

A high-fiber diet protects mice against the flu virus

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Dietary fiber increases survival in influenza-infected mice by setting the immune system at a healthy level of responsiveness, according to a preclinical study published May 15th in the journal *Immunity*. A high-

fiber diet blunts harmful, excessive immune responses in the lungs while boosting antiviral immunity by activating T cells. These dual benefits were mediated by changes in the composition of gut bacteria, leading to an increase in the production of short-chain fatty acids (SCFAs) through the microbial fermentation of dietary fiber.

"The beneficial effects of dietary fiber and SCFAs on a variety of [chronic inflammatory diseases](#), including asthma and allergies, have received substantial attention in recent years and have supported momentum toward their use in clinical studies," says senior study author Benjamin Marsland of Monash University. "But we were concerned that these treatments might lead to a general dampening of immune responses and could increase susceptibility to infections."

From a public health perspective, influenza A [infection](#) is especially relevant because it is one of the most common viral diseases worldwide. Up to 20% of people are infected each year, resulting in substantial morbidity and mortality. In the new study, Marsland and his team found that mice were protected from influenza infection by a diet supplemented with either the highly fermentable fiber inulin or SCFAs.

Specifically, these treatments led to both the dampening of the [innate immune response](#) that is typically associated with tissue damage, and also the enhancement of the [adaptive immune response](#) that is charged with eliminating pathogens.

"We typically find that a certain treatment turns our immune system either on or off," Marsland says. "What surprised us was that [dietary fiber](#) was selectively turning off part of our immune system, while turning on another, completely unrelated part of our immune system."

Taken together with past studies, the new findings suggest that the modern Western diet consisting of food high in sugar and fat and low in

fiber could increase susceptibility to [inflammatory diseases](#) while decreasing protection against infections. From a therapeutic standpoint, additional research is needed to determine how much fiber, and what type of fiber, would be most effective in humans.

For their own part, Marsland and his team will further examine how dietary changes influence the immune system, and particularly how changes in the gut can influence lung diseases. Currently, they are planning dietary intervention studies in humans to determine how their results could best be translated to day-to-day living.

"There is a need for carefully designed and controlled dietary or SCFA intervention studies in humans to address how these findings could be exploited to benefit people with asthma, or for preventing viral infections," Marsland says. "We should also look further into these pathways as a means of supplementing other therapies or enhancing vaccine efficacy."

More information: *Immunity*, Trompette and Gollwitzer et al.: "Dietary Fiber Confers Protection against Flu by Shaping Ly6c-Patrolling Monocyte Hematopoiesis and CD8+ T Cell Metabolism" [www.cell.com/immunity/fulltext ... 1074-7613\(18\)30191-2](http://www.cell.com/immunity/fulltext...1074-7613(18)30191-2) , DOI: [10.1016/j.immuni.2018.04.022](https://doi.org/10.1016/j.immuni.2018.04.022)

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