

Substance found in fruits and vegetables reduces likelihood of the flu

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Mice given quercetin, a naturally occurring substance found in fruits and vegetables, were less likely to contract the flu, according to a study published by The American Physiological Society. The study also found that stressful exercise increased the susceptibility of mice to the flu, but quercetin canceled out that negative effect.

Quercetin, a close chemical relative of resveratrol, is present in a variety of fruits and vegetables, including red onions, grapes, blueberries, tea, broccoli and red wine. It has been shown to have anti-viral properties in cell culture experiments and some animal studies, but none of these studies has looked specifically at the flu.

The study, "Quercetin reduces susceptibility to influenza infection following stressful exercise," was carried out by J. Mark Davis, E.A. Murphy, J.L. McClellan, and M.D. Carmichael, of the University of South Carolina and J.D. Gangemi of Clemson University. The study appears in the current issue of the *American Journal of Physiology-Regulatory, Integrative and Comparative Physiology*.

The study was conducted using mice, but if quercetin provides a similar benefit for humans, it could help endurance athletes, soldiers and others undergoing difficult training regimens, as well as people under psychological stress, according to Davis.

Study builds on previous research

"Quercetin was used because of its documented widespread health benefits, which include antiviral activity, abundance in the diet and reported lack of side effects when used as a dietary supplement or food additive," Davis said.

Earlier mouse studies have found that stressful exercise can increase susceptibility to upper respiratory infections, although it is not yet clear if the same is true for humans. There was also preliminary information that mice may be more susceptible to the flu when they exercise to fatigue. The researchers in the current study hypothesized that exercise would increase the chance of the mice getting the flu but that quercetin would counteract the increased risk.

Davis and his colleagues examined four groups of mice. Two groups performed three consecutive days of running to fatigue on a treadmill to mimic a short period of stressful exercise. One group of runners received quercetin, the other did not.

The remaining two groups did not exercise. One non-exercise group received quercetin while the other did not. All four groups were then exposed to a common flu virus, H1N1.

The researchers found that:

- Stressful exercise increased susceptibility to the flu. The mice that exercised to fatigue for three days were more likely to develop the flu than the mice that did not exercise (91% versus 63%).
- The mice that exercised developed the flu much sooner than those that did not (6.9 days versus 12.4 days).
- Mice that exercised and took quercetin had nearly the same rate of illness as those that did not exercise. In other words, quercetin canceled out the negative effect of stressful exercise.
- The severity of the symptoms among those mice that either did not

exercise or those that exercised but took the quercetin was about the same.

-- Quercetin had protective effects for the mice that did not exercise.

Although this study was done with mice, a recent human study found that people who took quercetin suffered fewer illnesses following three days of exhaustive exercise compared to those who did not. Unlike the mouse study, the humans were not inoculated with a virus.

"This is the first controlled experimental study to show a benefit of short-term quercetin feedings on susceptibility to respiratory infection following exercise stress," said Davis. "Quercetin feeding was an effective preventive strategy to offset the increase in susceptibility to infection that was associated with stressful exercise."

Source: American Physiological Society

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