Medical Xpress

Vitamin E shows possible promise in easing chronic inflammation

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With up to half of a person's body mass consisting of skeletal muscle, chronic inflammation of those muscles – which include those found in the limbs – can result in significant physical impairment.

According to University of Illinois kinesiology and community health professor Kimberly Huey, past research has demonstrated that the antioxidant properties of Vitamin E may be associated with reduced expression of certain pro-inflammatory cytokines, in vitro, in various types of cells. Cytokines are regulatory proteins that function as intercellular communicators that assist the immune system in generating a response.

To consider whether the administration of Vitamin E, in vivo, might have similar effects on skeletal and cardiac muscle, Huey and a team of Illinois researchers put Vitamin E to the test in mice. The team included study designer Rodney Johnson, a U. of I. professor of animal sciences, whose previous work has suggested a possible link, in mice, between short-term Vitamin E supplementation and reduced inflammation in the brain.

The study represents the first time researchers have looked at in vivo effects of Vitamin E administration on local inflammatory responses in skeletal and cardiac muscle.

In this study, the researchers investigated the effects of prior administration of Vitamin E in mice that were then injected with a low

dose of *E. coli* lipopolysaccharide (LPS) to induce acute systemic inflammation. The effects were compared with those found in placebo control groups.

The research team examined the impact the Vitamin E or placebo treatment had on the mRNA and protein levels of three cytokines – interleukin (IL-6), tumor necrosis factor-alpha (TNF-alpha) and IL-1beta.

"The mice were administered Vitamin E for three days prior to giving them what amounts to a minor systemic bacterial infection," Huey said. "One thing we did – in addition to (looking at) the cytokines – was to look, in the muscle, at the amount of oxidized proteins.

"Oxidation can be detrimental, and in muscle has been associated with reduced muscle strength," Huey said.

Among the team's major findings, in terms of function, Huey said, was that "there was a significant reduction in the amount of LPS-induced oxidized proteins with Vitamin E compared to placebo."

"So that's a good thing," she said. "Potentially, if you reduce the oxidized proteins, that may correlate to increased muscle strength."

Additionally, the researchers' experiments yielded a significant decrease in two cytokines – IL-6 and IL-1beta – with Vitamin E, compared with the placebo.

That finding translates to somewhat mixed reviews.

"It's hard to say functionally what those cytokine changes might mean," Huey said. "IL-1beta is primarily a pro-inflammatory cytokine, so that could be a good thing – especially in terms of cardiac function."

However, she said, "IL-6 can have both pro- or anti-inflammatory actions." She said that the literature has yielded some evidence pointing to the detrimental effects of chronic increases in IL-6. But the effects of acute increases in IL-6 in skeletal muscles – which occur during exercise – may be another story.

"Whether there's a difference between exercise-induced increases versus inflammation-induced increases in IL-6 is still highly debatable," she said.

Nonetheless, Huey said, the larger take-home message of the study, published in the December issue of the journal *Experimental Physiology*, is that Vitamin E "may be beneficial in individuals with chronic inflammation, such as the elderly or patients with type II diabetes or chronic heart failure."

While the Illinois research team's work provides a foundation for future investigations that could ultimately have positive outcomes for people afflicted with chronic skeletal or cardiac muscle inflammation, Huey cautioned that it is still far too soon to speculate on results in humans.

"This is clearly an animal model so whether it would translate to humans still requires a lot more research," she said. "Vitamin E is a supplement that is already approved, and these results may suggest an additional benefit of taking Vitamin E beyond what's already been shown."

Source: University of Illinois at Urbana-Champaign

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