

Feed a cold, feed a fever: Research shows calorie cut makes it harder to fight flu

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Dieters or those who consume fewer calories during flu season could have a harder time fighting off the flu virus, according to research by Michigan State University nutritional immunology professor Elizabeth Gardner.

In a study published in the November issue of the *Journal of Nutrition*, Gardner showed that mice with a calorie-restricted diet were more likely to die during the first few days of infection than mice with a normal diet. Caloric restriction is the practice of reducing the intake of calories to 40 percent of a normal diet, while maintaining adequate vitamins and minerals.

"If you are exposed to a new strain of influenza, to which your body has not made adequate antibodies to protect you from infection, your body must rely on cells that will kill the virus," Gardner said. "The natural killer cells are important in controlling the early stages of virus infection, because they act quickly once they encounter virus-infected cells. Our studies show that calorically restricted mice have increased susceptibility to influenza, and their bodies are not prepared to produce the amount of natural killer cells needed to combat the stress of fighting an infection."

In Gardner's research, both regularly fed mice and calorically restricted mice exposed to the virus exhibited decreased food intake as they tried to fight off the infection. Yet the mice on calorically restricted diets took longer to recover and exhibited increased mortality, weight loss and other negative effects. Even though both sets of mice had a diet fortified

with appropriate vitamins, the mice consuming normal amounts of food had their appetites back sooner and recovered faster.

"Our research shows that having a body ready to fight a virus will lead to a faster recovery and less-severe effects than if it is calorically restricted," Gardner said. "Adults can calorically restrict their diet eight months out for the year, but during the four months of flu season they need to bump it up to be ready. You need the reserves so your body is ready for any additional stress, including fighting a virus."

Calorically restricted diets in general have been shown to increase lifespan in everything from yeast to primates, according to Gardner. But the model used in Gardner's research can be extended to more vulnerable groups including children and the elderly, who don't eat as much but often take vitamin supplements.

Flu shots can't guarantee protection, in any case, since they are formulated months in advance and only can target a small handful of the many flu virus strains that might infect the population.

"If the strain of flu a person is infected with is different from the strain included in the flu vaccination, then your body sees this as a primary infection and must produce the antibodies to fight it off. A calorically restricted body is not as well prepared to do this and cannot control early infection, which impedes recovery," Gardner added.

Gardner, an associate professor in the Department of Food Science and Human Nutrition, now is investigating the mechanisms responsible for decreased immune function during caloric restriction. Her research in nutritional immunology will lead to a better understanding of how a diet affects the immune system and the best conditions for a body to quickly and successfully fight infections.

Source: Michigan State University

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