OPRM1 rs1799971 Genotype Predicts Drinking Behavior in Males, but Not Females

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Introduction

- The prevalence of alcohol disorders costs Americans $223.5 billion yearly due mostly from losses in workplace productivity, as well as health care and criminal justice expenses (CDC, 2016).
- Maximum number of drinks consumed in a 24 hour period is a valid indicator of dangerous drinking behavior and may reflect an increased tolerance for high levels of alcohol (Edberg, 2016).
- Awareness of factors related to such heavy drinking is important for targeting interventions for dangerous alcohol use.
- Men drink significantly more than women, with about 4.5% of men and 2.5% of women meeting the diagnostic criteria for alcohol dependence in 2013 (Wilsnack, et al., 2000).

Recommended NIAAA Alcohol Quantity and Frequency Questions

Undergraduates (N=825) were recruited from the psychology department’s subject pool at a Midwestern university (70.5% female; 87.4% White; mean age=20.4 [SD=3.15]) and received course credit for one hour of participation, which involved completing self-report questionnaires and donating a buccal cell sample for genotyping. The University’s IRB approved the study and all participants gave written informed consent.

Methods

- Sample. Undergraduates (N=825) were recruited from the psychology department’s subject pool at a Midwestern university (70.5% female; 87.4% White; mean age=20.4 [SD=3.15]) and received course credit for one hour of participation, which involved completing self-report questionnaires and donating a buccal cell sample for genotyping. The University’s IRB approved the study and all participants gave written informed consent.

- Measures. Recommended NIAAA Alcohol Quantity and Frequency Questions concerning the frequency, quantity, maximum number of drinks, and binge drinking were assessed as endorsement of risky drinking behavior, which are correlated with alcohol use disorders (NIAAA), such as “During your lifetime, what is the largest number of drinks containing alcohol that you drank within a 24-hour period?”

- Genotyping. DNA was extracted from buccal cells using the Gentra PURGENE Cell Kit (Qiagen, Valencia, CA) following with manufacturer’s protocol. The SNP rs1799971 was genotyped using Taqman SNP Genotyping Assays (Applied Biosystems, Foster City, CA) following manufacturer’s protocol in 2 µl volume. Allele frequencies were consistent with a Caucasian population (Sherry et al., 2010) and were in Hardy-Weinberg equilibrium (p=0.05) with observed allele frequencies of A=0.86 and G=0.14.

- Data Analysis. An ANOVA was performed using SPSS version 22 (IBM, Armonk, NY) using sex and genotype as independent factors, and maximum number of drinks within a 24 hour period consumed as the dependent variable.

- Results. A homozygous males reported having a higher number of maximum drinks consumed in a 24 hour period when compared to G allele carriers; there is no significant effect for females.

- Conclusion. While the genetic effect we found was opposite of that which we predicted, there is evidence in the literature that supports this finding. In a study that focused on the same parameter of maximum drinks consumed in a 24 hour period, A homozygous males reported significantly higher maximum drinks than those with at least one G allele (Du & Wan, 2009).

- Literature Cited


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