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Polymorphisms in Alcohol Dehydrogenase (ADH): A case study on the effects of ADH and ALDH on alcoholism among Native American population

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ABSTRACT

Genetic variations in an individual affects the way alcohol is metabolized in the body. Alcohol Dehydrogenase (ADH) and Aldehyde Dehydrogenase (ALDH) are the two known enzymes that participate in alcohol metabolism. Polymorphisms of these enzymes are reported to make one more or less susceptible to alcoholism in some ethnic groups. The current study is a review of various articles highlighting the effects of ADH and ALDH on different populations. A study of 26 Native American, 21 Inuit, and 17 caucasian ethnic groups revealed the influence of ADH and ALDH on alcohol dependence. In one of the studies, different ADH allele populations were studied and found that the presence of ADH1B*1 allele led to increase in alcoholism whereas ADH1B*2 and ADH1B*3 alleles led to decrease in alcoholism. In another study, each participant was given alcohol intravenously until their blood alcohol was at approximately 125 mg.%. The rate of metabolism was calculated using body weight, concentration of alcohol, and the time it took for blood alcohol levels to reach a desired amount. The rate of decline of alcohol metabolism among Caucasian was 0.370 mg.% per minute, Native American 0.259 mg.% per minute, and the Inuit population 0.264 mg.% per minute. The study found that the Native American and Inuit rate of decline were similar, and the alcohol metabolism is much slower than the Caucasian counterparts. ADH polymorphism affects the ability to metabolize alcohol at different rates among different ethnicities.

Key Words: Alcoholism, Polymorphism, Native American, Alcohol Metabolism

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