MedicalXpress

Chronic drinking interferes with absorption of critical vitamins by pancreas

May 12 2016

Chronic exposure to alcohol interferes with the pancreas' ability to absorb vitamin C, potentially predisposing the body to pancreatitis and other pancreatic diseases, a new study in the *American Journal of Physiology—Cell Physiology* reports.

The pancreas produces the enzymes used to digest food and the hormones, such as insulin, that are needed to store energy from food. Pancreatic diseases and damage to the pancreas can lead to digestive problems, malnutrition and diabetes.

Alcohol-related pancreatitis takes an average of 10 years of daily alcohol abuse to develop, and the risk of developing the condition increases with the amount of alcohol consumed, says Fred Gorelick, MD, of Yale University and a collaborator of the study's authors. Earlier studies support that prolonged alcohol exposure weakens the pancreas' defense system, making it more vulnerable to injury. However, less than 10 percent of alcoholics develop pancreatitis, indicating that alcohol is a sensitizer but other genetic and environmental factors are also involved. While long-term continual alcohol intake is a significant factor in developing pancreatitis, little is known about how daily consumption patterns affect the likelihood of developing the disease, Gorelick says.

To function properly, pancreatic cells require a number of vitamins, which they take from the blood stream. The research team at the University of California, Irvine, led by Hamid Said, PhD, investigated whether the pancreas' weakened defense from alcohol exposure could be

attributed to poor absorption of vitamins. The researchers reported in earlier studies that chronic alcohol exposure prevented the pancreatic cells from absorbing biotin and thiamin. In this new study, the team investigated whether alcohol exposure also interfered with the pancreas's absorption of vitamin C.

The research team first identified the protein called sodium-dependent vitamin C transporter 2 (SVCT-2) as the main protein responsible for transporting vitamin C into pancreatic cells. Next, researchers exposed mouse pancreatic cells to alcohol levels similar to the blood alcohol concentration of chronic alcoholics. The researchers also fed mice a diet in which alcohol made up 25 percent of the total calories consumed. They found that both pancreatic cells directly exposed to alcohol and pancreatic cells from alcohol-fed mice had lower numbers of SVCT-2, blocking the cells' absorption of vitamin C.

Reducing the levels of vitamin C and other essential micronutrients will interfere with normal cellular activities in the pancreas, Said says. "This may sensitize the pancreas to a secondary insult, predisposing it to the development of pancreatitis and other pancreatic diseases."

The article "Uptake of ascorbic acid by pancreatic acinar cells is negatively impacted by chronic alcohol exposure" is published ahead-of-print in the *American Journal of Physiology—Cell Physiology*.

More information: Veedamali S Subramanian et al. Uptake of ascorbic acid by pancreatic acinar cells is negatively impacted by chronic alcohol exposure, *American Journal of Physiology - Cell Physiology* (2016). DOI: 10.1152/ajpcell.00042.2016

Provided by American Physiological Society