Richard Westlund
February 8, 2023

Miller School Researchers Receive NIH Grant to Study Epigenetic Mechanisms in Alcohol Addiction

A distinguished researcher at the University of Miami Miller School of Medicine has been awarded a $2.1 million grant from the National Institutes of Health (NIH) to study the epigenetic mechanisms in the brain related to alcohol addiction.

Zane Zeier, Ph.D.; Claes Wahlestedt, M.D., Ph.D.; and Luis Tuesta, Ph.D.

“Our goal is to find the underlying drivers for alcohol use disorder in the hope of eventually developing some type of treatment,” said Claes Wahlestedt, M.D., Ph.D., professor of psychiatry and behavioral sciences, director of the Center for Therapeutic Innovation, and associate dean for therapeutic innovation at the Miller School.

Dr. Wahlestedt is the principal investigator for the five-year collaborative grant, “Epigenetic Modulation of Amygdalar Circuits That Control Alcohol Compulsivity.” The laboratory study will be conducted in collaboration with Estelle Barbier, Ph.D., associate professor, and Markus Heilig, M.D., Ph.D., professor at Linkoping University in Sweden; and Zane Zeier, Ph.D., associate professor, and Luis Tuesta, Ph.D., assistant professor in the Miller School’s Department of Psychiatry and

Behavioral Sciences.

Dr. Wahlestedt noted that this will be the among the first alcohol use disorder studies to focus on epigenetic drivers – modifications of gene expression due to stress or environmental factors rather than direct alterations of the genetic code. “We have long hypothesized that compulsive drinking and addiction relate to epigenetic changes in the brain, almost like if a switch has been turned on or off,” he said. “This study will help test that hypothesis and examine where in the brain this happens, and which specific molecular pathways play key roles.”

Previous research by Dr. Wahlestedt and his collaborators has shown that behavioral changes associated with alcohol addiction are evident in signaling networks in specific brain regions, such as the amygdala, which is activated in response to threatening or dangerous stimuli. For instance, the Barbier/Heilig laboratory has investigated why some laboratory animals self-administer alcohol in a compulsive manner. Other laboratory studies have pointed to the importance of an epigenetic modification called histone methylation in regulating gene expression.

“A key feature of alcohol use disorder is compulsive drinking despite negative consequences or at the expense of other rewards,” added Dr. Wahlestedt. “These clinically significant compulsive behaviors occur in a minority of individuals that consume alcohol – a strong indication that epigenetic vulnerabilities are at the core of the disease. Hopefully, this new study will point to new therapeutic targets within the brain’s signaling system.”

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