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The Role of Genetics in Alcoholism

Department of Microbiology and Molecular Genetics, Oklahoma State University, Stillwater, OK 74078, USA

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Alcoholism is a very debilitating disease that affects millions of people and has a morbidity rate that continues to rise. Scientists understand alcoholism to have genetic factors, although its expansiveness is still unknown. Recent studies have linked alcohol use disorder, alcohol consumption, and alcohol dependence genes to be regulated by SNPs thought to be in the endocannabinoid system. This discovery is believed to continue to define alcoholism as a psychiatric disorder characterized by substance abuse. Alongside its relationship with SNPs, other recent studies have connected alcohol use disorder to other psychiatric disorders, including schizophrenia and bipolar disorder. Although some findings are not statistically significant, the information continues to lead science toward the understanding of alcoholism and how it is created.

Introduction

Alcoholism is a psychiatric dysfunction characterized by compulsive drinking that leads to pathological alcohol-seeking behavior (Pabalan et al., 2021). Alcohol abuse is responsible for 5.3 percent of all deaths globally and is a major factor in the total global disease burden (Wiström et al., 2021). While scientists know alcoholism has some genetic tendencies, their exact understanding remains unknown. Furthermore, the knowledge of how alcohol abuse is constructed is still a topic open for discussion. A few preliminary studies have suggested that the endocannabinoid system (ECS) is crucial in forming a substance addiction (Pabalan et al., 2021). The endocannabinoid system is comprised of cannabinoid receptors; here, we will specifically focus on CB1, encoded by the CNR1 gene, and heavily believed to be involved in drug rewards and drug memories (Pabalan et al., 2021). Many scientists believe this gene is responsible for the manufacturing of substance abuse. The CNR1 gene has various single-nucleotide polymorphisms (SNPs) associated with polysubstance abuse, in which a person is addicted to many different substances (Pabalan et al., 2021). Alongside substance abuse alone, alcoholism is also associated with many different psychiatric disorders, specifically schizophrenia and bipolar disorder (Wiström et al., 2021). Alcohol dependence is considered close to both schizophrenia and bipolar disorder genetically because the three can often be found in one individual. Together, they exponentially increase the morbidity of the other disorder (Wiström et al., 2021).

Recent Progress

Many researchers are working on the relationship between alcoholism and genetics, all covering different bases of the issue. A few works to determine if alcoholism is sex-linked if it is linked to other genes, where the genes are, etc. Due to this, there has been a significant increase in our understanding of the topic recently. The focus here is specifically centered on the function of SNPs and the genomic architecture of alcoholism alongside other psychiatric disorders. To test if the SNPs in the CNR1 gene did have a linkage to the development of alcohol dependence, research team Pabalan et al performed a meta-analysis of already available data on the CNR1 gene and performed a variety of statistical analyses to determine if any of the information was significant (Pabalan et al., 2021). The data they collected ultimately determined that only 6 of their outcomes for SNPs being connected to AD were statistically significant and not false positives, but that this was not enough for their hypothesis to be supported, as the majority of their data was not statistically significant or had no interactions with AD biomarkers. Another study worked to determine the genetic architecture of alcohol consumption, bipolar disorder, schizophrenia, and alcohol use disorder as all four psychiatric conditions seemed to increase the morbidity of the other when combined. As a result, researchers wanted to determine if there was a reason for the relationship between these psychiatric disorders. Their research found that many genes contributing to these disorders are positioned on shared loci, specifically schizophrenia with alcohol use disorder and alcohol consumption and bipolar disorder with alcohol use disorder and alcohol consumption

(Wiström et al., 2021). This study also found that some were transcribed in the same direction for those with shared loci.

Discussion

Although the results were insignificant, the first study provides valuable insight into the development of an alcohol use disorder. The findings of this study indicate that the issue with studying the origins of alcoholism comes from the fact that genetic, environmental, and behavioral factors rule alcohol dependence. This study also determined that all six of their successful trials were haplotypes, meaning that these genes are inherited from one parent. This specific finding is incredibly relevant, especially in the context of the other study determining the genetic architecture and closeness alcohol use disorder and alcohol consumption have with schizophrenia and bipolar disorder. Determining that all four physiological disorders are found in different combinations on the same loci is an interesting finding that helps advance the understanding of alcoholism and its different genes as a haplotype. The information learned from both of these studies expands our knowledge of all the disorders. It allows the medical community to better understand how these diseases interact with each other genomically. Although both articles did have exciting findings, they also both had shortcomings. For both articles, limitations came in the form of only including one or two races in their sample sizes. These studies set a baseline that can continue to grow, as future studies can build off of their findings. In specific, looking at other mental illnesses alcohol use is close to, or studying the biomarkers of alcoholism specifically to better understand what they are and how they are manufactured.

References

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