History of Eugenics

Started in England by Sir Francis Galton
“the more suitable races or strains of blood a better chance of prevailing speedily over the less suitable.”

History of Eugenics

Charles Davenport started the Eugenics Records Office; directed by Harry Laughlin 1910-1939

In 1910, Davenport published *Eugenics: The Science of Human Improvement though Better Breeding*

In Congress, Laughlin testified that Southern and Eastern Europeans inferior to Northern Europeans. Led to National Origins Act (Immigration Act of 1924) that restricted immigration

By 1935, 30 states had eugenic sterilization laws
21,000 people had been sterilized
50% in California

Mental patients and epileptics could be sterilized
1942 Supreme Court struck down law allowing forced sterilizations of criminals.

Some sterilizations continued into the 1970s

History of Eugenics

2002 Virginia Governor apologizes for the Buck vs Bell case

"The eugenics movement was a shameful effort in which state government never should have been involved."

Mark Warner
History of Eugenics

Science behind eugenics discredited by 30s
Eugenics Records Office closed in 1939
1927 Rockefeller Foundation provides funds for Kaiser Wilhelm Institute of Anthropology, Human Genetics, and Eugenics
Directed by Eugen Fischer, author of Principles of Human Heredity and Race Hygiene

History of Eugenics
1933 Hitler charged the medical profession with the task of implementing a national program of race hygiene.
Passage of an act permitting sterilization of feebleminded, mentally ill, epileptics, and alcoholics.
Within a year, more than 50,000 sterilizations were ordered.
1939 400,000 people had been sterilized.

"If they [eugenicists] want to do this sort of thing, well and good...but I think it is just as well for some of us to set a better standard, and not appear as participators in the show. I have no desire to make any fuss.'
Thomas Hunt Morgan, 1915

"People keep asking me why I do not rebut The Bell Curve. The answer is because it is so stupid, it is not rebuttable."
David Botstein, 1997

DNA Forensics

How does it work?
99.9% of DNA sequences identical among individuals.
Look at sequences that differ.

Isolate DNA
From suspect: cheek swab
From crime scene

What type of analysis is used?

PCR is the basis for most current analysis

Because it is so sensitive!!!!

PCR can be used to detect:

Single Nucleotide Polymorphisms (SNPs)

Difference detected by DNA sequencing

Short Tandem Repeats (STRs)

Differences detected by observing the sizes of the PCR products.

How do we calculate probabilities?

We have a DNA sample from a crime scene, and it matches the suspect’s DNA for a single STR. What is the likelihood of this happening by chance?

Let’s say that there are 7-44 repeats at this STR locus or 38 possible alleles.

Both the DNA sample and the suspect have 22 and 31 repeats at this locus. In other words, one chromosome has 22 copies of the repeat; the other 31.

If we spin the roulette wheel twice, the probability of getting a 22 and a 31 is:

\[ \frac{2}{38} \times \frac{1}{38} = \frac{1}{722} \]

With more STR loci, we can be more confident that we have the right person. The lack of a match means the suspect cannot be the person that left the DNA sample.

Qualifiers

Not all alleles have an equal probability, so the frequencies of each allele is estimated by measuring its frequency in a sample of the population.

Different groups will have different allele frequencies.
CODIS: forensic science and computer technology
CODIS began as a pilot project in 1990 serving 14 state and local laboratories
The DNA Identification Act of 1994 formalized the FBI’s authority to establish a national DNA index for law enforcement
The National DNA Index System (NDIS) became operational in 1998

CODIS is used for
- Identification of criminals
- Identification of family members
- Identification in certain fatality cases

13 CODIS Core STR Loci with Chromosomal Positions

The Forensic Index contains DNA profiles from crime scene evidence.
The Offender Index contains DNA profiles of individuals convicted of sex offenses (and other violent crimes) with many states now expanding legislation to include other felonies.

Through February 2007
*Investigations Aided* is a metric that tracks the number of criminal investigations where CODIS has added value to the investigative process.
California

Statistical Information

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<th>Total</th>
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Clark McMillan

- Year of Incident: 1979
- Jurisdiction: TN
- Charge: Rape, Robbery
- Conviction: Aggravated Rape, Robbery With A Deadly Weapon
- Sentence: 119 Years
- Year of Conviction: 1980
- Year of Exoneration: 2002
- Sentence Served: 22 Years
- Real perpetrator found? Yes
- Contributing Causes: Eyewitness Misidentification

http://www.innocenceproject.org/