

Top 9 Benefits of NAC (N-Acetyl Cysteine)

How we reviewed this article:

N-acetyl cysteine (NAC) is a supplement form of cysteine, a conditionally essential amino acid. NAC has many health benefits, including replenishing antioxidants and nourishing your brain.

Top 9 Health Benefits of NAC (N-Acetyl Cysteine)

Are you curious about NAC? This video explains what it is and the top 9 benefits of it.

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NAC is considered ‘conditionally essential’ because your body can produce it from other amino acids. It becomes essential only when the dietary intake of methionine and serine is low.

Cysteine is found in most high protein foods, such as chicken, turkey, yogurt, cheese, eggs, sunflower seeds, and legumes.

Consuming adequate cysteine and NAC is important for various health reasons, including replenishing the most potent antioxidant in your body, glutathione. These amino acids also help with chronic respiratory conditions, fertility, and brain health.

Here are the top 9 health benefits of NAC.

NAC is valued primarily for its role in antioxidant production. Along with two other amino acids — glutamine and glycine — NAC is necessary to make and replenish glutathione.

Glutathione is one of your body’s most important antioxidants — compounds that help neutralize free radicals that can damage cells and tissues. Antioxidants help support the body’s natural immune system and toxin-elimination processes. Research also suggests that antioxidant intake can reduce the risk of several chronic conditions, including cardiovascular disease. ([1Trusted Source](#), [2Trusted Source](#)).

Summary

NAC helps replenish glutathione, arguably your body’s most powerful antioxidant. Therefore, it may help improve a variety of health conditions.



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NAC plays an important role in your body's detoxification process. It can help prevent side effects of environmental toxin exposure (3).

Doctors regularly give intravenous NAC to people with an acetaminophen overdose to prevent or reduce kidney and liver damage (4Trusted Source). NAC has applications for other liver diseases thanks to its antioxidant and [anti-inflammatory](#) benefits.

Summary

NAC helps detoxify your body and can treat acetaminophen overdoses.

NAC helps regulate glutamate levels, the brain's most important neurotransmitter. While glutamate is required for regular brain activity, excess glutamate and glutathione depletion can cause brain damage.

This may contribute to mental health conditions such as bipolar disorder, schizophrenia, obsessive-compulsive disorder (OCD), and substance use disorder (5Trusted Source, 6, 7).

For people with bipolar disorder and depression, NAC may help decrease symptoms and improve quality of life. Moreover, research suggests that it may play a role in treating moderate to severe OCD (8Trusted Source, 9Trusted Source).

Likewise, an animal study suggested that NAC may minimize the adverse effects of schizophrenia, such as social withdrawal, apathy, and reduced attention spans (10Trusted Source).

NAC may also have applications in managing substance use disorders. For example, preliminary studies show that NAC may decrease cannabis and nicotine use and cravings

([11Trusted Source](#), [12Trusted Source](#)).

Summary

By regulating glutamate levels in your brain, NAC may alleviate symptoms of mental health conditions and reduce substance use and cravings.

NAC can relieve symptoms of respiratory conditions by acting as an antioxidant and expectorant, loosening mucus in your air passageways.

As an antioxidant, NAC helps [replenish glutathione levels](#) in your lungs and reduces inflammation in your bronchial tubes and lung tissue.

People with chronic obstructive pulmonary disease (COPD) experience long-term oxidative damage and inflammation of lung tissue, which causes airways to constrict, leading to shortness of breath and coughing.

Some studies suggest that taking NAC supplements can help improve COPD symptoms, exacerbations, and lung decline ([13Trusted Source](#), [14Trusted Source](#)).

People with chronic bronchitis can also benefit from NAC. Bronchitis occurs when the mucous membranes in your lungs' bronchial passageways become inflamed, swell, and shut off airways to your lungs ([15Trusted Source](#)).

By thinning mucus in your bronchial tubes and boosting glutathione levels, NAC may help decrease the severity and frequency of wheezing, coughing, and respiratory attacks.

In addition to relieving COPD and bronchitis, NAC may improve other lung and respiratory tract conditions — such as cystic fibrosis, asthma, and pulmonary fibrosis — as well as symptoms of nasal and sinus congestion due to allergies or infections ([16Trusted Source](#)).

Summary

NAC's antioxidant and expectorant capacity can improve lung function by decreasing inflammation and breaking up mucus.

NAC's ability to replenish glutathione and regulate brain glutamate levels can boost brain health.

The neurotransmitter glutamate is involved in a broad range of learning, behavior, and memory functions, while the antioxidant glutathione helps reduce brain cell oxidative damage associated with aging.

Because NAC helps regulate glutamate levels and replenish glutathione, it may benefit those with health conditions affecting the brain and memory ([4Trusted Source](#)).

Alzheimer's disease slows down learning and memory capacity. Animal studies suggest that NAC may slow the loss of thinking ability in people with Alzheimer's disease ([5Trusted Source](#), [17](#)).

Parkinson's disease is characterized by the deterioration of cells that generate the neurotransmitter dopamine. Both oxidative damage to cells and a decrease in antioxidant

ability contribute to this disease.

NAC supplements appear to improve both dopamine function and disease symptoms such as tremors ([5Trusted Source](#)).

While NAC may improve [brain health](#), more human research is needed to make firm conclusions.

Summary

By helping replenish the antioxidant glutathione and regulate glutamate, NAC has the potential to treat conditions such as Alzheimer's disease and Parkinson's disease.

In some cases, NAC has been shown to improve male fertility.

Approximately 15% of all couples trying to conceive are affected by infertility. In almost half of these cases, [male infertility](#) is the main contributing factor ([18Trusted Source](#)). Many male infertility issues increase when antioxidant levels are insufficient to address free radical formation in the reproductive system ([19Trusted Source](#)).

One condition contributing to male infertility is varicocele — when veins inside the scrotum enlarge due to free radical damage. In one study, 35 men with varicocele received 600 mg of NAC daily for 3 months after surgery. The combination of surgery and NAC supplementation improved semen integrity and partner pregnancy rate by 22% compared with the control group ([20Trusted Source](#)).

In addition, NAC may improve [fertility in older women](#) and those with polycystic ovary syndrome (PCOS) by inducing or augmenting the ovulation cycle, although more research is needed ([21Trusted Source](#)).

Summary

NAC may help improve fertility in men by reducing oxidative stress that damages or kills reproductive cells. It may also aid fertility in women with PCOS.

High blood sugar and obesity contribute to inflammation in fat tissue.

This can damage or destroy insulin receptors and increase the risk of type 2 diabetes ([22Trusted Source](#)).

Animal studies show that NAC may stabilize blood sugar by decreasing inflammation in fat cells and thereby improving [insulin resistance](#) ([23Trusted Source](#)).

When insulin receptors are intact and healthy, they properly remove sugar from your blood, keeping levels within normal limits.

Summary

By decreasing inflammation in fat tissue, NAC may reduce insulin resistance and improve blood sugar regulation, but human-based research is lacking.

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Oxidative damage to heart tissue often leads to heart disease, causing strokes, heart attacks, and other severe conditions. NAC may reduce heart disease risk by reducing oxidative damage to tissues in your heart ([24Trusted Source](#)).

Studies show that NAC may protect heart function and heart health in people with diabetes and those recovering from certain heart surgeries ([25Trusted Source](#), [26Trusted Source](#)).

Summary

NAC can reduce oxidative damage to your heart, which can, in turn, decrease your risk of heart disease.

NAC and glutathione also benefit immune health.

Research on certain diseases associated with NAC and glutathione deficiency suggests that supplementing with NAC might improve — and potentially restore — immune function ([27](#), [28](#)).

Summary

NAC's ability to boost glutathione levels may improve immune function.

There is no specific dietary recommendation for cysteine because your body can produce small amounts.

For your body to make the amino acid cysteine, you need adequate amounts of folate, vitamin B6, and [vitamin B12](#). These nutrients can be found in beans, lentils, spinach, bananas, salmon, and tuna.

While most protein-rich foods — such as chicken, turkey, yogurt, cheese, [eggs](#), sunflower seeds, and legumes — contain cysteine, some people supplement with NAC to increase their cysteine intake.

NAC has low bioavailability as an oral supplement, meaning your body does not absorb it well. The accepted daily supplement recommendation is 600–1,800 mg of NAC ([29](#)).

NAC can be administered intravenously or orally, as an aerosol spray, or in liquid or powder form.

Summary

Eating high protein foods can provide your body with the amino acid cysteine, but you can also take NAC as a supplement to help treat certain conditions.

NAC is likely safe for adults when provided as a prescription medication.

However, high amounts may cause [nausea](#), vomiting, diarrhea, and constipation. Inhalation of

NAC solutions can cause swelling in the mouth, runny nose, drowsiness, and chest tightness.

People with bleeding disorders or taking blood thinning medications should not take NAC because it may slow blood clotting ([30Trusted Source](#)).

NAC has an unpleasant smell that makes it hard to consume. If you choose to take it, consult your doctor first.

Summary

While NAC is considered safe as a prescription medication, it can cause nausea, vomiting, and gastrointestinal disturbances, as well as mouth issues if inhaled.

What is the benefit of taking NAC?

At a glance, supplementing with NAC may help:

- replenish glutathione, an important antioxidant
- detox your body
- treat overdoses of acetaminophen
- regulate glutamate, a neurotransmitter involved in mood regulation
- relieve respiratory symptoms
- support cognitive functions like memory and learning
- reduce inflammation
- support sugar regulation and reduce insulin resistance
- protect heart function
- improve your immune system

What happens if you take NAC daily?

You may take NAC daily for a short time, but research about the safety of taking NAC every day for the long term is limited. A [2021 literature reviewTrusted Source](#) found that most studies use it with specific therapeutic goals between 6 weeks and 6 months. Toxicity from NAC intake is rare, particularly in low doses.

If you take NAC to manage or prevent a condition, consider asking a healthcare professional about the best protocol for your health needs.

Does NAC reduce inflammation?

Yes, research suggests NAC suppresses the production of inflammatory compounds in the body.

Doctors may use NAC supplementation as an [anti-inflammatory agentTrusted Source](#) in conditions like liver disease, neurodegenerative conditions, mental health disorders (like Alzheimer's), and heart disease, among others.

Should you take NAC in the morning or at night?

Your healthcare professional may advise when and how often to take NAC depending on your

health goals and total dosage.

NAC may also interact with medications and other supplements, so when you should take NAC may depend on your overall protocol.

NAC plays several important roles in human health.

Renowned for its ability to replenish levels of the antioxidant glutathione, it also regulates the important neurotransmitter glutamate. Additionally, NAC helps your body's detoxification system.

These functions make NAC supplements a viable treatment option for multiple health conditions.

Consult your doctor to determine whether NAC may benefit your health.