

# Findings a step toward a pill that provides benefit of exercise

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A researcher at the University of Virginia School of Medicine has magnified a benefit of exercise in mice to provide a "profound" protection from diabetic cardiomyopathy, a potentially deadly heart condition that affects many people with diabetes. The discovery demonstrates the power of exercise to prevent chronic health conditions and suggests that one day some benefits of exercise may come in a pill or bottle.

"This is a proof of concept. It shows that an antioxidant coming from skeletal muscle that can be induced by [exercise](#) training can provide profound protection against an important detrimental disease condition," said UVA researcher Zhen Yan, PhD. "The implication is if we can come up with a strategy to promote [this effect] in people who are vulnerable to, or already developing, diabetes, that could prevent the development of diabetic cardiomyopathy."

Yan and his team used genetically modified mice to show that enhancing the production of a molecule called EcSOD - which is produced in [skeletal muscle](#) and promoted by [regular exercise](#) - would prevent the damaging effects of [diabetic cardiomyopathy](#). These effects include stiffening and enlargement of the heart, which can lead to [heart failure](#).

While the work amplified the expression of the molecule to levels beyond what normal exercise would produce, Yan said it's an important demonstration of the concrete benefits of regular exercise in people. "Our studies show that even as little as two weeks of exercise could

significantly elevate the level in the blood and the heart," he said.

A shortage of the molecule in people who can't exercise could worsen their health problems, said Yan, of UVA's Department of Medicine and its Robert M. Berne Cardiovascular Research Center. "It's quite possible that there could be a vicious cycle of inactivity. Conditions like heart failure or other chronic diseases would lead to loss of physical capacity and fitness and reduced activity, and due to the difficulties of exercising, this would lead to reduced expression of EcSOD, make them more vulnerable and accelerate their disease process," he said. "So that is one of the reasons I personally believe that exercise is such a powerful intervention. It's not only that exercise itself is really powerful, there's a secondary consequence of inactivity."

To help those can't exercise, and potentially to boost the manufacture of the molecule in those who can, Yan hopes to find ways to stimulate the production of EcSOD using a drug - in effect, an exercise pill. While that's still in the future, his latest discovery represents a step toward that goal. "For this particular study, we wanted to know precisely what is the contribution of muscle-derived EcSOD," he said. "With that understanding, we can design experimental and clinical interventions to help patients. So that's our next step."

Provided by University of Virginia

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