

Mouse study shows how alcohol may cause cancer

Alcohol damages the DNA of stem cells responsible for producing new blood, according to a mouse study which may explain the link between drinking and cancer, scientists said.



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Health watchdogs have long warned that alcohol consumption contributes to seven types of cancer — of the mouth, throat, larynx or voice box, oesophagus or food pipe, breast, liver and bowel.

What was not well understood was: how?

For the new study, published in the science journal *Nature*, researchers gave lab mice diluted alcohol, known chemically as ethanol.

They then used chromosome and DNA analysis to examine genetic damage caused by acetaldehyde, a chemical produced when the body processes alcohol.

“They found that acetaldehyde can break and damage DNA within blood stem cells, leading to rearranged chromosomes and permanently altering the DNA sequences within these cells,” Cancer Research UK, which helped fund the research, said in a statement.

“It is important to understand how the DNA blueprint within stem cells is damaged because when healthy stem cells become faulty, they can give rise to cancer.”

DNA damage can lead to cell death, but can also trigger the body’s natural repair mechanisms. However, if the DNA is repaired incorrectly, it can lead to cancer.

“While some damage occurs by chance, our findings suggest that drinking alcohol can increase the risk of this damage,” said lead author Ketan Patel of the MRC Laboratory of Molecular Biology in Cambridge.

The team also examined how the body fights against alcohol damage using a family of enzymes called ALDH, which turn acetaldehyde into acetate, which cells can use as energy.

Millions of people — particularly from Southeast Asia — either lack these enzymes or carry faulty versions, said the team. And mice lacking ALDH, given alcohol, suffered four times as much DNA damage.

“Our study highlights that not being able to process alcohol effectively can lead to an even higher risk of alcohol-related DNA damage and therefore certain cancers,” said Patel.

It may be a contributor to an “extremely high prevalence” of throat cancer in countries such as China, commented Malcolm Alison of the Queen Mary University of London, who was not involved in the study.

Commentators welcomed the paper’s contribution to the knowledge base.

“This is beautiful work, which puts our finger on the molecular basis for the link between alcohol and increased cancer risk and stem cells. Very important,” said Magdalena Zernicka-Goetz of the University of Cambridge.

Source: *AFP*

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