History of the dna and forensics criminology essay

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Wyman established the foundation for the concept with the hallmark observation and White (1980) of a polymorphic DNA locus characterized by a number of variable-length restriction fragments called restriction fragment length polymorphisms (RFLPs). The history of DNA fingerprinting, is even more recent, dating from 1985 with the paper " Hypervariable Minisatellite Regions in Human DNA" by Alex Jeffreys et-al (Kirby, 1998 p. 19)

In 1985, a routine investigation into the structure of a human gene led to a breakthrough discovery that portions of the DNA structure of certain genes are as unique to each individual as fingerprints. Alec Jeffrey and his colleagues at Leicester University, England, responsible for these revelations, named the process for isolating and reading these DNA markers DNA fingerprinting. As researchers' uncovered new approaches and variations to the original Jeffrey's technique, the terms DNA profiling and DNA typing became applied to describe this relatively new technology (Saferstein, 2011p. 226). The theory that a criminal perpetrator leaves a part of himself at the scene of a crime and takes a piece of the crime site with him was postulated by Edmund Locard Lyon, of France, who established the world's first crime lab. Referred to as the Locard exchange principle, this idea, along with the need to reconstruct what took place at the site of a criminal act, is the basic rationale behind crime-scene investigation (Fisher, p 4). " The term " associative evidence" describes traces of things that, pursuant to the Locard principle, connect a suspect to or associate him with the scene of an offense" (Fisher, 2008 p. 4)

Benefits of DNA in society

Through the discovery of deoxyribonucleic acid (DNA), the deciphering of its structure and the decoding of its genetic information our understanding of the underlying concepts of inheritance changed and expanded. Molecular biologists are unraveling the basic structure of genes at an incredible pace; we are now able to create new products through genetic engineering and develop diagnostic tools and treatments for genetic disorders (Saferstein, 2011 p. 266).

How DNA affects investigations?

The legal system, in both the criminal and civil arenas, may well be revolutionized by the advent of forensic DNA typing. One state trial judge has written that DNA typing " can constitute the single greatest advance in the ' search for truth,' and the goal of convicting the guilty and acquitting the innocent, since the advent of cross-examination." People v. Wesley, 140 Misc. 2d 306, 533 N. Y. S. 2d 643 (Co. Ct. 1988) (Kirby, 1993 p. 206).

DNA identification analysis, identity testing, profiling, fingerprinting, typing, or genotyping refers to the characterization of one or more relatively rare features of an individuals' genome or hereditary makeup. Every human, has a characteristic phenotype or physical appearance because each possesses a unique hereditary composition. An exception to this rule is identical twins, because they possess the same unique genotype but, because of the consequences of developmental events, have faintly different phenotypes. The DNA of any individual is identical whether extracted from hair bulbs, white blood cells, or a semen specimen. The uniqueness and identical DNA structure within all tissues of the same body provide the basis for DNA

profiling (Kirby, 1993 p. 18). The forensic applications of DNA typing are limited only by precaution and alertness of the criminal mind. Regardless of the type of crime committed, whatever trace evidence is appropriate for DNA analysis, left behind by the perpetrator, is later recovered by the police. Forensic test results can prove to be important investigative tools. Most frequently, such evidence will be found because of violent crimes (Kirby, 1993 p. 207).

What Controversies are there in the use of DNA evidence in criminal cases?

The inventor of DNA fingerprinting Professor Sir Alec Jeffreys, recently launched a candid attack on the way the genetic profiles of suspects in the UK who have been cleared of any crime are still stored by the authorities. He believes that the practice of storing the genetic profiles of suspects who have not been found guilty of a crime is a step too far. Professor Jeffreys said, “ The practice was discriminatory and measures should be taken to safeguard against particular individuals or groups being targeted”. In addition, he called for the creation of a national database, storing the profiles of the entire UK population, managed by an independent body. He said, “ If we’re all on the database, we’re all in exactly the same boat – the issue of discrimination disappears.” Another potential problem according to a number of scientists is that as the database grows the probability of two very similar profiles from two different people emerging increases (Anonymous, 2002). These arguments are echoed in the United States as well.

For police and prosecutors, DNA science has been a double-edged sword; Thousands of rapists and killers have been identified by DNA and sent to

prison. On the other hand, DNA technology also reveals flaws in other forensic sciences such as bite-mark and hair follicle identification. It has also exposed weaknesses and corruption in the way crimes are investigated (Fisher, J. 2008 p 231).

What Benefits are there in the use of DNA Evidence?

The forensic science community finds DNA of great value because forensic scientists now have the ability to link biological evidence such as blood, semen, hair, or tissue to a single individual with confidence (Saferstein, 2011 p. 266).

What improvements can be made in the use of DNA in Criminalistics?

In an effort to improve the crime-fighting potential of DNA profiling, the FBI initiated a pilot project called Combined DNA Index System (CODIS). The program would link data banks across the country housing computerized collections of DNA profiles of arrested felons. Investigators would be able to submit an unknown DNA profile for identification by activating one computer instead of running the evidence through dozens of statewide systems. An evidence submission that matches a DNA profile in one of the databases is called a hit, when such a computer match is made; it is tantamount to solving the crime and proving who committed it. CODIS promised a crime-fighting potential equal to the FBI’s Integrated Automatic Fingerprint Identification System. Even better, the criminals caught by CODIS would be the worst of the worst- rapists, child molesters, and sexually motivated killers serial offenders all (Fisher, 2008 pp. 231-2).

The National DNA Index (NDIS) contains over 9, 535, 059 offender profiles and 366, 762 forensic profiles as of March 2011. Ultimately, the success of the CODIS program will be measured by the crimes it helps to solve. CODIS's primary metric, the " Investigation Aided," tracks the number of criminal investigations where CODIS has added value to the investigative process. As of March 2011, CODIS has produced over 141, 000 hits assisting in more than 135, 500 investigations (FBI)

The United States is having a backlog handling all of the data being submitted to the forensic laboratories. There are two types: (1) casework backlogs and (2) convicted offender and arrestee DNA backlogs (DNA. gov , n. d.).

The demand for DNA testing is rising primarily because of increased awareness of the potential for DNA evidence to help solve cases. The demand is coming from two primary sources: (1) the increased amount of DNA evidence collected in criminal cases and (2) the expanded effort to collect DNA samples from convicted felons and arrested persons. According to a 2010 report from the National Instituted of Justice " Until laboratories can meet the rising demand for DNA services and until their capacity to process samples is greater than the demand, backlogs will continue to exist and increase in proportion to the demand for services" (Nelson, 2010). Crime laboratories are processing more cases than ever before, however expanded capacity to meet the increased demand (Nelson, 2010).

What is in the future of DNA in society and what benefits will they bring to the criminalistics and forensic investigations?

In the future, we will be able to determine the color of a person’s hair and eyes though a sample of DNA taken from blood, sperm, saliva or other biological materials relevant in forensic case work. Criminals can run, but they might be leaving some incriminating evidence behind. Scientists have figured out how to use DNA information to predict a person’s hair color. In the near future, DNA from blood, sperm or saliva samples being used to help track down an unknown perpetrator.

Dutch researchers from Erasmus Medical Center and their collaborators in Poland have discovered 13 genetic markers in 11 genes that can be used to predict hair color. The research was published in the journal Human Genetics, where scientists, claim they can predict if a person has red hair or black hair with 90% accuracy. When it comes to predicting if a person has blond or brown hair, the scientists claim to be 80% accurate. The scientists can also predict different shades of hair color, so people with dirty blond hair or other unusual colors can be tracked down too (Dickinson, B. 2011).

The necessary DNA can be taken from blood, sperm, saliva or other biological materials relevant in forensic casework. Prof. Manfred Kayser, Chair of the Department of Forensic Molecular Biology at Erasmus MC, who led the study, stated, “ That we are now making it possible to predict different hair colors from DNA represents a major breakthrough as, so far, only red hair color (which is rare) could be estimated from DNA. For our research, we made use of the DNA and hair color information of hundreds of Europeans and investigated genes previously known to influence the differences in hair color. We identified 13 ‘ DNA markers’ from 11 genes that are informative to predict a person’s hair color.”

Predictability Prof. Ate Kloosterman, of the Department of Human Biological Traces at the Netherlands Forensic Institute (NFI) said: “ This research lays the scientific basis for the development of a DNA test for hair color prediction. A validated DNA test system for hair color shall become available for forensic research in the not too distant future (Erasmus Medical Center 2011).

This study might pave the way for yet another DNA test that would give forensic scientists more tools to crack unsolved mysteries. Predicting human phenotypes like a person’s hair color would certainly give crime fighters an edge Dickinson, B. 2011).

DNA and its application to Criminalistics are changing the way evidence is pursued. The past decade has seen enormous advances in this powerful criminal justice tool: deoxyribonucleic acid, or DNA. DNA can be used to identify criminals with incredible accuracy when biological evidence exists. Similarly, DNA evidence can be implemented to clear suspects and exonerate persons mistakenly accused or convicted of crimes. DNA technology is increasingly vital to ensuring accuracy and fairness in the criminal justice system.

We take for granted all the progress that has been made in the last few decades due to new breakthroughs in science. DNA has not only affected science and medicine in our society but it also has affected the judicial system, and the way we conduct our criminal cases in the courts of the United States.