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

Cysteine is a semi-essential amino acid.

It's considered semi-essential because your body can produce it from other amino acids, namely methionine and serine. 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.



N-Acetyl cysteine (NAC) is a supplement form of cysteine.

Consuming adequate cysteine and NAC is important for a variety of health reasons — including producing the most powerful 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.

## 1. Essential for Making the Powerful Antioxidant Glutathione



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NAC is valued primarily for its role in antioxidant production.

Along with two other amino acids — glutamine and glycine — NAC is needed to make and replenish glutathione.

Glutathione is one of the body's most important [antioxidants](#), which helps neutralize free radicals that can damage cells and tissues in your body.

It's essential for immune health and fighting cellular damage. Some researchers believe it may even contribute to longevity (1 [👍](#)).

Its antioxidant properties are also important for combatting numerous other ailments caused by oxidative stress, such as heart disease, infertility and some psychiatric conditions (2 [👍](#)).

#### SUMMARY

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

## 2. Helps With Detoxification to Prevent or Diminish Kidney and Liver Damage

NAC plays an important role in your body's detoxification process.

It can help prevent side effects of drugs and environmental toxins (3 [👍](#)).

In fact, doctors regularly give intravenous (IV) NAC to people with an acetaminophen overdose to prevent or reduce kidney and liver damage (4 [👍](#)).

NAC also has applications for other liver diseases due to its antioxidant and [anti-inflammatory](#) benefits (5 [👍](#)).

#### SUMMARY

NAC helps detoxify your body and can treat acetaminophen overdoses.

## 3. May Improve Psychiatric Disorders and Addictive Behavior

NAC helps regulate levels of glutamate — the most important neurotransmitter in your brain (6 [👍](#)).

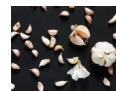
While glutamate is required for normal brain action, excess glutamate paired with glutathione depletion can cause brain damage.



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This may contribute to mental health conditions, such as bipolar disorder, schizophrenia, obsessive-compulsive disorder (OCD) and addictive behavior (7, 8).

For people with bipolar disease and depression, NAC may help decrease symptoms and improve your overall ability to function. What's more, research suggests that it may play a role in treating moderate to severe OCD (9, 10).

Likewise, an animal study implied that NAC may minimize negative effects of schizophrenia, such as social withdrawal, apathy and reduced attention spans (11).

NAC supplements can also help decrease withdrawal symptoms and prevent relapse in cocaine addicts (12, 13).

Additionally, preliminary studies show that NAC may decrease marijuana and nicotine use and cravings (14, 15).

Many of these disorders have limited or currently ineffective treatment options. NAC may be an effective aid for individuals with these conditions (16).

#### SUMMARY

By regulating glutamate levels in your brain, NAC may alleviate symptoms of multiple psychiatric disorders and reduce addictive behavior.

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## 4. Helps Relieve Symptoms of Respiratory Conditions

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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.

NAC supplements have been used to improve COPD symptoms, exacerbations and lung decline (17, 18, 19).


In a one-year study, 600 mg of NAC twice a day significantly improved lung function and symptoms in those with stable COPD (20).

Those 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 (21, 22).

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 (23).

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In addition to relieving COPD and bronchitis, NAC may improve other lung and respiratory tract conditions like cystic fibrosis, asthma and pulmonary fibrosis, as well as symptoms of nasal and sinus congestion due to allergies or infections (24 )


#### SUMMARY


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



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## 5. Boosts Brain Health by Regulating Glutamate and Replenishing Glutathione


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

The brain neurotransmitter glutamate is involved in a broad range of learning, behavior and memory actions, while the antioxidant glutathione helps reduce oxidative damage to brain cells associated with aging (6 )

Because NAC helps regulate glutamate levels and replenish glutathione, it may benefit those with brain and memory ailments (4 )

The neurological disorder Alzheimer's disease slows down a person's learning and memory capacity. Animal studies suggest that NAC may slow the loss of cognitive ability in people with Alzheimer's (4 , 25 )

Another brain condition, 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 (4 )

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

#### SUMMARY

By helping replenish the antioxidant glutathione and regulate glutamate, NAC has the potential to treat diseases like Alzheimer's and Parkinson's.

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## 6. May Improve Fertility in Both Men and Women

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 (26 <sup>👤</sup>).

Many male infertility issues increase when antioxidant levels are insufficient to combat free radical formation in your reproductive system. The oxidative stress can cause cell death and reduced fertility (26 <sup>👤</sup>).

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

One condition that contributes to male infertility is varicocele — when veins inside the scrotum become enlarged due to free radical damage. Surgery is the primary treatment.

In one study, 35 men with varicocele were given 600 mg of NAC per day for three months post-surgery. The combination of surgery and NAC supplement improved semen integrity and partner pregnancy rate by 22% compared to the control group (27 <sup>👤</sup>).

Another study in 468 men with infertility found that supplementing with 600 mg of NAC and 200 mcg of [selenium](#) for 26 weeks improved semen quality (28 <sup>👤</sup>).

Researchers suggested that this combined supplement should be considered as a treatment option for male infertility.

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In addition, NAC may improve [fertility in women](#) with polycystic ovary syndrome (PCOS) by inducing or augmenting the ovulation cycle (29 <sup>👤</sup>).

### 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.

## 7. May Stabilize Blood Sugar By Decreasing Inflammation in Fat Cells

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

This can lead to damage or destruction of insulin receptors and put you at a higher risk of type 2 diabetes (30 <sup>👤</sup>).

Animal studies show that NAC may stabilize blood sugar by decreasing inflammation in fat cells and thereby improving [insulin resistance](#) (31 <sup>👤</sup>, 32 <sup>👤</sup>).

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

However, keep in mind that human research on NAC is needed to confirm these effects on blood sugar control.

#### 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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## 8. May Reduce Heart Disease Risk by Preventing Oxidative Damage

Oxidative damage to heart tissue often leads to heart disease, causing strokes, heart attacks and other serious conditions.

NAC may reduce heart disease risk by reducing oxidative damage to tissues in your heart (33<sup>🔗</sup>).

It has also been shown to increase nitric oxide production, which helps veins dilate and improves blood flow. This expedites blood transit back to your heart and can lower your risk of heart attacks (34<sup>🔗</sup>).

Interestingly, a test-tube study showed that — when combined with [green tea](#) — NAC appears to reduce damage from oxidized “bad” LDL cholesterol, another contributor to heart disease (35<sup>🔗</sup>).

#### SUMMARY

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

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## 9. Ability to Boost Glutathione Levels May Improve Immune Function

NAC and glutathione also boost immune health.

Research on certain diseases associated with NAC and glutathione deficiency suggests that immune function might be improved — and potentially restored — by supplementing with NAC (36<sup>🔗</sup>).

This factor has been studied most in people with human immunodeficiency virus (HIV).

In two studies, supplementing with NAC resulted in a significant increase in immune function — with an almost complete restoration of natural killer cells (36<sup>🔗</sup>, 37<sup>🔗</sup>, 38<sup>🔗</sup>).

High levels of NAC in your body may also suppress HIV-1 reproduction (39<sup>🔗</sup>).

A test-tube study indicated that in other immune-compromised situations, such as the flu, NAC may hamper the virus's ability to replicate. This could potentially reduce the symptoms and lifespan of the illness (40🔗).

Similarly, other test-tube studies have linked NAC to [cancer cell death](#) and blocked cancer cell replication (41🔗, 42🔗).

Overall, more human studies are needed. Therefore, be sure to talk to your doctor before taking NAC during cancer treatment (43🔗).

#### SUMMARY

NAC's ability to boost glutathione levels may improve immune function in a variety of diseases.

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## Dosage

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 choose to supplement with NAC to increase their cysteine intake.

NAC has low bioavailability as an oral supplement, meaning that it's not well absorbed. The accepted daily supplement recommendation is 600–1,800 mg of NAC (44🔗, 45🔗).

NAC can be administered as an IV or taken 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 NAC can also be taken as a supplement to help treat certain conditions.

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## Side Effects

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

However, high amounts may cause [nausea](#), vomiting, diarrhea and constipation (47🔗).

When inhaled, it 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, as it may slow blood clotting (48🔗).

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

### SUMMARY

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

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## The Bottom Line

NAC plays several important roles in human health.

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

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

Consult with your doctor to see if NAC may boost your health.

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