

Team explores the effects of exercise on ulcerative colitis

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Aerobic exercise can lessen – or worsen – the symptoms of inflammatory bowel diseases such as ulcerative colitis, depending on the circumstances under which the exercise is undertaken, researchers report.

The researchers found that mice allowed to run freely on an exercise wheel for six weeks had fewer symptoms of colitis than sedentary mice after exposure to a chemical agent that induces colitis symptoms in mice. However, mice forced to run at a moderate pace on a treadmill a few times per week for six weeks had more colitis symptoms and higher mortality after exposure to the agent than sedentary mice, the researchers found.

These seemingly contradictory findings add to a growing body of research into the role of exercise and stress in reducing or increasing the severity of a host of inflammatory states, including those associated with Alzheimer's disease and infection with the [influenza virus](#).

"We are building a strong case to investigate how exercise affects gut [immune function](#) in humans and why exercise may beneficially affect disease activity in ulcerative colitis patients, as a few preliminary studies have indicated," said University of Illinois graduate student Marc Cook, who led the research with [U. of I. kinesiology and community health](#) professor [Jeffrey Woods](#). "Our exciting new data give us some potential causes of these benefits that need to be tested in people, which is our ultimate goal."

The new findings are reported in the journal *Brain, Behavior, and Immunity*.

The researchers found that voluntary wheel running significantly reduced the expression of some pro-inflammatory genes in the colon in the [mouse model](#) of colitis, while forced treadmill running significantly increased expression of many of those same genes. Forced running on a treadmill by itself, but not voluntary wheel running, also increased expression of an [antibacterial](#) signaling protein, suggesting that forced exercise disrupted the microbial environment of the gut.

"There is evidence that prolonged, intense exercise can cause gastrointestinal disruption in competitive athletes. However, very little is known about regularly performed moderately intense exercise, especially in those with inflammatory bowel diseases," Woods said. "From a public health perspective, this would be important information to gather."

In humans, inflammatory bowel diseases "cause chronic morbidity that significantly reduces physical functioning and quality of life in afflicted patients," the authors wrote. Although diseases of the gut, including colitis, appear to arise spontaneously, scientists know that environmental influences such as diet, genetic factors, infection and psychological stress play a role. The microbial populations of the gut are also key contributors to gastrointestinal health, and disruptions can trigger chronic inflammatory responses, "instigating clinical symptoms, including colon ulcers, rectal bleeding, diarrhea, abdominal pain, fatigue, and an overall altered emotional well-being," the authors wrote. Ulcerative colitis also "significantly increases the risk of developing colorectal cancer later in life."

A number of factors may help explain the different physiological responses to voluntary and forced exercise in the mice, including altered gut populations of harmful versus beneficial bacteria and changes to the

resident populations of specific immune cells in the gut, the researchers said.

Although more studies must be conducted to clarify the interplay of exercise and stress in maintaining or undermining the health of the gut, the research "supports a role for exercise in the adjunct treatment of [ulcerative colitis](#) in humans," the authors wrote.

More information: The paper, "Forced Treadmill Exercise Training Exacerbates Inflammation and Causes Mortality While Voluntary Wheel Training is Protective in a Mouse Model of Colitis," is available online: [www.sciencedirect.com/science/ ... ii/S0889159113001955](http://www.sciencedirect.com/science/.../S0889159113001955)

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