

Study: Popular supplement quercetin does not enhance athletic performance

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The antioxidant quercetin is increasingly being marketed as a supplement that boosts athletic performance, but a new University of Georgia study finds that it is no better than a placebo.

Professor Kirk Cureton, head of the department of kinesiology in the UGA College of Education, and his colleagues tested quercetin in a double-blind, placebo-controlled study that assessed a variety of measures, including the ability of muscles to synthesize energy, cycling performance, perceived exertion and strength loss following exercise. The researchers, whose results appear in the early online edition of the [Journal of Applied Physiology](#), found that quercetin did not improve [athletic performance](#) in any of the measures they examined.

"We did not see any performance enhancing effect of quercetin," Cureton said. "To a certain extent that was disappointing because our hypothesis, based on previous studies in mice, was that we would see positive effects. But our findings are important because they suggest that results from the animal studies shouldn't be generalized to humans."

Quercetin is a naturally occurring antioxidant found in the skins of fruits, leafy vegetables, and berries, as well as in [black tea](#), [red wine](#) and various fruit juices. It is sold as a supplement in nutrition stores and is an ingredient in sports drinks such as FRS Energy, which is promoted by cyclist Lance Armstrong.

In mice, quercetin has been shown to stimulate the production of

mitochondria, which are the energy producing components of [muscle cells](#) and other tissue. One study found that mice supplemented with quercetin increased their running endurance by up to 37 percent.

In humans, however, the results have been mixed. An early and widely-cited study reported improvements in performance during a cycling time trial, but Cureton notes that data from the experimental group was not compared to the control group, making the statistical significance of the finding unclear. Published studies on competitive runners and cyclists have found no improvement in performance. A recent published study by the same researchers who reported mitochondrial and endurance increases in mice, however, found that volunteers who consumed a drink containing quercetin saw a 13 percent improvement in endurance. Cureton said the reason for the conflicting results is unknown, but added that several other studies currently in review for publication also have found no performance-enhancing effect.

Cureton and his colleagues hypothesized that the athletes used in the previous studies might not have benefitted from quercetin because they had already maximized their mitochondrial density through aerobic training. To address that possibility, the researchers recruited 30 men who were healthy but not endurance trained and randomly assigned them to either an experimental group or a placebo group.

The experimental group consumed a sports drink containing 250 milligrams of quercetin four times a day for up to 16 days, a dose and duration similar to previous human studies and comparable to studies in mice. The placebo group received the same sports drink without quercetin.

Because the mechanisms of quercetin's action are unclear, the researchers examined a number of variables in what is the most comprehensive study to date on its effect on athletic performance. The

variables included:

- The rate at which muscles synthesize energy after strenuous exercise;
- Peak oxygen consumption;
- The rate of perceived exertion during cycling;
- Metabolic changes, such as the percentage of energy derived from fats and carbohydrates (more conditioned individuals tend to use more fat for energy);
- Performance on a cycling test; and
- Strength loss following prolonged cycling.

Cureton notes that had there been a performance-enhancing effect of quercetin, a sample size of 30 would have been sufficient to detect it. Plant-based compounds related to quercetin, such as resveratrol, have been similarly touted for their health benefits based primarily on animal studies, but Cureton said his findings should serve as a reminder that the gold-standard of science is randomized, double-blinded studies in humans.

"The take home message here is that promising results in mice don't necessarily translate to humans," Cureton said.

Source: University of Georgia ([news](#) : [web](#))

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