Why hard drinking is harder on the body with age

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(Medical Xpress)—It's no secret that chronic alcohol abuse can cause a variety of health problems. Along with a greater risk of cancer, cardiovascular and liver disease, and depression, heavy over time drinking leads to changes in body composition – in particular, a loss of muscle mass is observed which leads to impaired locomotion and strength. Previous research has suggested this wasting is primarily caused by a decrease in muscle protein production or synthesis, much like that occurring with aging. Excessive alcohol consumption also promotes premature aging. As the proportion of older individuals in the U.S. population is rapidly growing, and many of these individuals are chronic, heavy drinkers, researchers have not yet explored how alcohol abuse interacts with other effects of aging, such as muscle loss.

In a new study, scientists led by Charles H. Lang of the Penn State College of Medicine and Donna H. Korzick of The Pennsylvania State University compared how alcohol abuse affects muscle mass in young adult and aged rats. They found that aging seems to have a synergistic effect with heavy drinking over time, leading to a significantly greater loss of muscle mass.

The article is entitled "Aging Accentuates Alcohol-Induced Decrease in Protein Synthesis in Gastrocnemius" bit.ly/11CMS0P. It appears in the Articles in PresS section of the *American Journal of Physiology – Regulatory, Integrative, and Comparative Physiology*, published by the American Physiological Society.

Methodology

Lang and his colleagues worked with rats that were 3 months old (the equivalent of young adult humans) and rats that were 18 months old (the equivalent of senior citizens). For 20 weeks, all the animals ate a nutritionally complete liquid diet. However, for half the animals in each group, alcohol made up a growing portion of the diet's calories, maxing out at 36 percent from 3 weeks onward. The researchers monitored the amount of food each animal ate daily and weighed the rats weekly. At the end of the study, they assessed the rats' body compositions. They also took samples of each rat's gastrocnemius, or calf muscle, to look for differences between old and young animals, and drinkers and non-drinkers, as well as to look for a mechanism behind the effects they found.

Results

Although all the alcohol-fed rats had a lower body weight than those eating the regular diet, the older alcohol-fed animals weighed significantly less—about 17 percent—than older animals who didn't consume alcohol. Both the aged animals and the alcohol-fed ones had lower lean body mass and lower muscle mass than the younger and alcohol-free ones. However, aging and alcohol together appeared to have an additive effect, with the older, alcohol-fed rats experiencing the most wasting among all the groups. The experiments revealed that the rate of protein synthesis in muscle was reduced by almost half in the aged, alcohol-fed rats compared to the young alcohol-fed ones. Further examination suggests that the mechanisms behind alcohol-fueled muscle wasting in the aged were varied but generally the same as those seen with alcohol in younger animals only accentuated.

Importance of the findings

These results reinforce the idea that chronic alcohol abuse causes a form of premature aging, with the normal muscle loss that comes with old age accelerated by alcohol. The findings also highlight the potential danger of drinking for older adults, they say.

"Collectively, our results suggest that sustained excessive alcohol consumption by the elderly should be discouraged to minimize the sarcopenia typically seen in this patient population," the authors write, "as muscle mass and strength are predictive of disability and all-cause mortality."

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