

# BioNMN: A Reliable NMN Supplement Ingredient

written by Mike Roberto | March 30, 2021

You may have read our mega-guide about *nicotinamide mononucleotide (NMN)* supplements. This article will focus on our preferred nucleotide supplement on the market – **BioNMN** by NNB Nutrition.

## The Basics



**Nicotinamide mononucleotide (NMN)** is a precursor to *nicotinamide adenine dinucleotide (NAD+)*. NAD+ plays a crucial role in the production of *adenosine triphosphate (ATP)* – which fuels most of the cells in our body. NAD+ levels decline as we age, which may cause health problems. Humans cannot absorb NAD directly, but can process *NMN* precursors into NAD+.

The *issue* with NAD+ supplements is that high quality, lab-tested products are hard to find. This is where NNB Nutrition comes in. BioNMN is NNB Nutrition's patented take on *NMN* that emphasizes bioavailability and quality through their mastery of "Ingredientology". NNB Nutrition backs BioNMN via third party high-performance liquid chromatography (HPLC). HPLC is a gold standard form of analytic chemistry that tells us *exactly what is inside a product down to the molecule* – so you know what you're getting with BioNMN.

Most NAD enhancement supplements on the market use untraceable ingredients from no-name companies, but NNB put their entire philosophy into BioNMN, and any brand can use it. While ingredient quality is good, you may be wondering why NMN is worth taking.

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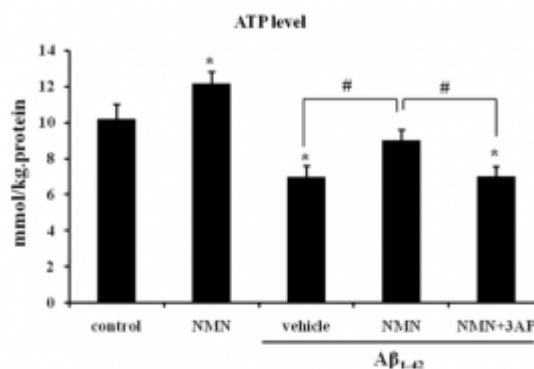
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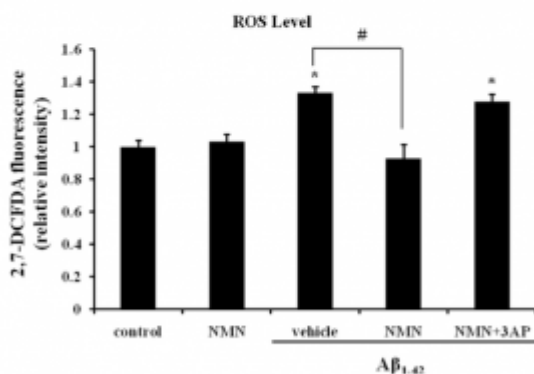
## The Science Behind BioNMN

### • Potential Brain and Heart Benefits

NAD<sup>+</sup> supplementation appears to stimulate SIRTUIN, a family of genes that geriatric researchers implicate in the aging process. By *stimulation* of SIRTUIN, NAD<sup>+</sup> may mitigate the cellular damage that occurs from physiologic stress.



**Fig. 6.** Effect of NMN on ATP level in hippocampus. In comparison to control, NMN alone increased the ATP level and A $\beta_{1-42}$  oligomer decreased ATP level. NMN increased the A $\beta_{1-42}$  oligomer induced ATP level decrease. The presence of 3-AP prevented the protective effect of NMN and showed a decreased level of ATP level. \*p < 0.05 relative to control, #p < 0.05 relative to A $\beta_{1-42}$  oligomer.



**Fig. 7.** Changes in reactive oxygen species (ROS) contents of OHCs. OHCs were exposed to experimental treatments for 6 h and ROS levels were measured with an H2DCFDA assay. NMN alone did not affect ROS level in the absence of A $\beta_{1-42}$  oligomer. A $\beta_{1-42}$  oligomer significantly increased the ROS level of hippocampus over control, and NMN decreased A $\beta_{1-42}$  oligomer-induced ROS accumulation. 3-AP prevented the protective effect of NMN and showed an increase of ROS accumulation. \*p < 0.05 relative to control, #p < 0.05 relative to A $\beta_{1-42}$  oligomer.

NMN helped the brain generate more ATP and less ROS (reactive oxygen species),[1] which *alone* makes it of major interest

A study in 2014 by Rutgers Medical School and Tokai University shows that NMN supplementation maintains tissue perfusion (circulation of blood, providing oxygenation) even in the face of ischemia.[2,3] The researchers linked this protective effect to a dose-dependent stimulation of *SIRT3*, a gene within the SIRTUIN family.[3]

Another investigation shows that NMN supplementation confers cardioprotective effects through a combination of improved ATP synthesis and induction of a relative acidosis.[4]

### Neuroprotection

NMN acts as a neuroprotective agent through similar mechanisms – and may even benefit those suffering from neurodegenerative disorders! A trial on mice with Alzheimer’s Disease suggests that NMN use increases mitochondrial oxygen utilization, reduces mitochondrial damage, and even *strengthens* mitochondrial integrity within neural tissue.[1] A separate trial showed that NMN combats *amyloid plaque* accumulation – a pathognomonic feature of Alzheimer’s Disease implicated in the neural degenerative aspects of the disease.[5]

For those that want *the brass tax* – **BioNMN supplementation may protect cells against low oxygen states and may improve mitochondrial health.** Which is exactly what NNB Nutrition strives for, as told in our articles detailing *The NNB Nutrition Story: Supplement Ingredient Solutions for the New Decade.*

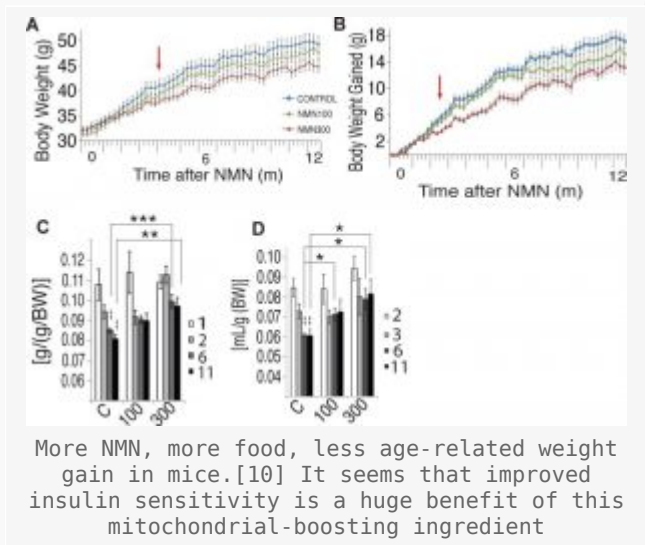
- **Hormonal Health**



NMN supplementation may also improve insulin sensitivity.[6]

Researchers at the University of Washington found that mice with diabetes have *lower* amounts of NAD+ within their fat and liver tissue compared to healthy mice.[7] When these diabetic mice were given NMN for 7-10 days, their insulin sensitivity improved. The researchers believe low levels of NAD+ may suppress genes responsible for insulin sensitivity. Due to the improvement in insulin

sensitivity after supplementation, this study illustrates that glucose-control gene activity may improve when NAD+ deficiency is corrected.[8,9]

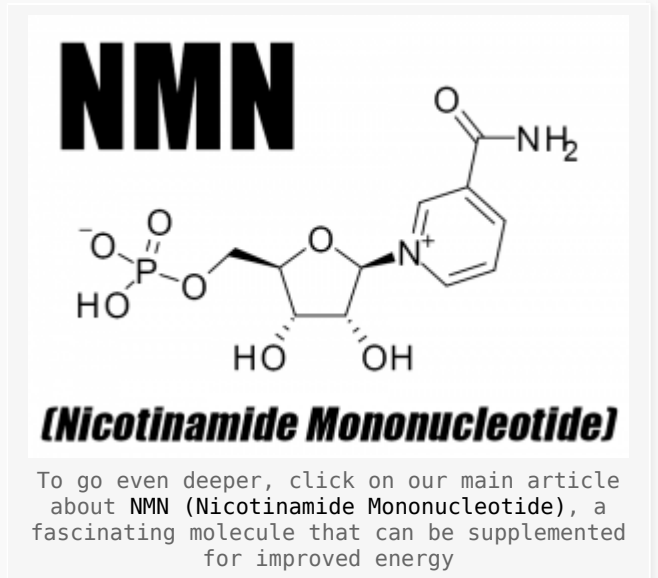


This improvement in insulin sensitivity could help combat obesity. A trial published in *Cell Metabolism* shows that a daily-dose of NMN led to *lower body weights in mice that ate more food than a control group*. While this appears to be an obvious violation of the “calories in vs calories out” manifesto, it makes sense as NMN-treated mice showed more oxygen consumption and energy expenditure than the control group,[10] likely demonstrating even *greater* “calories out” than the amount from increased food consumption!

Another trial done on exercising mice concluded that NMN supplementation may combat obesity in a mechanism similar to regular exercise.[11] Since exercise *also tends to increase oxygen consumption and energy expenditure* – this conclusion did not surprise us. Interestingly, this reminds us of another exercise-induced “signal” that can be supplemented, NNB Nutrition’s MitoBurn, which is their branded form of L-BAIBA.

While we are optimistic about NMN’s future as a diabetic health supplement, we want to see more results in humans (the existing ones are quite promising) before giving our full endorsement. As NNB ran human trials for NucleoPrime, we expect more research to develop as BioNMN matures as a product.

## • The Longevity Angle

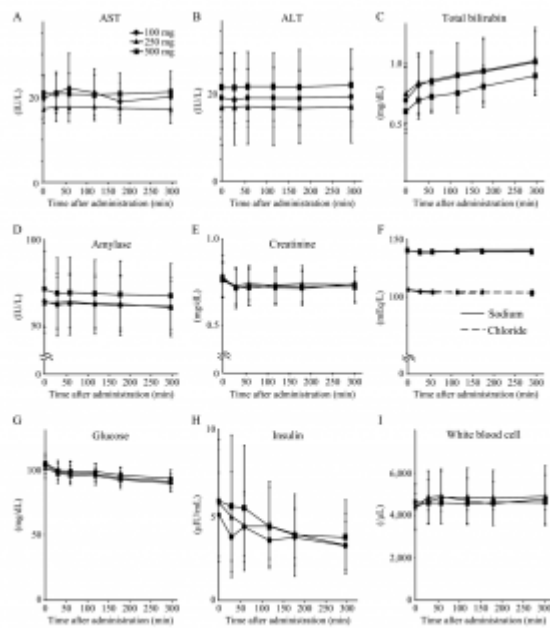


Neurologic health, mitochondrial functionality, and metabolic efficiency decrease with age.[12,13] As NMN provides a protective role throughout the body, BioNMN *truly shines as an anti-aging supplement*. For those that want *direct research* of NMN's benefits in geriatrics patients, the animal study below is quite promising.

A trial in *Aging Cell* sought to reverse vascular dysfunction in older mice through NMN supplementation. The researchers compared the carotid artery functionality of these older mice against a younger control group. *Prior* to supplementation, the older mice had worse vascular function than the control group. By the end of this trial, **the older mice given NMN had vascular function that was nearly indistinguishable from the younger mice**.[13] While we want this finding *replicated*, it certainly created a serious amount of hype in the anti-aging space.

NMN supplementation also may improve optic health, bone health, and myeloid-lymphoid composition.[10]

- **Human Trials: In progress and succeeding (2021 update)**



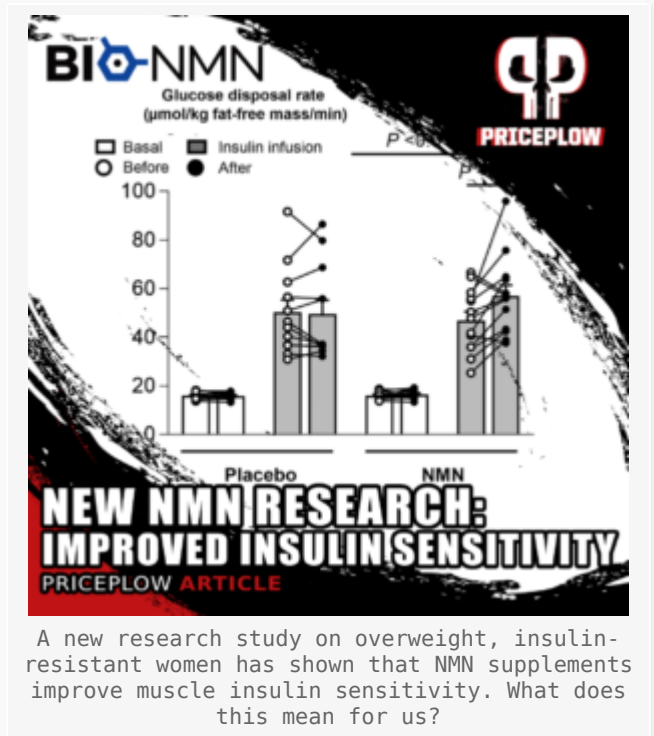
**Fig. 3** Changes in serum parameters after the oral administration of NMN. NMN was orally administered to 10 healthy men and the serum parameters were measured for 5 h. Serum parameters included aspartate transaminase (AST) (A), alanine transaminase (ALT) (B), total bilirubin (C), amylase (D), creatinine (E), sodium and chloride (F), glucose (G), and insulin (H) levels, and white blood cell count (I),  $N = 8-10$ . Data are presented as mean  $\pm$  standard deviation. Circle, triangle, and square indicate 100, 250, and 500 mg of NMN, respectively.

The human safety data is great news, but even more compelling is the **reduction in insulin** alongside a drop in glucose.[14]

The keen-eyed readers of PricePLOW may be curious about *human*-based trials. While such research is still young, it is promising. A trial by the Keio University School of Medicine suggests that NMN is well-tolerated in humans. While the subject size was *small* at 10 subjects, no adverse effects were noted. The trial also shows that **NMN supplementation may reduce insulin concentration and blood glucose levels**[14] – a finding that supports the insulin sensitivity improvements shown in mice.

Phase II of this study, utilizing a larger subject pool is currently underway. The National Institute of Health is also conducting a double-blind, randomized, placebo-controlled study on NMN in humans. This study is expected to finish in 2021[15] – so stay tuned and subscribe to our NMN alerts below for updates.

## 2021 Update: Increased Muscle Insulin Sensitivity in Overweight Women



A 2021 human double-blinded, placebo-controlled study out of Washington University has been published showing **NMN improve muscle insulin sensitivity in overweight women!**[16]

The study is covered in our article titled *New NMN Study: Improved Muscle Insulin Sensitivity in Women*, but essentially, 13 women in the NMN group (taking 250mg twice daily) averaged a 20% improvement in muscle insulin sensitivity compared to no change in the control group of 12 women.

In addition, NMN also improved expression of genes involved in muscle structure and remodeling.

This leads us to believe that the dosing suggested below (250mg twice daily) is on the right path, and also leads us to wonder if we have a new glucose disposal agent ingredient here for *athletes* as well as metabolically unfit individuals!

## Dosing and Recommended Products

We look forward to seeing anti-aging and mitochondrial booster supplements with a dose of 250-500mg BioNMN.. but what about GDA supplements too?

As a newer supplement, there is no *agreed upon* clinical dosing for NMN supplementation. Much of the trials relied on intramuscular dosing as well – making an effective oral dose an open question. The Keio University study suggests doses of 500mg at one time are well-tolerated.[14] For those new to BioNMN products, we suggest taking **250mg twice per day** and titrating up to **500mg twice per day**.

Other nicotinamide products are *generally recognized as safe* (GRAS),[17-19] which bodes well for BioNMN achieving GRAS status soon as well. For those that are formulating, or want to give NAD+ supplements a shot, we suggest looking towards **NNB Nutrition's BioNMN**. As we saw with other anti-aging / cellular energy supplements such as NucleoPrime, MitoBurn, and GlucoVantage, NNB backs their ingredients with actual top-of-the-line HPLC lab tests – not just COAs.

**PricePlow Blog Post**

**Berberine.**  
**The Best Glucose Disposal Ingredient Just Got Better**

How does the best glucose disposal ingredient in **berberine** get any better? It's known as *dihydroberberine*, and sold as NNB Nutrition's **GlucoVantage**, and if there's *one* anti-aging ingredient we suggest, it's this one!

## The Ultimate Anti Aging Stack

Anti-aging supplements seem to have “stalled” in the past couple of years, with a lot of emphasis shifted to immunity and stress. Getting back to *forward* progress, you can stack BioNMN with NucleoPrime (mixed nucleotides) and GlucoVantage (dihydroberberine, a more bioavailable form of berberine) as an effective all-inclusive anti-aging combination. MitoBurn L-BAIBA could make great sense as a mitochondrial booster as well. We suspect that such an offering will eventually be available as an official product that brings cellular energy *and* blood sugar support back to give a breath of fresh air to your mitochondria. On top of the *NNB Nutrition Story* linked above, you can also learn more about this philosophy in our article titled *The Power of “Mito”: Optimizing the Mitochondria to Unlock Clean Energy*.



## Conclusion: BioNMN is the next major NAD Booster



NNB Nutrition is an innovative ingredient development company with an elite team of over 100 scientists from over 10 countries.

NAD+ supplements are an exciting innovation in an all-too-stale category of the industry. They appear to provide cardiovascular and neurologic benefits while also improving insulin sensitivity. As these three domains of health worsen with age, NAD+ products may be a potent inclusion to an antiaging regimen. BioNMN by NNB Nutrition appears to be on the *cutting edge* of the industry because of NNB's emphasis on ingredient quality, bioavailability, and safety. For those looking to improve their preventative health measures, keep an eye out for BioNMN as it makes its way into products.

To learn more about the *biochemistry* behind this molecule, see our in-depth article on **NMN**.

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