The Role of Genetics with Alcoholism and its Effects on Genes ALDH2, ADH1B by Causing Mutations in the Genome

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The role of genetics with alcoholism and its effects on genes ALDH2, ADH1B by causing mutations in the genome.

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Introduction

- Alcohol use disorder (AUD) can be described as a psychiatric illness characterized by harmful drinking patterns leading to negative emotional and physical ramifications (Tawa et al. 2016).
- Alcoholism is seen in 1 out of every 3 Americans (Chartier et al. 2016).
- Study shows that alcohol dependence is closely related to genetics but not limited to it, environmental factors as well as generational status also relate to alcoholism (Gowin et al. 2017).
- Two genes believed to be associated with alcoholism, ADH1B and ALDH2
- A SNP in rs1229984, encodes for the alcohol dehydrogenase ADH1B gene reducing the clearance of alcohol through the liver, carriers of this SNP are also at an increased risk of developing cancer (SNPedia 2018).

What do I propose to do?

- Genome sequencing for two separate families, to ensure for ALDH2 gene but different alleles
- One family with: 2 sons, 2 daughters who occasionally drink, with parents
- One family with 2 sons who binge drink and 1 daughter who rarely drinks, with parents
- Measure BAC levels among both groups, by breathalyzer and blood testing
- Rest for 2 days
- Measure liver Enzymes (GGT levels) for each subject
- Each subject continues normal routine for 21 days
- Each subject gives a Self-Report Alcohol Measure

Potential Conclusions

- Individuals who have a higher blood alcohol concentration may have increased risks of alcoholism
- Individuals with SNP in rs1229984 on gene ADH1B, have lower clearance or tolerance for alcohol through the liver
- There could be no differences among the genome among the two families in which case another study using different individuals must be done.

Potential Pitfalls

- There are too many variables to specifically pin-point alcoholism
- It is possible that individuals may have other alternate variations to the alleles, causing even stranger side-effects from alcohol consumption
- There could be sources of error in the self-alcohol report from individuals
- Is it due to genetics or is it a disease or an addiction?

Specific Aim

- To understand the role of genetics with alcoholism and its effects on genes ALDH2, ADH1B, and GABRB1 by causing mutations in the genome.

Citations

SNPedia. 2018. Rs1229984.