I32 MAOA, the Warrior Gene: Skirmishes, Battles, and Truce

James S. Walker, PhD, and Stephen A. Montgomery, MD*, Vanderiblt University School of Medicine, 1601 23rd Avenue South, Nashville, TN 37212; and William Bernet, MD*, Vanderbilt Psychiatric Hospital, 1601 23rd Avenue South, Suite 3050, Nashville, TN 37212-3182*

After attending this presentation, attendees will learn an evidence based and ethical approach to testifying about behavioral genomics at criminal trials.

This presentation will impact the forensic science community by improving the relevance, reliability, and validity of testimony regarding behavioral genomics at criminal trials.

Considerable research suggests that a gene x environment (G x E) interaction occurs between the *MAOA* gene (sometimes called the "warrior gene") and childhood maltreatment. Individuals with the low activity *MAOA* allele and a history of serious child abuse are reportedly much more likely to be antisocial and commit violent crimes than individuals with neither of these risk factors. This presentation – which is particularly relevant to the theme of this Annual Meeting, "Relevant, Reliable, and Valid Forensic Science" – describes the proper use of testimony regarding this G x E interaction at criminal trials.

James S. Walker, PhD, will present, *"Skirmishes between Law and Neuroscience: A Brief History of the MAOA Gene and Its Implications for Criminal Responsibility."* Adult behavior is presumably the result of interaction among one's genetic constitution, the person's life experiences, and each individual's personal choices. As neuroscientists have rapidly advanced our understanding of the human mind through the study of behavioral genomics and brain imaging, challenging questions have arisen. What is the neuroscientific basis for our experience of "free will?" Should jurisprudence take neuroscience into consideration when addressing criminal responsibility? When sentencing occurs, should some G x E interactions be considered mitigating factors, while others are aggravating factors? How have the courts addressed neuroscientific explanations of criminal behavior?

Stephen A. Montgomery, MD, will present, *"Battle Lines: Research For and Against the Hypothesis that a Gene x Environment Interaction Is a Risk Factor for Future Violence."* The theory that a G x E interaction is a risk factor for future violence was first proposed in an important paper by Avshalom Caspi and his colleagues in 2002. Since then, approximately thirty research teams have attempted to replicate Caspi's findings. In this presentation, the meta-analyses and the literature reviews that create the bases for testimony regarding this G x E interaction at criminal trials will be summarized.

William Bernet, MD, will present *"Time for a Truce: Collaboration among Science, Ethics, and Professionalism."* The authors have testified regarding this G x E interaction at several criminal trials in a manner that they consider evidence-based and ethically sound. The testimony that

was presented at a murder trial in Tennessee will be summarized, in which the jury took testimony regarding behavioral genomics into consideration when addressing the defendant's criminal responsibility. Principles for testifying regarding these findings will be presented in a scientific and ethical manner: a genetic test all by itself means very little; assessment of behavioral genomics is only one part of a comprehensive forensic evaluation; this G x E interaction is only a risk factor, not a direct cause of violence.

Behavioral Genomics, MAOA Gene, Child Maltreatment

 ** Presenting Author*