

Preventing rape in the military through effective DNA computing

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Cybergenetics

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Preventing military rape

"Preventing the crime of sexual assault remains our focus."
United States Secretary of Defense Chuck Hagel



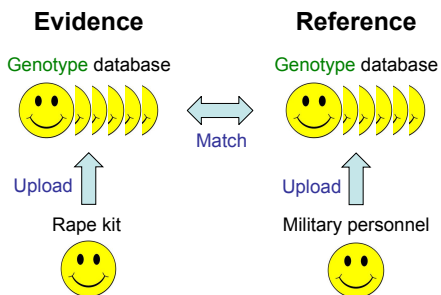
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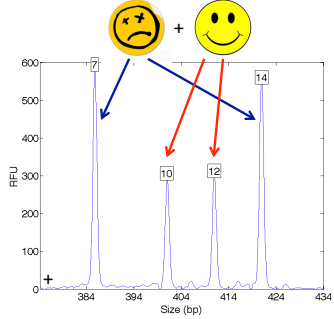
SUBJECT: Sexual Assault Prevention and Response

Eliminating sexual assault from our Armed Forces remains one of our top priorities. This effort requires our absolute and sustained commitment to providing a safe environment in which every Department Service member and civilian is free from the threat of sexual harassment and assault. Our success depends on a dynamic and responsive approach. We, therefore, must continually assess and strive to improve our prevention and response programs.

DNA database deterrent?

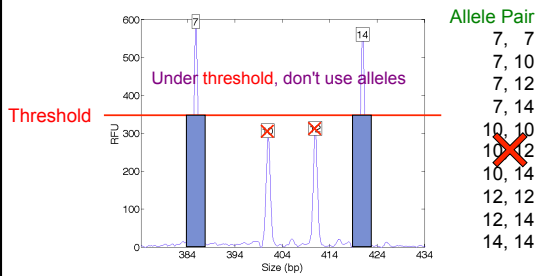


Rape: DNA mixture evidence



Problem: human thresholds

Simplify data for human review



Mixture database problem

Evidence

Allele database



Upload

Rape kit



Reference

Allele database

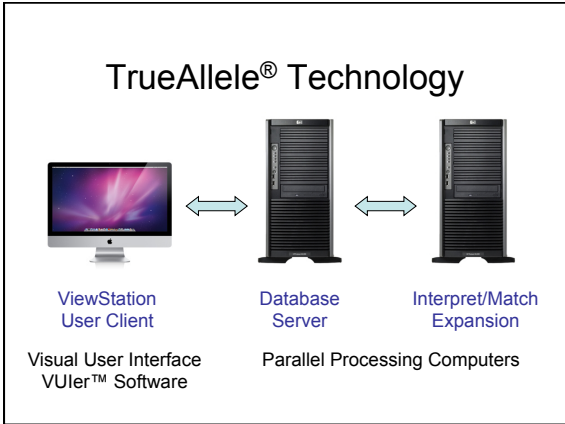


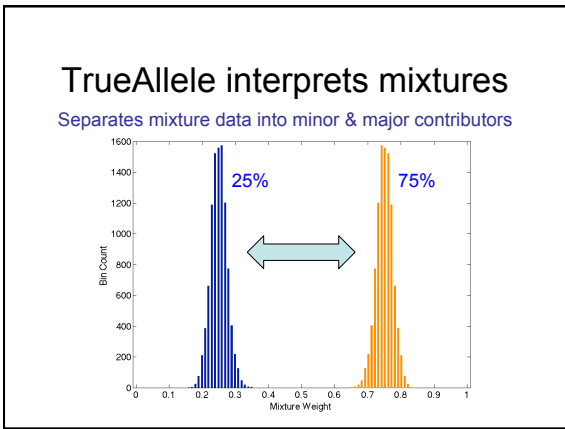
Match

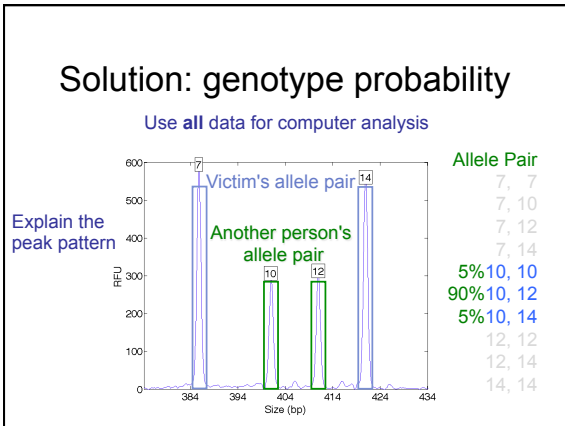
Upload

Military personnel









TrueAllele solves rape cases

Pittsburgh Post-Gazette

Man sentenced to 75-150 years for rape

April 17, 2014 11:43 PM

By Paula Reed Ward / Pittsburgh Post-Gazette

Skundrich was developed as a suspect after a DNA match was made in the national database in 2010. He went to trial in January and was found guilty of five counts of involuntary deviate sexual intercourse, as well as multiple counts of sexual assault, indecent assault, terroristic threats, simple assault and false imprisonment.

At trial, a DNA expert said the probability of the sample collected from the victim coming from Skundrich was 4.04 quadrillion times more likely than coincidence, Ms. Necessary said.

TrueAllele computer, over quadrillion
Lab's human review, under a million
(Billion-fold loss of information)

TrueAllele in criminal trials

About 200 case reports filed on DNA evidence

Court testimony:

- state
- federal
- military
- international

Crimes:

- armed robbery
- child abduction
- child molestation
- murder
- rape
- terrorism
- weapons

TrueAllele: validated & reliable

Perlin MW, Sineelnikov A. An information gap in DNA evidence interpretation. *PLoS ONE*. 2009;4(12):e8327.

Perlin MW, Legler MM, Spencer CE, Smith JL, Allan WP, Belrose JL, Duceman BW. Validating TrueAllele® DNA mixture interpretation. *Journal of Forensic Sciences*. 2011;56(6):1430-47.

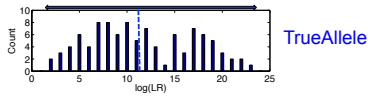
Ballantyne J, Hanson EK, Perlin MW. DNA mixture genotyping by probabilistic computer interpretation of binomially-sampled laser captured cell populations: Combining quantitative data for greater identification information. *Science & Justice*. 2013;53(2):103-14.

Perlin MW, Belrose JL, Duceman BW. New York State TrueAllele® Casework validation study. *Journal of Forensic Sciences*. 2013;58(6):1458-66.

Perlin MW, Dormer K, Hornyak J, Schiermeier-Wood L, Greenspoon S. TrueAllele® Casework on Virginia DNA mixture evidence: computer and manual interpretation in 72 reported criminal cases. *PLoS ONE*. 2014;9(3):e92837.

TrueAllele preserves information

11.05
113 billion



OPEN ACCESS Freely available online

PLOS ONE

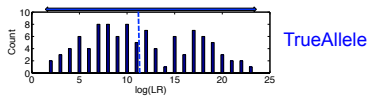
TrueAllele Casework on Virginia DNA Mixture Evidence: Computer and Manual Interpretation in 72 Reported Criminal Cases

Mark W. Perlin^{1*}, Kiersten Dörner¹, Jennifer Hornyak¹, Lisa Schliermeier-Wood², Susan Greenspoon²

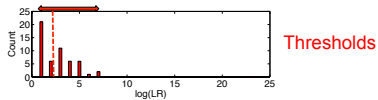
¹ Cybergenetics, Pittsburgh, Pennsylvania, United States of America, ² Department of Forensic Science, Richmond, Virginia, United States of America

Human thresholds lose information

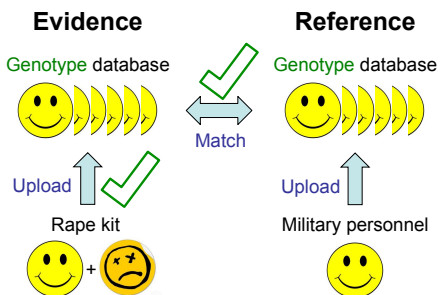
11.05
113 billion



2.15
140



TrueAllele mixture database



World Trade Center attack

September 11, 2001 in New York City, USA



Over 2,700 victims



WTC TrueAllele database

victim remains

missing people



match



1. Collect DNA from all military

Reference

Genotype database



Upload



Military personnel

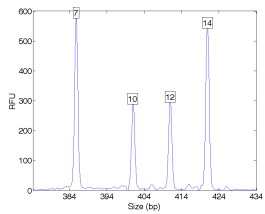



2. Collect DNA from all rapes

- rape crime must be reported
- rape kit must be collected
- but attacker need not be named

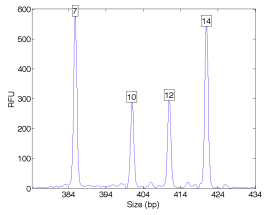


3. Rapidly process rape kits



 Cybergenetics

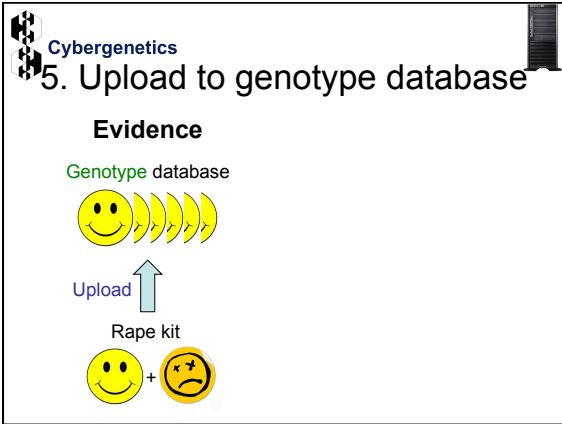
4. Accurately interpret DNA

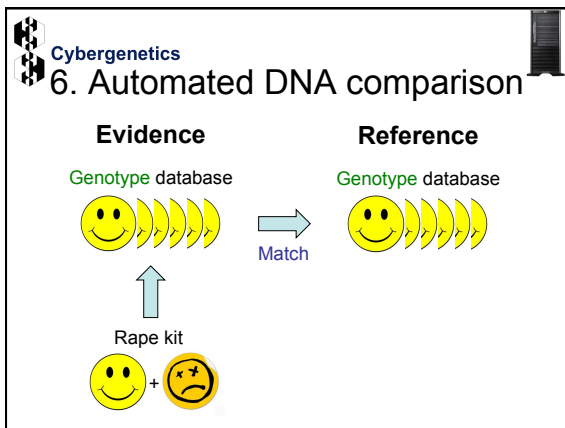


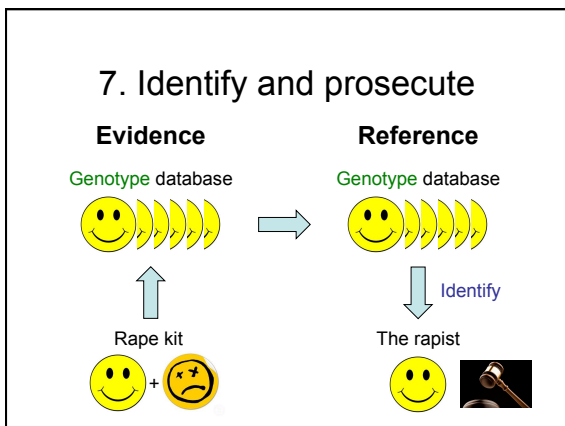
Genotype probability

- 7, 7
- 7, 10
- 7, 12
- 7, 14
- 5% 10, 10
- 90% 10, 12
- 5% 10, 14
- 12, 12
- 12, 14
- 14, 14

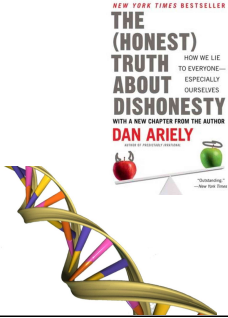
Rape kit







Prevent rape by DNA monitoring



Monitoring helps prevent people from behaving badly.

TrueAllele computing for genetic surveillance to deter rape in the military.

More TrueAllele information

<http://www.cybgen.com/information>



- Courses
- Newsletters
- Newsroom
- Presentations
- Publications

<http://www.youtube.com/user/TrueAllele>
TrueAllele YouTube channel