I18 Relationship of Oxytocin (OXT) and the Serotonin Transporter (5-HTT) Single Nucleotide Polymorphisms and Antisocial Behavior

Elizabeth Chesna, BS, Sam Houston State University, Dept of Forensic Science, 1003 Bowers Boulevard, Huntsville, TX 77340; Charity M. Beherec, MS, Texas DPS, 1404 Lubbock Business Park Boulevard, Ste 200, Lubbock, TX 79403; Gabriella Cansino-Jones, MS, 19790 Highway 105 W, Apt 1334, Montgomery, TX 77356; Peyton Gandy, MSFS, 2052 Myrtle, Unit 3, Dover, DE 19901; Jessica Wells, MS, Department of Criminal Justice and Criminology, 816 17th Street, Huntsville, TX 77340; Danielle Boisvert, PhD, Department of Criminal Justice and Criminology, 816 17th Street, Huntsville, TX 77340; Todd Armstrong, PhD, Sam Houston State University, College of Criminal Justice, 816 17th Street, Huntsville, TX 77320; Sheree R. Hughes-Stamm, PhD, Sam Houston State University, Dept of Forensic Science, Huntsville, TX 77340; and David A. Gangitano, PhD, Sam Houston State University, 13906 Paradise Valley Drive, Houston, TX 77069*

After attending this presentation, attendees will have gained knowledge about the relationship between Single Nucleotide Polymorphisms (SNPs) associated with genes for oxytocin and the serotonin transporter and specific behavioral traits. Furthermore, attendees will learn about the use of Massive Parallel Sequencing (MPS) in the behavioral genetics and forensic psychiatry field.

This presentation will impact the forensic science community by demonstrating how aggressive and antisocial behavior have become a major problem as the United States currently has the highest incarceration rate in the world. Moreover, these behaviors are some of the leading causes of mental health referrals. The strong heritability and environmental issues surrounding criminal activity indicates that the underlying genetics can help explain at least some features related to these behaviors.

Behavior is a complex process influenced by both genetics and the environment. Some neurotransmitters, including OXT and 5-HT have been associated with social behavioral traits. Certain genes (such as the genes of receptors, transporters, and enzymes involved in metabolic pathways of these neurotransmitters) are associated with OXT and 5-HT. These genes contain polymorphic sites that can be studied to relate or link to certain behavioral traits. SNPs are single base variations located at a specific location on the genome and considered to be the most abundant type of polymorphism in humans. While some associations between SNPs and behavior have been made, many studies have been limited on the number of SNPs due to conventional methods. MPS is a new technology that provides an opportunity to analyze a large number of SNPs simultaneously.

This study analyzed two SNPs located within the intronic region of OXT gene (rs877172 and rs4813625) and three SNPs located within the 5-HTT (rs25531, rs6314 exonic, and rs6311) using Single Base Extension (SBE) and MPS with a custom-designed panel of SNPs linked or related to genes of neurotransmitters. A student sample set (N=100) was genotyped and individuals participated in a survey designed to assess behavioral traits.

Two OXT SNPs were analyzed using both techniques and for all samples, the alleles called were 100% concordant. These results indicate that the custom primer panel may be used to assess a large panel of behavioral markers at once. It was also found that OXT and 5-HT may have an impact on social behavior. Statistically significant associations were found between two SNPs (rs25531 and rs877172) and behavioral traits, including antisocial behavior, drug use/distribution, and property crimes.

The results of this study provide some evidence that OXT and 5-HT can influence behavior. It was found that SNPs associated with 5-HT and OXT influence behaviors, including drug use/distribution, property crimes, and antisocial behavior. Also, MPS may be used in the forensic psychiatry and behavioral sciences field to analyze several SNPs related to multiple behaviors simultaneously. This large panel of behavioral SNPs may be used in early prevention or treatment of psychiatric disorders, which has a large impact on the medical field and criminal justice system. Furthermore, understanding the influence of OXT and 5-HT on behavior may help explain the etiology of aggressive and antisocial behavior.

Single Nucleotide Polymorphism, Oxytocin, Serotonin