

Polymorphisms in mitochondrial genes encoding complex I subunits are maternal factors of voluntary alcohol consumption in the rat

Sapag, Amalia

González-Martínez, Ginez

Lobos-González, Lorena

Encina, Gonzalo

Tampier, Lutske

Israel, Yedy

Quintanilla, María Elena

OBJECTIVE: Alcohol is detoxified in the liver by oxidizing enzymes that require nicotinamide adenine dinucleotide (NAD) such that, in the rat, the availability of NAD contributes to control voluntary ethanol intake. The UChA and UChB lines of Wistar rats drink low and high amounts of ethanol respectively and differ in the capacity of their mitochondria to oxidize NADH into NAD. This function resides in complex I of the respiratory chain and its variation is linked to genes transmitted through the maternal line. The aim of this study was to identify the genetic basis for the difference in the reoxidation of NADH in these nondrinker (UChA) and drinker (UChB) rats. **METHODS:** Seven mitochondrial genes and two chromosome X genes encoding complex I subunits from rats of both lineages were amplified from liver DNA and sequenced. **RESULTS:** The UChA and UChB rat lines differ in their Nd2, Nd4, Nd5 and Nd6 mitochondrial genes and in the encoded proteins. Most noteworthy are ND2 and ND4 whose amino