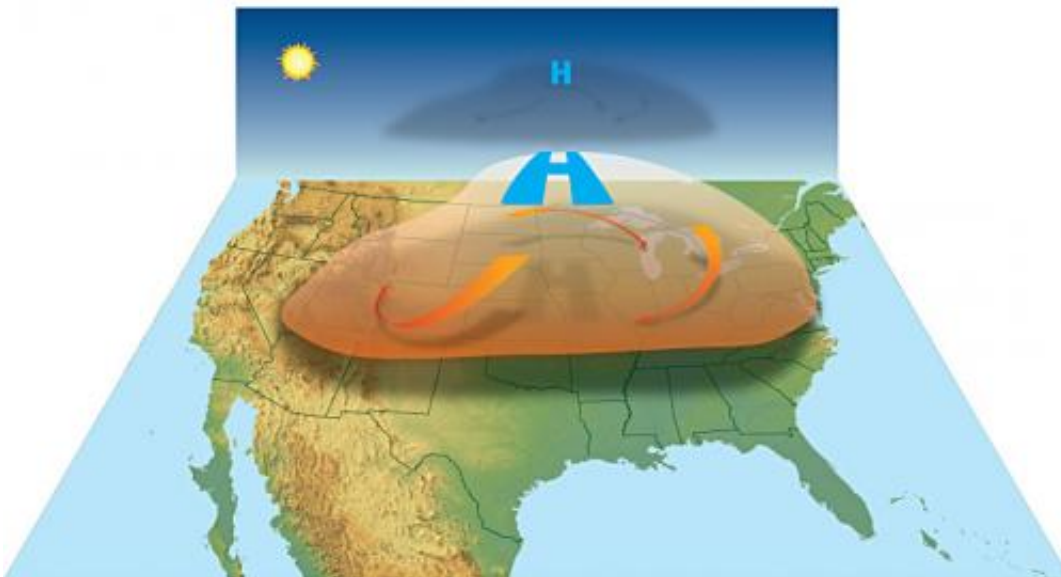


# Folic acid may help elderly weather heat waves

March 31 2015, by A'ndrea Elyse Messer

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Formation of a heat wave. Credit: U. S. National Weather Service

Supplemental folic acid can enhance blood vessel dilation in older adults, according to Penn State researchers, suggesting that folic acid supplements may be an inexpensive alternative for helping older adults to increase skin blood flow during heat waves and reduce cardiovascular events.

"We know that when [older adults](#) are exposed to heat, their bodies are not able to increase skin [blood flow](#) to the same extent that young subjects do, and as a consequence, older adults are at a greater risk for

cardiovascular events, such as heart attack and stroke, during environmental heat waves," said Anna Stanhewicz, post-doctoral fellow in kinesiology.

Researchers know this is due, in part, to aged blood vessels that cannot produce enough nitric oxide, Stanhewicz said. "When young, healthy people are exposed to heat, their bodies increase blood flow to the skin and this increased flow, combined with sweating, helps to cool the body down."

Nitric oxide is the molecule produced by the blood vessels using an enzyme that requires tetrahydrobiopterin—BH4. As people age, BH4 bioavailability decreases, Stanhewicz said.

In a previous study, Stanhewicz and researchers found that when they gave BH4 to older adults they were able to produce more nitric oxide. Folic acid increases the bioavailability of BH4 in the body, so in this study researchers believe that folic acid increased nitric oxide production by increasing BH4, Stanhewicz said. The researchers published their results online in the journal *Clinical Science*.

"The bottom line is that folic acid supplementation increased nitric oxide production in older blood vessels," Stanhewicz said. "In the past, studies conducted in our lab showed that we can increase nitric oxide production, and then consequently reflex skin blood flow, in older adults by giving them an expensive pharmaceutical. So in this study, we wanted to test that again, but with an inexpensive treatment that might work the same way."

Researchers tested very healthy older adults in order to isolate the affect of age without other cardiovascular diseases.

They conducted two sub-studies, localized heating and whole-body

heating. For the local heating study, the researchers used two intradermal microdialysis fibers to deliver folic acid solution locally to the blood vessels in the skin.

"In this study we found that when we locally increased folic acid availability, those blood vessels produced more [nitric oxide](#) than the [blood vessels](#) at the control site," Stanhewicz said.

Subjects received both folic acid and lactated ringer's solution, a placebo, at randomized sites on their arms so subjects could serve as their own controls.

For the whole-body heating study, subjects took 5 milligrams of folic acid or a placebo once daily for six weeks. The researchers chose this treatment regimen because of previous reports and pilot testing. They performed all tests in a temperature-neutral laboratory with the subjects lying down and the experimental arm supported at heart level. They controlled skin temperature using a water-perfused suit that covered the entire body except for the head, hands, feet and forearms.

"In the future, it would be interesting to study whether folic acid can also improve vessel function in people with clinical cardiovascular disease, and to try to determine if people who have taken [folic acid](#) supplements throughout their life have better vascular health compared to people who do not," Stanhewicz said.

Additional authors include Lacy M. Alexander, associate professor of kinesiology; and W. Larry Kenney, Marie Underhill Noll Chair in Human Performance and professor of physiology and kinesiology.

"In my opinion, this series of studies epitomizes translational research," Kenney said. "Through systematic, stepwise advances in our knowledge Anna was able to identify a cost-effective way to potentially improve

vascular health for a large number of individuals."

The National Institutes of Health funded this study.

Provided by Pennsylvania State University

Citation: Folic acid may help elderly weather heat waves (2015, March 31) retrieved 16 April 2024 from <https://medicalxpress.com/news/2015-03-folic-acid-elderly-weather.html>

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