Medical Xpress

Education and reward genes interact to influence alcoholism among Mexican-Americans

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Hispanics with alcohol-induced problems - especially male Mexican Americans - have significantly worse health and welfare than those with other ethnic backgrounds. This study examined the influence of gene/environment interaction on alcoholism among Mexican Americans. Researchers have found that interaction between education and a polymorphism of the reward gene contribute to severe alcoholism among Mexican Americans.

Results will be published in the December issue of *Alcoholism: Clinical & Experimental Research* and are currently available at Early View.

"Problem drinking is particularly bad among male Mexican Americans, which is reflected by a three times higher prevalence rate of past heavy drinking in this population than that reported for non-Hispanic male populations," explained Yu-Jui Yvonne Wan, professor at The University of Kansas Medical Center and corresponding author for the study. "Hispanics with alcohol-induced problems, such as alcoholic liver disease (ALD), appear to fare significantly less well than those with other ethnic backgrounds. For example, the survival rate of Hispanic ALD patients after 4.5 years of follow-up is only 28 percent, in contrast to 66 percent for African Americans and 40 percent for Caucasians."

The early belief that alcoholism is largely the result of social and interpersonal influences has greatly benefitted from a more informed

understanding that inheritance plays a much stronger role in the development of alcoholism than was previously thought, added Elizabeth C. Penick, professor and director of the division of psychology at The University of Kansas Medical Center.

"However, it is unclear exactly how inheritance works to produce alcoholic drinking," she said. "It is also unclear how inherited influences could operate differently in certain groups to produce higher or lower rates of alcoholism. For example, rates of alcoholic drinking are higher in males than females, higher in young people than older, and higher in certain ethnic groups. Since the end of the 20th century and into the 21st, greater research effort has been focused on specific ways in which inheritance can influence someone to drink alcoholically. Quite naturally, this research has turned to an examination of specific genes or parts of genes and their expression in the human body."

Researchers genotyped two groups of Mexican Americans living in Los Angeles County for three polymorphisms of reward genes - serotonin transporter linked polymorphic region (5-HTTLPR), A118G in opioid receptor mul (OPRM1 A118G) and -141C Insertion/Deletion in dopamine receptor D2 (DRD2-141C Ins/Del) - 365 (296 males, 69 females) alcoholics and 338 (258 males, 80 females) non-alcoholics or "controls," who were age and gender matched. The alcoholics were also stratified according to severity defined by number of drinks consumed in one 24-hour period.

"While the individual factors of education, OPRM1 A/A genotype, and DRD2 -141C Ins/Ins genotype contributed to pathogenesis of moderate and/or severe alcoholism in Mexican Americans, " said Wan, "only the co-existence of education and OPRM1 A/A genotype put individuals at high risk for severe alcoholism. This suggests synergistic interaction between education background and OPRM1."

This means that only when an individual receives less than or up to 12 years of education can the causative effect of OPRM1 A/A be expressed. "This finding implies that improving educational levels of Mexican Americans has the potential to counteract the genetic risk factors and help to prevent alcoholism," said Wan.

"These findings add pieces to the puzzle of alcoholism by focusing on 'candidate genes' identified in other studies as involved in the so-called 'reward system' of the brain," said Penick. "Drs. Du and Wan have added another important dimension by asking whether selected gene products interact with powerful and influential social variables: marital status and education. Their conclusion - that environmental factors interacted with genetic factors, and that the presence of one appeared to influence the strength of the other - does not mean that we have a lab test or lab measure that can measure an individual's vulnerability to alcoholism. Much more research needs to be done before that is possible. But it does represent a significant start to the unraveling of the mysteries of this very destructive illness."

Source: Alcoholism: Clinical & Experimental Research

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