

Mediterranean diet helps reduce effects of stress in animal model, study shows

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Even before the pandemic and the presidential election, Americans reported some of the highest perceived levels of stress in the world, according to the American Psychological Association. Not only does stress have negative effects on work and personal relationships, it also increases the risk of many chronic conditions, such as heart disease and Alzheimer's disease, and is associated with higher mortality rates.

But eating a Mediterranean diet may provide a relatively easy way to help lessen the physiological effects of [stress](#) and promote healthy aging, according to a new study conducted by researchers at Wake Forest School of Medicine, part of Wake Forest Baptist Health.

Findings from the study, the first preclinical trial to measure the effects of long-term consumption of a Western versus Mediterranean diet on stress under controlled experimental conditions, are published in the current online edition of the journal *Neurobiology of Stress*.

"It is very difficult to control or reduce stressors in

our lives," said Carol A. Shively, Ph.D., professor of pathology and comparative medicine at Wake Forest School of Medicine and principal investigator of the study. "But we do know that we can control our diet, and previous observational studies have suggested that lower perceived stress is associated with high fruit and vegetable consumption.

"Unfortunately, Americans consume a diet rich in [animal protein](#) and saturated fat, salt and sugar, so we wanted to find out if that diet worsened the body's response to stress compared to a Mediterranean diet, in which much of the protein and fat come from plant sources."

The researchers studied the effects of the chronic stress of low social status and the acute stress of being socially isolated for 30 minutes in 38 middle-age animals that were fed either a Mediterranean or Western diet. The diets were formulated to closely reflect human diets, with protein and fat derived largely from animal sources in the Western group and primarily from plant sources in the Mediterranean group.

To determine the diets' effect on stress responses, the scientists measured changes in the sympathetic and [parasympathetic nervous systems](#) and in the adrenal gland hormone cortisol, in response to acute and chronic stress.

The [sympathetic nervous system](#) is involved in the "fight or flight" response and regulates bodily functions such as heart rate and blood pressure. The parasympathetic nervous system has opposite effects that help the body return to a calmer state. High sympathetic nervous system activity can be harmful to health, so maintaining a healthy balance between the two systems is important, Shively said.

Cortisol, the body's main stress hormone, helps the body access resources needed to fight or flee. However, if stress is continuous, cortisol levels stay high and damage tissues.

Compared to animals fed a Western diet, those fed the Mediterranean diet exhibited enhanced stress resilience as indicated by lower sympathetic nervous system and cortisol responses to stress, and more rapid recovery after the stress ended, Shively said.

"Our study showed that the Mediterranean diet shifted the balance toward the parasympathetic nervous system, which is good for health," Shively said. "By contrast, the Western diet increased the sympathetic response to stress, which is like having the panic button on all the time—and that isn't healthy."

As the animals aged over the 31-month study, which is equivalent to about 9 years in humans, the research group noted that sympathetic nervous system activity increased. However, the Mediterranean diet slowed the aging of the sympathetic nervous system.

The study's findings suggest that population-wide adoption of a Mediterranean-like [diet](#) may provide a relatively simple and cost-effective intervention to reduce the negative impact of psychological stress on health and delay nervous system aging, Shively said.

More information: Carol A. Shively et al. Mediterranean diet, stress resilience, and aging in nonhuman primates, *Neurobiology of Stress* (2020). [DOI: 10.1016/j.ynstr.2020.100254](https://doi.org/10.1016/j.ynstr.2020.100254)

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