

# Can These Nutrients Help Prevent Muscle Wasting?

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✓ Fact Checked

November 25, 2022

## STORY AT-A-GLANCE

- › Age-related muscle loss, also called sarcopenia, begins at age 30 and affects at least half of the people over age 80; omega-3 fatty acids, the amino acid leucine, and the probiotic *Lactobacillus paracasei* PS23 help counteract sarcopenia
- › Whey protein is high in leucine and has long been known as an excellent source of protein that is easily digested and absorbed. Leucine may regulate muscle protein turnover and is an effective way to optimize muscle growth when combined with resistance training
- › Nicotinamide adenine dinucleotide (NAD+) is a substrate for important enzymes and impacts age-related amyloid protein aggregates in the muscle that affects muscle aging. Boost your levels through exercise, sauna bathing, fasting, and minimizing EMF exposure
- › A Harvard study showed consuming protein is not enough to protect muscle mass, participants must also include strength training, which also improves basal blood flow in the lower extremities. This helps protect against functional impairment and metabolic syndrome

As you age, your body naturally tends to lose muscle. This condition is known as sarcopenia or muscle wasting. A 2022 study published in the journal *Nutrients*<sup>1</sup> found increasing certain nutrients could lower your risk of sarcopenia as you age.

If you are not proactive, you can expect to lose approximately 15% of your muscle mass between your 30s and your 80s.<sup>2</sup> An estimated<sup>3</sup> 10% to 25% of older adults under age 70 and half of those over age 80 have sarcopenia.

Even when you're younger, if you are forced to stay in bed it can have a dramatic impact on your muscle mass. In one 2015 review,<sup>4</sup> researchers found you could lose 5.2% of your muscle mass in the first two weeks of bed rest and by Day 23, you could have lost up to 10% of your quadriceps muscle mass. Strong muscles are required for mobility, balance and the ability to live independently.

Sarcopenia<sup>5</sup> can increase the risk of falls and fractures, which ultimately can lead to hospitalization and surgery. It is important to know that sarcopenia is not related to your body mass. In other words, individuals who are obese can also lose muscle mass, which increases their risk for complications.

One meta-analysis<sup>6</sup> of 35 studies and 58,404 people demonstrated the global prevalence of sarcopenia is 10% in men and women. Scientists understand the importance of muscle wasting as it relates to longevity and health. This led the Centers for Disease Control and Prevention<sup>7</sup> to recognize it as an independently reportable medical condition.

When you have a reserve of muscle mass, it minimizes the challenges that result from muscle wasting<sup>8</sup> if you become sick or hospitalized. Because muscle is lost far more easily and quickly than it's built, it's crucial to find ways to continuously promote and maintain muscle mass.

## **Nutritional Treatment Helps Counteract Sarcopenia**

Researchers in the featured study<sup>9</sup> knew that a variety of nutrients have shown effectiveness in supporting muscle. The randomized clinical trial was developed to analyze how effective two months of food high in omega-3 fats, leucine and probiotic *Lactobacillus paracasei* PS23 (LPPS23) would be on appendicular lean mass, inflammatory status, amino acid profile and muscle performance in people who were diagnosed with sarcopenia.

The researchers enrolled 60 participants who were within 4.8 years of 79.7 years and split them into an intervention or placebo group. The researchers prepared a customized

diet schedule for both groups that provided 1.5 grams of protein per kilogram of body weight each day.<sup>10</sup> Each group also received a dietary plan that consisted of approximately 30% lipids and 55% carbohydrates.

The researchers measured weight loss as compared to the individual's weight history in the six months before their baseline visit. The subjects were questioned about how well they had followed their diet plan and physical activity recommendations. They also filled out a 24-hour dietary recall once a month.

The group that received the intervention took a supplement containing 500 mg of omega-3 fatty acid, 2.5 g of leucine and an LPPS23 probiotic. The control group received an isocaloric placebo. At the end of the study, the researchers measured body composition, physical performance, mood, blood pressure, muscle strength and functional status.

They concluded from the measurements that the intervention appeared to be a “valid strategy to counteract the progression of sarcopenia and sarcopenic-defining parameters in older adults.”<sup>11</sup>

## **Whey Protein Another Tool to Prevent Sarcopenia**

As the featured study demonstrated, your diet plays a significant role in muscle development since your muscles need enough protein to stay viable. A 2011 paper<sup>12</sup> published in the American Journal of Nutrition noted that the differences in digestion and absorption of dietary protein can modulate muscle growth.

So, while you need protein to build and maintain muscle, some proteins are more easily digested and absorbed than others. When you eat the right kind of protein it can make a difference in the potential risk for sarcopenia. The researchers in the featured study<sup>13</sup> included the amino acid leucine in the intervention, which is also found in high concentrations in whey protein.<sup>14</sup>

Whey is a byproduct of cheese production and has long been acknowledged as an excellent source of protein. In the 2011 study, whey protein was compared to casein and

casein hydrolysate, and was found to stimulate muscle protein growth the best, likely because of the leucine content.

One of the reasons that leucine is so important to prevent sarcopenia is that it helps regulate the turnover of protein in your muscle. A 1975 paper<sup>15</sup> in the Journal of Clinical Investigation said leucine may also “play a pivotal role in the protein-sparing effect of amino acids.”

A more recent 2017 study<sup>16</sup> explained the most effective way to optimize muscle building is to use a combination of resistance training followed by a protein meal, with leucine-rich whey being one of the most efficient proteins that can be used. However, a Harvard study demonstrated that simply taking leucine will likely be ineffective.<sup>17</sup>

Two groups of men over age 65 consumed either 0.8 grams of protein per kilo per day or 1.3 g of protein per kilo per day. The researchers found the high protein group did not experience an increase in lean muscle mass, or improve physical function or muscle strength, greater than the low protein group, most likely because they were not exercising.

Whey protein also contains glutathione, another important component in promoting and protecting muscle mass. It is thought to play an important role in muscle wasting, specifically in helping to modulate higher levels of oxidative stress<sup>18</sup> often found in patients with sarcopenia. As noted in a 2012 review:<sup>19</sup>

*“It has been suggested that oral antioxidant supplementation may contribute at reducing indices of oxidative stress both in animal and human models by reinforcing the natural endogenous defenses ...*

*Antioxidants are substances able to inhibit the rate of oxidation. Mainly, antioxidant enzymes (e.g., catalase, superoxide dismutase (SOD), glutathione peroxidase, glutathione reductase) work to maintain a state of balance preventing the transformation of ROS and to convert them into more stable molecules (like water and molecular oxygen).”*

## **NAD+ Combats Age-Related Muscle Deterioration**

Studies have also proposed that mitochondrial dysfunction in the motor neurons may drive the development of sarcopenia. A 2021 paper<sup>20</sup> published in Cell Reports compared the similarities between muscle aging and degenerative muscle diseases. The data revealed that protein aggregates deposit in skeletal muscle, which is a feature of muscle aging.

The researchers identified an amyloid-like protein that impairs mitochondrial function. While researchers have known that aggregated proteins could contribute to brain aging, this was the first time that data had shown it could contribute to muscle aging and directly damage the mitochondria.

The researchers first used a substance in worms and found it could reduce age-related amyloid protein aggregates.<sup>21</sup> They found the same results in human muscle tissue from older subjects. They then went on to test nicotinamide adenine dinucleotide (NAD+) boosting nicotinamide riboside in aged mice and found it reduced the number and size of the amyloid aggregates within the skeletal muscle tissue.

NAD+ is a substrate for several important enzymes and is essential in metabolic processes, such as creating ATP in the mitochondria. A 2020 paper<sup>22</sup> published in Endocrinology and Metabolism demonstrated that when the NAD+ salvage pathways in muscle are impaired, mitochondrial dysfunction and decreased muscle mass ensue.

If your NAD+ level is low, some simple lifestyle strategies can help. For example, exercise, fasting, minimizing electromagnetic field (EMF) exposure and sauna bathing can help improve your NAD+ levels. Exercise, heat exposure and fasting address low NAD+ because they are catabolic stressors that activate AMP protein kinase (AMPK).

This in turn activates an enzyme called NAMPT, which governs the NAD+ salvage pathway. Oxidative stress and inflammation can also deplete NAD+. Exercise, sauna and fasting can help reduce oxidative stress and inflammation, and as a result, less NAD+ is depleted.

The best way to increase NAD+ levels is to optimize your circadian rhythm by going to bed around 9 and getting up around 5 AM. The further you veer from these hours the more you challenge your circadian rhythm. It is also important to avoid blue light from screens and home lights after sunset and before sunrise.

Then you want to make sure you are doing regular strength training exercises. The best time to do them would be in the AM while you are fasting. You can also take niacinamide 50 mg powder three times a day. More is not better and will be counterproductive by inhibiting your longevity proteins (sirtuins). You can see [my interview with Nichola Conlon](#) for more details.

## **Strength Training Helps Preserve Muscle Mass and Heart Health**

As the Harvard study<sup>23</sup> demonstrated, consuming protein is not enough to protect your muscle mass. One study<sup>24</sup> from the University of Michigan School of Public Health found those with lower muscle strength did not live as long as their peers with stronger muscles. After adjusting for confounding factors, the data continue to show those with low muscle strength had a 50% greater risk of dying early.

The data was pulled from a study of 8,326 men and women aged 65 and older. A loss of muscle in older adults may also be a primary driver of insulin resistance<sup>25</sup> and declining strength may impact a reduction in daily physical activity, which also contributes to metabolic dysfunction.<sup>26</sup>

Researchers from the National Institute of Health and Nutrition in Tokyo, Japan,<sup>27</sup> tested the hypothesis that a reduction in leg blood flow would be absent or minimal in people who regularly perform strength training exercises. They engaged a group of 104 men ages of 20 to 34 and 35 to 65 to compare whole-leg blood flow and vascular conductance between the groups.

The data showed no notable differences in the two age groups in those who used resistance training. However, there was a significant difference in the sedentary middle-

aged group leading the team to conclude that a reduction in basal whole leg blood flow may be absent in men who routinely engage in resistance training.

The researchers suggested that resistance training could favorably influence leg perfusion. Lower levels of basal leg blood flow are associated with developing metabolic syndrome and functional impairment.<sup>28</sup>

I have been exercising for over 50 years. In the first 43 years, I exclusively used aerobic exercise. I didn't realize that while it lowered the risk of heart disease, it is highly catabolic and eventually lowers the ability to build muscle. At the height of my running career, my upper arm circumference was 10.5 in.

However, contrast that with my arm circumference in December 2020 when it measured 15 inches. I stopped long-distance running and started resistance training. The results didn't happen overnight, and I was well over 50 when I first began using resistance training.

The key to my success has been allowing time for significant recovery so the connective tissue and muscle can rebuild. I work with a trainer, but if you cannot afford a trainer, there are many great videos.

When you use resistance training and add the nutritional elements your body needs to grow muscles, you'll reap the benefits. Remember to avoid doing the same exercise every day to allow the body to recover and repair so you get the benefits and avoid injuries.

## Sources and References

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