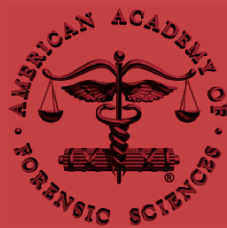


PROCEEDINGS

*American
Academy
of Forensic
Sciences*



*66th Annual Scientific Meeting
Seattle, WA
February 17-22, 2014*



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PROCEEDINGS

of the American Academy of Forensic Sciences
66th Annual Scientific Meeting

The *Proceedings* of the American Academy of Forensic Sciences is an official publication of the American Academy of Forensic Sciences (AAFS). It is devoted to the publication of the abstracts of technical oral papers and posters presented at the AAFS annual scientific meeting. These include various branches of the forensic sciences such as pathology, toxicology, physical anthropology, psychiatry, immunology, odontology, jurisprudence, criminalistics, questioned documents, digital evidence, and engineering. Similar submissions dealing with forensic oriented aspects of the social sciences are also included.

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behaviors.

Emotional responses are controlled by a complex system of neurotransmitters in the brain. Genetic polymorphisms located in the coding genes of neurotransmitter receptors, enzymes, and transporters have been shown to modulate the transcription of these proteins. The interaction and modulation of central neurotransmitters and related proteins (receptors, transporters, and metabolic enzymes) affect emotional behaviors such as aggression. Associations between aggressive behavior and specific polymorphisms on the Androgen Receptor (AR), the Monoamine Oxidase A (MAOA-VNTR), and the serotonin transporter (5-HTTLPR) genes have been previously reported. This research intends to compare the allele frequencies of repeat variants located in AR, MAOA, and 5-HTT genes between inmates and a control population of Texas. Buccal swabs were collected from male inmates incarcerated at a jail located in southern Texas (N=98) and from control male students at Sam Houston State University (N=93). All samples were extracted using organic extraction with ethanol precipitation, quantified, amplified, and then analyzed by capillary electrophoresis with fluorescent detection. For 5-HTT, departures from the Hardy-Weinberg equilibrium were detected in the inmate sample ($p < 0.01$) but not in the control group. Significant differences were observed in allele frequencies of MAOA-VNTR ($p < 0.05$) and AR ($p < 0.01$) but not in 5-HTT, when both samples were compared. MAOA alleles 2 and 3 showed higher frequency in the inmate sample. Research has shown that alleles 3.5 or 4 are transcribed more efficiently, whereas alleles 2, 3, or 5 show lower levels of transcription. Allele 4 has been classified as a high-activity MAOA allele, while alleles 2 and 3 are known as low-activity MAOA alleles. The low-activity MAOA has been associated in past studies with increased levels of antisocial and criminal behavior. Higher frequency of shorter AR alleles (<23 repeats) was also detected in the inmate group. Previous studies have shown that shorter Cytosine-Adenine-Guanine (CAG) repeats are associated with impulsive-disinhibited personality traits and increased verbal aggression. Although no significant differences were detected in 5-HTT, the very long allele was observed only in the inmate sample. The results obtained for the AR and MAOA polymorphisms support the hypothesis that the inmate population would display a higher frequency of short repeats which, in turn, is associated with aggressive behavior.

However, contrary to the hypothesis, no differences were observed for the 5-HTT polymorphism. This discrepancy may be attributed to the limited size of the sample. Overall, the results support current studies in human and animal models; however, much research is still required to understand the complex mechanisms which regulate aggressive behaviors.

Monoamine-Oxidase, Serotonin Transporter, Androgen Receptor

13 47, XYY Karyotype and Deviance: A Case Report

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After attending this presentation, attendees will be able to discuss the influence of genetics on criminal behavior and will understand how to approach a case of psychiatric evaluation on a subject affected by a chromosomal abnormality.

This presentation will impact the forensic science community by demonstrating how clinical evaluation can promote

accurate and complete knowledge of an individual.

The case report concerns a young Italian man afflicted by Borderline Personality Disorder and Jacobs' Syndrome, which consists of a 47,XYY karyotype. The additional Y-chromosome derives from paternal meiosis II non-disjunction or postzygotic mitotic non-disjunction.

The prevalence of XYY Sex Chromosome Abnormalities (SCAs) in newborns is as high as 1:1000, but they are often unidentified because they are not necessarily associated with gross physical or cognitive impairments, and may never come to the attention of medical personnel. The only common and obvious features are high stature (greater than six feet) and a strong build.

The young man in this case report frequently exhibited violent behavior toward his relatives, and the court asked for an evaluation of his mental condition. Forensic psychiatrists expressed their opinions regarding his danger to society and criminal liability by analyzing the influences on his behavior from both his mental and genetic conditions. During the 1960s and the 1970s, some studies postulated that Jacobs' Syndrome can lead to aggressive behavior, but the statistical certainty of this association was questioned. Some experts hypothesized that these subjects' increased tendencies to commit crimes is not due to underlying aggression, but rather to associated intellectual deficits, since the presence of an additional Y-chromosome is related to cognitive disorders and deficits in intelligence. Other authorities hypothesized that these men are more easily recognized as offenders because of physical characteristics (e.g., high stature and stocky build), making them more identifiable.

More recent developments in genetics and neuroimaging have led to new publications on the relationship between the presence of an extra Y-chromosome and social function. According to the results of these studies, there is no significant evidence that people affected by Jacobs' Syndrome are necessarily antisocial or deviant. Such behaviors are indeed thought to have multifactorial etiologies, in which the genetic component may play some role, but should not be considered the sole cause.

Even today, there are differing opinions about the relevance of Jacobs' Syndrome in the forensic psychiatric assessment of societal danger and criminal liability, hence the importance of clinical evaluations and findings to promote an accurate and complete knowledge of individuals. This presentation concludes by reporting the accused's statements, revealing his personal feelings about the role his karyotype has played in influencing his criminal behaviour.

Jacobs' Syndrome, Genetics, Deviance

14 Neurogenetic Basis of Criminal Behaviors in Klinefelter Syndrome: A Case of Uxoricide-Suicide and a Review of the Literature

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After attending this presentation, attendees will be able to better understand cases of Klinefelter Syndrome.

This presentation will impact the forensic science