

Dietary supplement shows promise for reversing cardiovascular aging

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Scientists have long known that restricting calories can fend off physiological signs of aging, with studies in fruit flies, roundworms, rodents and even people showing that chronically slashing intake by about a third can reap myriad health benefits and, in some cases, extend lifespan.

From a public health perspective, that advice would be impractical for many and dangerous for some.

But a new University of Colorado Boulder study published today indicates that when people consume a [natural dietary supplement](#) called nicotinamide riboside (NR) daily, it mimics caloric restriction, aka "CR," kick-starting the same key chemical pathways responsible for its [health benefits](#).

Supplementation also tends to improve [blood pressure](#) and arterial health, particularly in those with mild hypertension, the study found.

"This was the first ever study to give this novel compound to humans over a period of time," said

senior author Doug Seals, a professor and researcher in the Department of Integrative Physiology. "We found that it is well tolerated and appears to activate some of the same key biological pathways that calorie restriction does."

For the study, published in the journal *Nature Communications*, Seals and lead author Chris Martens, then a postdoctoral fellow at CU Boulder, included 24 lean and healthy men and women ages 55 to 79 from the Boulder area.

Half were given a placebo for six weeks, then took a 500 mg twice-daily dose of nicotinamide riboside (NR) chloride (NIAGEN). The other half took NR for the first six weeks, followed by placebo.

The researchers took [blood](#) samples and other physiological measurements at the end of each treatment period.

Participants reported no serious adverse effects.

The researchers found that 1,000 mg daily of NR boosted levels of another compound called nicotinamide adenine dinucleotide (NAD+) by 60 percent. NAD+ is required for activation of enzymes called sirtuins, which are largely credited with the beneficial effects of calorie restriction. It's involved in a host of metabolic actions throughout the body, but it tends to decline with age.

Research suggests that as an evolutionary survival mechanism, the body conserves NAD+ when subjected to calorie restriction. But only recently have scientists begun to explore the idea of supplementing with so-called "NAD+-precursors" like NR to promote healthy aging.

"The idea is that by supplementing older adults with NR, we are not only restoring something that is lost with aging (NAD+), but we could potentially be ramping up the activity of enzymes responsible for helping protect our bodies from stress," Martens

said.

Provided by University of Colorado at Boulder

The new study also found that in 13 participants with elevated blood pressure or stage 1 hypertension (120-139/80-89 mmHg), systolic blood pressure was about 10 points lower after supplementation. A drop of that magnitude could translate to a 25 percent reduction in heart attack risk.

"If this magnitude of [systolic blood pressure](#) reduction with NR supplementation is confirmed in a larger clinical trial, such an effect could have broad biomedical implications," the authors note.

Ultimately, the authors say, such CR-mimicking compounds could provide an additional option—alongside the dietary changes and exercise currently recommended—for people whose blood pressure is not yet high enough to warrant medication but who are still at risk for a heart attack.

They stress that the study was small and "pilot in nature."

"We are not able to make any definitive claims that this compound is safe or going to be effective for specific segments of the population," said Martens, now an assistant professor at the University of Delaware. "What this paper provides us with is a really good stepping stone for future work."

Martens and Seals have applied for a grant to conduct a larger clinical trial looking specifically at the impact of NR supplementation on blood pressure and arterial health. Martens is also launching a separate trial looking at the impact NR has on older adults with mild cognitive impairment, a precursor to Alzheimer's disease.

More information: Chronic nicotinamide riboside supplementation is well-tolerated and elevates NAD⁺ in healthy middle-aged and older adults, *Nature Communications* (2018). [DOI: 10.1038/s41467-018-03421-7](#) , <https://www.nature.com/articles/s41467-018-03421-7>

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