Abstract
Alcohol use disorder is a common medical condition that is responsible for nearly 88,000 deaths

every year and affects approximately 14.5 million people in the United States. The nucleus accumbens is the area in the brain responsible for reward seeking behavior which is typically what incentivises binge alcohol consumption and other drug abuse. Data from preclinical studies suggest that clock genes, responsible for circadian rhythm, are strongly associated with alcohol abuse and binge drinking. In fact, alcohol-associated sleep problems have severe economic and healthcare costs that exceed $18 billion. In order to understand how sleep and alcohol interact, we designed an experiment using the Drinking in the Dark (DID) paradigm to study the role of circadian clock genes, specifically NPAS-2, Per1 and Per2, in the nucleus accumbens in the presence of alcohol in mice. Next, cannulas were bilaterally implanted in the shell region of the nuclear accumbens (NAcSh) in the mice to infuse either a mixture of Clock, Per1, and Per2 antisense oligodeoxynucleotides (AS-ODNs; Antisense group) or nonsense/random ODNs (R-ODNs; Control group) in order to test if antisense-induced downregulation of these genes in the NAcSh reduce binge drinking. Our findings showed that binge drinking is in fact associated with an increased expression in circadian genes in the NAcSh. Additionally, we found success in reducing alcohol consumption by antisense-induced downregulation of circadian genes in the NAcSh.