dispute, there is no reason to "impede admissibility of evidence that will aid the trier of fact in the search for truth." *Id.*

Published Method

- Perlin MW, Sinevnikov A. *An information gap in DNA evidence interpretation*. PLoS ONE. 2009;4(12):e8327.
- Perlin MW. *Explaining the likelihood ratio in DNA mixture interpretation*. Promega's Twenty First International Symposium on Human Identification, San Antonio, TX. 2010.
- Perlin MW, Legler MM, Spencer CE, Smith JL, Allan WP, Belrose JL, Dueeman BW. *Validating TrueAllele® DNA mixture interpretation*. Journal of Forensic Sciences. 2011;56(6):1430-47.
- Cowell RG, Lauritsen SL, Mortera J. *Identification and separation of DNA mixtures using peak area information*. Forensic Science International. 2007;166(1):28–34.
- Curran J. *A MCMC method for resolving two person mixtures*. Sci Justice. 2008;4(8):168-77.
- Tvedebrink T, Eriksen PS, Mogensen HS, Morling N. *Identifying contributors of DNA mixtures by means of quantitative information of STR typing*. J Comput Biol. 2011;18(In press).

Readily Available

- TrueAllele available as a forensic service
 - crime labs purchase TrueAllele computers
 - World Trade Center DNA re-examination
 - used in domestic and foreign criminal cases
 - provided to prosecution, defense or court
 - lectures, presentations, publications, transcripts
- www.cybgen.com/information

Day 2: Cross Examination

DEFENSE: The People v Hector Espino, it was a DNA admissibility decision in which the judge said - this is not a legal point my Lord - he said: "We all understand the laws of physics apply from things, entire solar systems down to a grain of sand, but once you get to the atomic level all of a sudden all the rules change and the laws of physics don't apply and we have to start employing guesswork." Do you recognize the possibility that the theories that underpin your methods may not actually apply in the particular area that we are talking about?

WITNESS: No, I don't. Let me address your analogy. When you move from the world of Newton down to the world of Schroedinger at a sub-atomic level, you move from classical mechanics to quantum mechanics ... the laws of probability begin to apply to physics, and the answers to physics problems ... become probability distributions.

A 67 line answer, spanning 2 1/2 pages
and taking several minutes.
Leaving out the historical context,
and skipping ahead a page or so,
the response concludes:

When you move from a classical model, whether it is in physics or in DNA mixtures, it is necessary, as we observed historically in physics and we see again happening in DNA, that in order to get reliable, accurate and reproducible results scientifically, whether in theory or in practice, you must move to a probability model. Your alternative is to simply discard all your data and not make any inference at all, however properly applied as confirmed by validation studies. You move from a deterministic classical world into a probability world that may be less comfortable initially to the practitioners, but is a better description of reality and makes more informative and accurate use of the data that is provided.

So I appreciate your analogy of moving from classical physics to quantum mechanics, because that's exactly what we see with DNA mixtures, as you move to uncertain data based on multiple individuals, as well as low template DNA.

Day 3: Cross Examination

WITNESS: That is correct.

DEFENSE: That's 33% isn't it? Isn't it?

WITNESS: I am looking at --

DEFENSE: Dr. Perlin, can you follow my questions?

PROSECUTION: Allow him to answer in his own way.

DEFENSE: You have reported on 33%.

JUDGE: Mr. O'Connor, please don't interrupt the witness.

DEFENSE: He had given an answer.

JUDGE: Please do not interrupt the witness.

DEFENSE: Do you want a calculator?

JUDGE: Don't ask any further questions until he has answered.

Motion to Exclude

27 page statement
99 paragraphs

Propositions.

1. P's assessments of LR's in this case are inadmissible for the following reasons:
 - a. no sufficiently reliable basis been provided to the Court for P's method of assessing LR's.
 - b. P has failed to fulfil his duty of candour as an expert witness.
 - c. P has at the very least negligently misled the Court upon important aspects of his evidence.
 - d. P lacks the necessary impartiality to provide admissible expert evidence.

Admissibility Ruling

December 1, 2011
The Honorable Mr. Justice Hart

18 page ruling on TrueAllele, concluding:

I am satisfied that the stage has now been reached in the case of this system where it can be regarded as being reliable and accepted, and I am satisfied that Dr Perlis has given his evidence in a credible and reliable fashion. In the light of these conclusions I can see no basis on which I could properly exercise my discretion ... to exclude this evidence, and I therefore admit it in evidence.

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20 January 2012 Last updated at 18:22 ET 364 Share

Brian Shivers guilty of Massereene soldiers' killings

One of the men accused of murdering two soldiers at Massereene Barracks in Antrim has been found guilty on all charges and sentenced to life in prison.

Brian Shivers, 46, from Magherafelt was convicted of the murders of Mark Quinsey, 23, and Patrick Azimkar, 21.

They were shot dead by the Real IRA as they collected pizza in March 2009.

Shivers' co-accused, Colin Duffy, 44, from Lurgan was earlier acquitted of murdering the two soldiers.

Patrick Azimkar and Mark Quinsey were murdered in March 2009

Related Stories

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UNITED KINGDOM 

DNA Techniques Used In Massereene Conviction Could Pave Way For Future Trials



Press Association

A pioneering method of genetic analysis could have major implications in future UK trials after helping to deliver a conviction in the Massereene Baracks murder case.

The high-profile case in Antrim saw a pioneering method of analysing genetic samples recovered from a crime scene accepted in a British courtroom for the very first time, opening the way for its use in future trials.

The computer-based statistical technique has emerged as an alternative to the long-established human review process in the last decade.

American scientist Dr Mark Perlin, has been used to examine samples containing mixed DNA traces when traditional lab analysis failed to identify a clear genetic profile of an individual.

After interpreting the sample, Dr Perlin's computer programme derives a likelihood ratio on whether the profile obtained matches a suspect or victim.