Researchers uncover why light-to-moderate drinking is tied to better heart health

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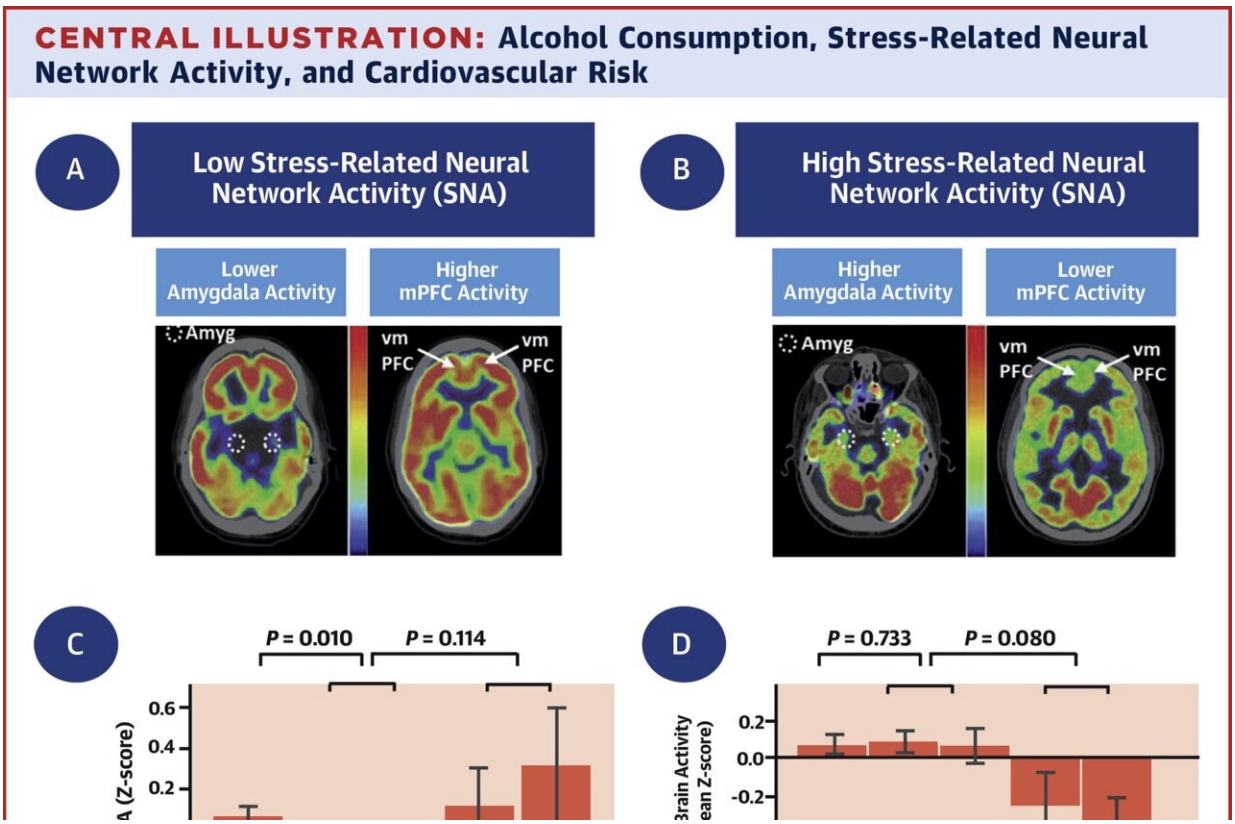

Credit: *Journal of the American College of Cardiology* (2023). DOI: 10.1016/j.jacc.2023.04.015

A new study led by investigators from Massachusetts General Hospital offers an explanation for why light-to-moderate alcohol consumption

may be associated with lower risk of heart disease. For the first time, researchers found that alcohol, in light to moderate quantities, was associated with long-term reductions in stress signaling in the brain. This impact on the brain's stress systems appeared to significantly account for the reductions in cardiovascular events seen in light to moderate drinkers participating in the study. Findings are published in the *Journal of the American College of Cardiology*.

"We are not advocating the use of alcohol to reduce the risk of heart attacks or strokes because of other concerning effects of alcohol on health," says senior author and cardiologist Ahmed Tawakol, MD, co-director of the Cardiovascular Imaging Research Center at Massachusetts General Hospital. "We wanted to understand how light to moderate drinking reduces cardiovascular disease, as demonstrated by multiple other studies. And if we could find the mechanism, the goal would be to find other approaches that could replicate or induce alcohol's protective cardiac effects without the adverse impacts of alcohol."

Previous epidemiological studies have suggested that light to moderate alcohol consumption (1 drink per day for women and 1 to 2 drinks per day for men) is associated with a lower risk of cardiovascular disease. But it was unknown whether alcohol was inducing cardiovascular benefits, or whether light/moderate drinkers' health behaviors, socioeconomic status, or other factors protected their hearts.

The study included more than 50,000 individuals enrolled in the Mass General Brigham Biobank. The first part of the study evaluated the relationship between light/moderate alcohol consumption and major adverse cardiovascular events after adjusting for a range of genetic, clinical, lifestyle, and socioeconomic confounders. The researchers found that light/moderate alcohol consumption was associated with a substantial reduction in the risk of cardiovascular disease events, even

after accounting for those other factors.

Next, they studied a subset of 754 individuals who had undergone previous PET/CT brain imaging (primarily for cancer surveillance) to determine the effect of light/moderate alcohol consumption on resting stress-related neural network activity.

The brain imaging showed reduced stress signaling in the amygdala, the brain region associated with stress responses, in individuals who were light to moderate drinkers, compared to those who abstained from alcohol or who drank little. When the investigators looked at these individuals' history of cardiovascular events, they found fewer heart attacks and strokes in light to moderate drinkers. "We found that the brain changes in light to moderate drinkers explained a significant portion of the protective cardiac effects," says Tawakol.

It's long been known that alcohol reduces the amygdala's reactivity to threatening stimuli while individuals are drinking. The current study is the first to indicate that light to moderate alcohol consumption has longer-term neurobiological effects in dampening activity in the amygdala, which may have a significant downstream impact on the cardiovascular system.

"When the amygdala is too alert and vigilant, the sympathetic nervous system is heightened, which drives up blood pressure and increases heart rate, and triggers the release of inflammatory cells," explains Tawakol. "If the stress is chronic, the result is hypertension, increased inflammation, and a substantial risk of obesity, diabetes, and cardiovascular disease."

Finally, the investigators examined whether light/moderate alcohol would be even more effective at reducing heart attacks and strokes in people who are prone to a chronically higher stress response, such as

those with a history of significant anxiety. They found that, within the 50,000-patient sample, light to moderate drinking was associated with nearly double the cardiac-protective effect in individuals with a history of anxiety compared with others.

Yet while light/moderate drinkers lowered their risk for cardiovascular disease, the study also showed that any amount of alcohol increases the risk of cancer. And at higher amounts of alcohol consumption—more than 14 drinks a week—heart attack risk started to increase while overall brain activity started to decrease (which may be associated with adverse cognitive health).

The authors concluded that research should focus on finding new interventions that reduce the brain's stress activity without the deleterious effects of alcohol. The research team is currently studying the effect of exercise, stress-reduction interventions such as meditation, and pharmacological therapies on stress-associated neural networks and how they might induce cardiovascular benefits.

Co-authors include Kenechukwu Mezue and Michael T. Osborne.

More information: Mezue Kenechukwu et al, Reduced Stress-Related Neural Network Activity Mediates the Effect of Alcohol on Cardiovascular Risk, *Journal of the American College of Cardiology* (2023). DOI: 10.1016/j.jacc.2023.04.015

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