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

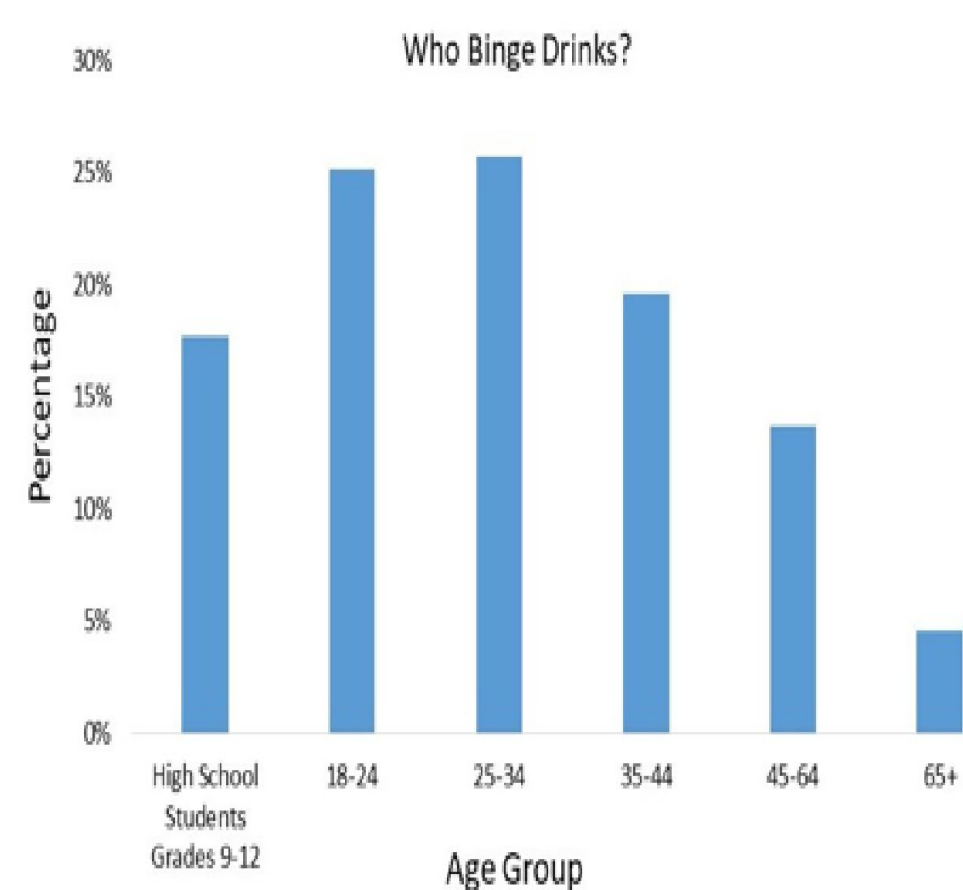
Department of Biological and Environmental Sciences

Erica Harris

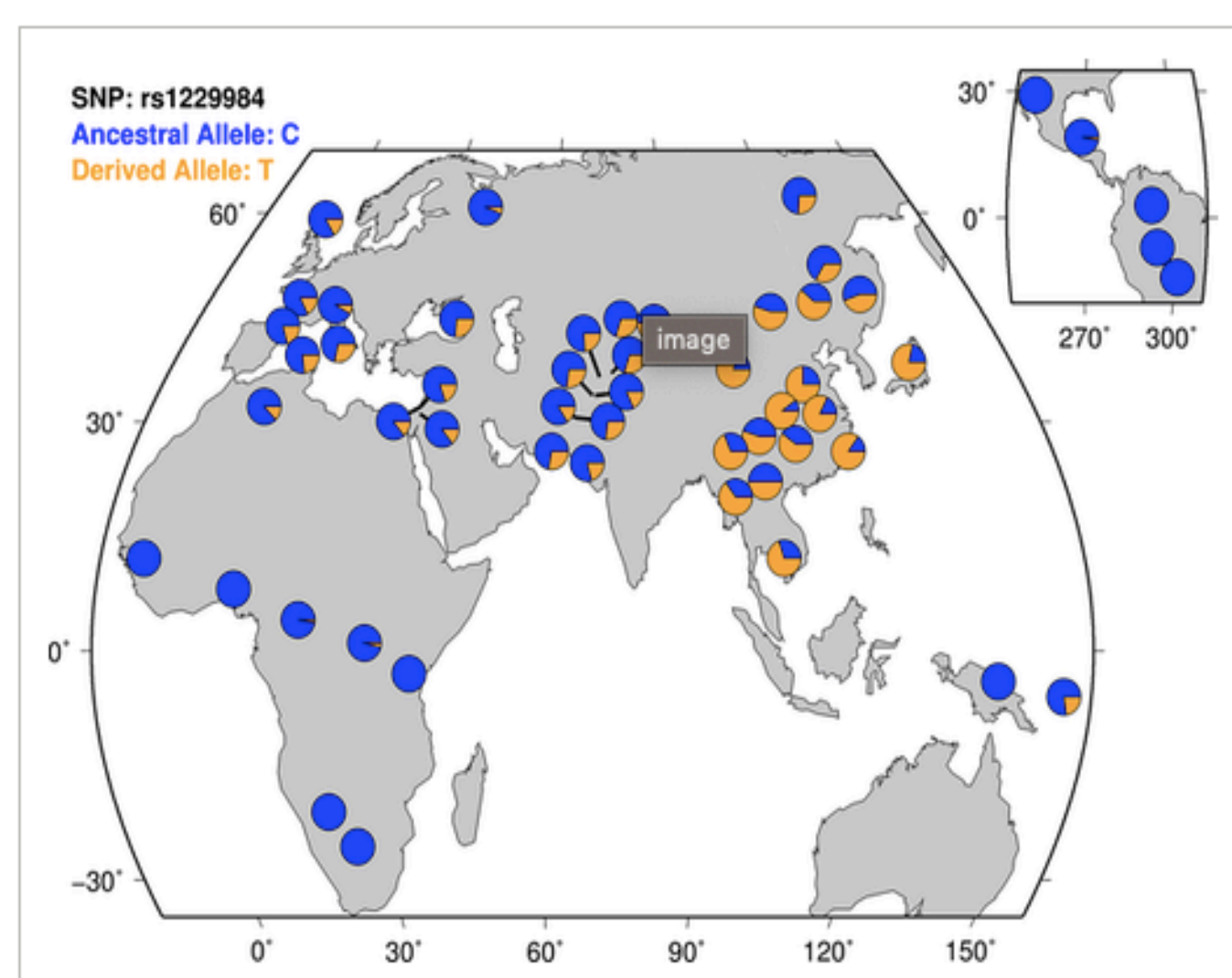


## Introduction

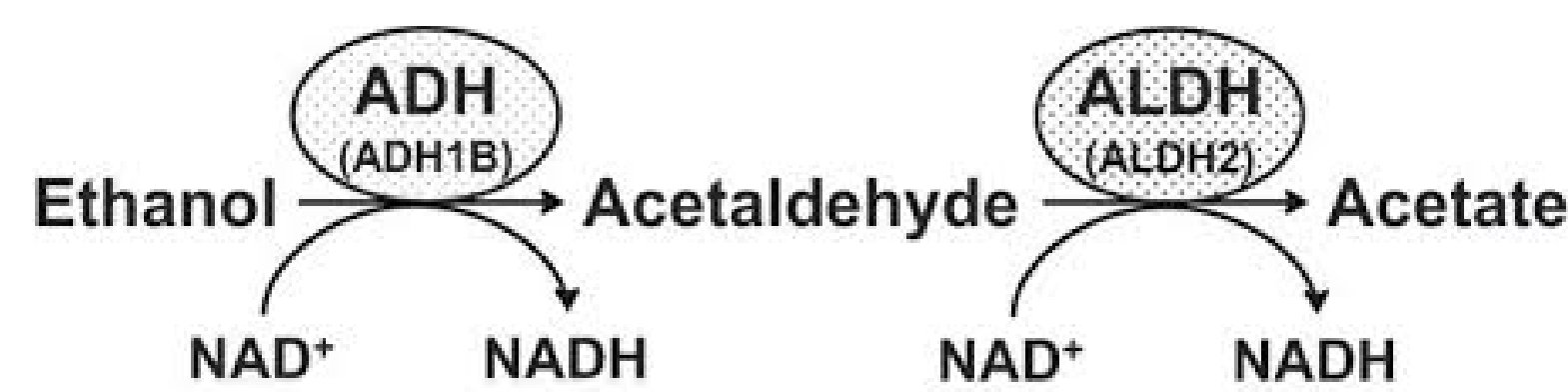
- Alcohol use disorder (AUD) can be described as a psychiatric illness characterized by harmful drinking patterns leading to negative emotional and physical ramifications (Tawa et al. 2016).
- Alcoholism is seen in 1 out of every 3 Americans (Chartier et al. 2016).
- Study shows that alcohol dependence 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).



**Figure 1.** Proportion of individuals who binge drink. Data sources: CDC. Youth Risk Behavior Surveillance System and Behavioral Risk Factor Surveillance System, 2015



**Figure 2.** Variation across human population of SNP *ADH1B* rs1229984. (data available at <http://hgdp.uchicago.edu/>)

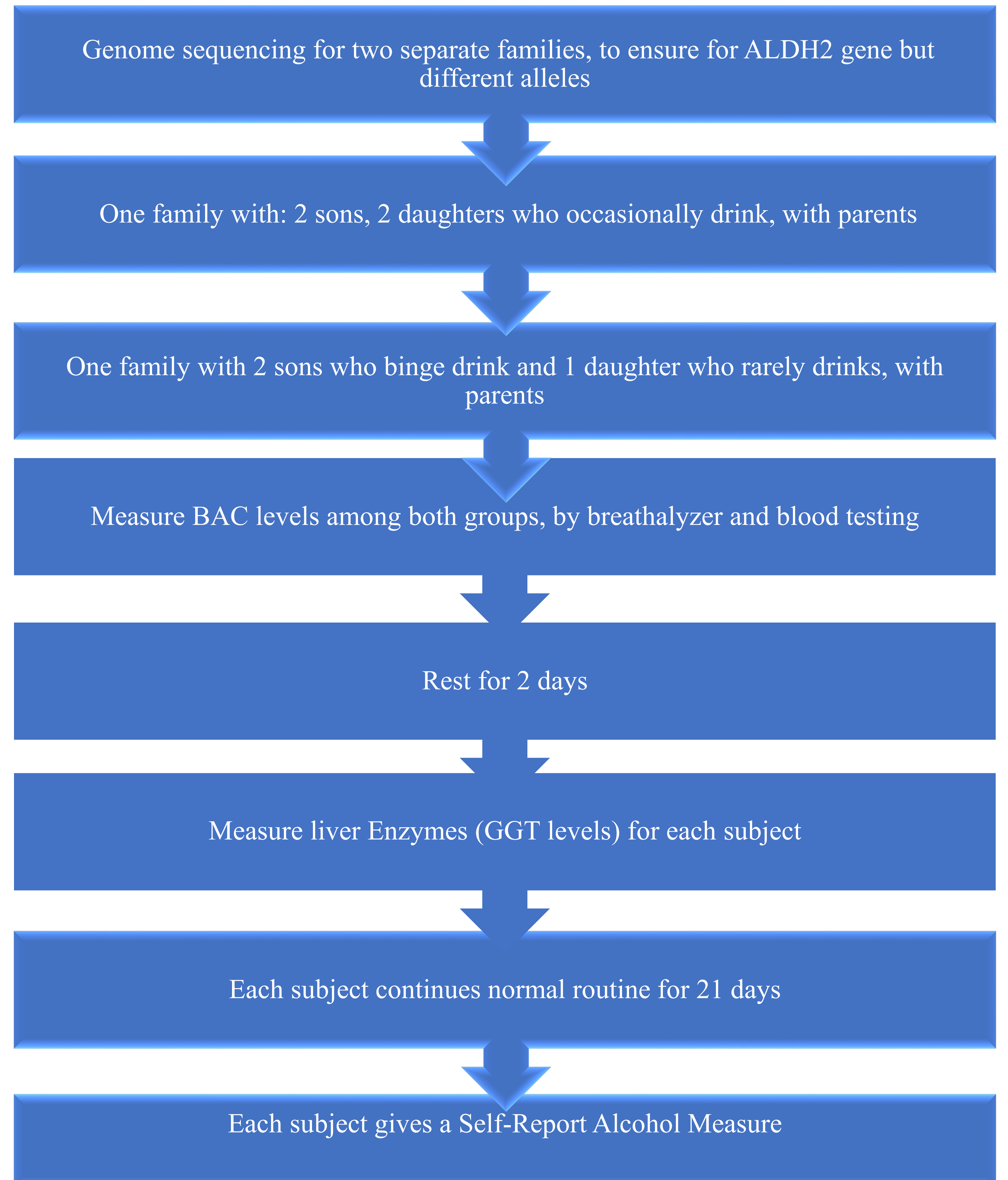


**Figure 3.** Ethanol oxidization by ADH and ALDH, these processes rely on ADH1B and ALDH2.

## 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.

## What do I propose to do?



## 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?

## Citations

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