



Niagen nicotinamide riboside may reduce obesity-related inflammation



By Stephen Daniells+

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Nicotinamide riboside, a vitamin B3 derivative, may reduce inflammation linked to obesity, and reduce the risk of diseases linked to this type of inflammation, according to pre-clinical data from scientists at the National Institutes of Health.

Excess calorie consumption by individuals with obesity often triggers inflammation, but new data published in *The Journal of Clinical Investigation* indicated that a protein called SIRT3 may provide resistance to the inflammatory response triggered by obesity.

"Previous research has shown that intermittent fasting or intermittent calorie restriction — by way of eating fewer calories for a few days a month — reduces inflammation," said Michael Sack, MD, PhD, a senior investigator at NIH's National Heart, Lung, and Blood Institute and lead researcher on the new study. Dr Sack and his team identified **the role of SIRT3** through an investigation involving 19 healthy volunteers who fasted for a 24-hour period.

"We found through our study that this effect is mediated, in part, on a molecular level when SIRT3 blocks the activity of another molecule known as the NLRP3 inflammasome," he added.

The NIH researchers also found that fasting is not the only way to activate SIRT3; it can also be



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activated by nicotinamide riboside (NR).

"Taken together, these early results point to a potential mechanism for addressing obesity-related inflammation, and thus diseases linked to this type of inflammation, such as asthma, type 2 diabetes, rheumatoid arthritis, and atherosclerosis — conditions associated with a reduced quality of life and/or premature death," said Dr Sack.

Dr Sack confirmed that his team is conducting a follow-up study at the NIH Clinical Center to determine whether nicotinamide riboside can specifically reduce bronchial inflammation in individuals with asthma. If the results of the study are promising, he said, they will conduct larger clinical trials to validate the findings and potentially inform treatment of obesity-related inflammation in asthma.

Nicotinamide riboside

NR is found naturally in trace amounts in milk and other foods, and is a more potent, no-flush version of niacin (vitamin B3). Published research has shown that NR is a potent precursor to NAD⁺ in the mitochondria of animals. NAD⁺ is an important cellular co-factor for improvement of mitochondrial performance and energy metabolism.

As organisms age, NAD⁺ levels drop, which leads to a decrease in mitochondrial health; this in turn leads to age-related health issues. Low NAD⁺ levels limit activity of a group of enzymes called sirtuins, which are believed to play a key role in longevity. NAD⁺ levels also can be depleted by lifestyle choices such as overeating and lack of exercise. By boosting NAD⁺, NR can increase mitochondrial health and induce creation of new mitochondria.

Irvine, CA-based ChromaDex has been accumulating the IP surrounding NR for a couple of years, having licensed patents from Cornell University, Dartmouth College, and Washington University in St Louis.

'NR is ready to move into larger clinical trials'

The study's findings were welcomed by Frank Jaksch, founder and CEO of ChromaDex, which markets NR as Niagen. "This NIH study shows that nicotinamide riboside can be used for preventing or reversing certain obesity-associated diseases," Jaksch told NutraIngredients-USA. "It is great seeing published research showing ingredients such as NR might be valuable in combating a substantial health problem such as obesity."



Frank Jaksch, ChromaDex

"We have had tremendous success with all of our collaborative studies on nicotinamide riboside, and we have over 40 such collaborative studies currently underway. This NIH study is another example of a successful preclinical study demonstrating NR is ready to move into larger clinical trials. We are looking forward to working with Dr. Sack at NHLBI-NIH on this very important study"

Material cooperative research and development agreement

Also this week, ChromaDex announced a material cooperative research and development agreement with the National Institute on Aging (NIA) to investigate Niagen nicotinamide riboside (NR) to further investigate the effects of NR on wild type and DNA repair deficient mouse models

Under the terms of the agreement, the NIA will study Niagen supplementation on Cockayne syndrome and Ataxia Telangiectasia to see if the ingredient can rescue dysfunctional mitochondria in *C. Elegans*.



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The NIA will also set up toxicity studies using NR in Cockayne syndrome mice and will study drug function and efficacy, and measure a variety of endpoints under short and long term treatment with NR. **ChromaDex will provide quantities of Niagen as well as contribute \$150,000 for the research activities under the agreement.**

Source: *The Journal of Clinical Investigation*
Published online ahead of print, doi:10.1172/JCI83260
"Fasting and refeeding differentially regulate NLRP3 inflammasome activation in human subjects"
Authors: J. Traba, et al.

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