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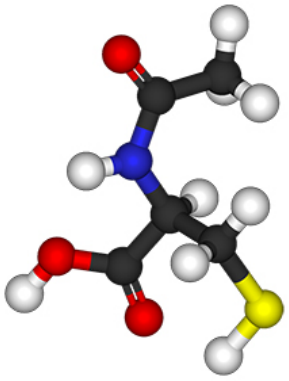
N-acetylcysteine (NAC)



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Summary: N-acetylcysteine (NAC) is a dietary supplement that might possibly be helpful in the treatment of various mental health conditions, though further research is required.

What is N-Acetylcysteine?

N-acetylcysteine (NAC) is a dietary supplement from the amino acid L-cysteine.

How does N-Acetylcysteine Work?

There are different theories on how NAC might be helpful.

1. NAC helps protect the body from excessive oxidative stress which causes cell damage. NAC is used by the body to make glutathione, an antioxidant. Normally our bodies make glutathione from cysteine. However, people may not have enough cysteine if they 1) do not get enough cysteine in their diet, and or 2) consume excessive processed food that lacks cysteine and sulphur-containing amino acids (SAA).

If this happens, the body may be unable to make enough glutathione, which protects against oxidation.

2. NAC can reduce inflammation. Inflammation is a normal process and can protect the body, too much inflammation may contribute to conditions such as depression and schizophrenia. By reducing cytokines, NAC can reduce inflammation.

3. NAC can lower levels of glutamate. High levels of glutamate appear linked to different mental health conditions.

4. NAC may raise dopamine levels. Insufficient dopamine appears linked to different mental health.

What Can NAC Be Used For?

Acetaminophen overdose

- It has been long known that NAC helps in conditions such as acetaminophen overdose. When people take an overdose of acetaminophen, this depletes glutathione (GSH), which can then lead to liver damage.
- Giving NAC provides the cysteine necessary to replace depleted glutathione (GSH) which then prevents liver injury.

It is theorized that NAC might be helpful with conditions with oxidative stress (Deepmala, 2015):

- Alzheimer's disease
- Trichotillomania, nail biting, skin picking, obsessive-compulsive disorder (OCD)
- Autism;
- Cocaine and cannabis addiction,
- Schizophrenia,
- Drug-induced neuropathy
- Anxiety,
- Attention deficit hyperactivity disorder
- Mild traumatic brain injury

Evidence does not support using NAC with

- Depression and bipolar. Early studies showed promise that NAC might be helpful, but later studies have not. More research is required to see if perhaps people respond better if they have lab tests that show increased inflammation (Andrade, 2021).
- Gambling,
- Methamphetamine and nicotine addictions
- Amyotrophic lateral sclerosis.

Research with NAC is still limited and thus, it is usually not recommended unless more commonly accepted treatments have been tried first.

Interested in Trying N-acetylcysteine (NAC)?

Interested in trying N-Acetylcysteine (NAC)? Contact a health care provider so that they can provide specific advice on your particular situation. And if it is decided to start NAC, then they can monitor you through the trial to see if it is helpful or not.

Dosages and Duration

Condition	Dosage	Duration
Treatment resistant obsessive compulsive disorder (OCD)	Adults: Start 1000 mg twice daily x 1-week, then increase to 1500 mg twice daily, up to 3,000 mg daily (Couto, 2018.) Adolescents: Start 600 mg twice daily and move up to 1200 mg twice daily (Arnold, 2020.)	Minimum of eight weeks (preferably 12 weeks) (Oliver, 2015.)
Adjunctive treatment in bipolar depression	Adults: 1000 mg twice daily (Berk, 2011.)	
Trichotillomania	Adults: 600-1200 mg twice daily (Grant, 2009.)	

Side Effects with N-acetylcysteine NAC)

N-acetylcysteine is relatively safe, with minor side effects such as

- Gastrointestinal discomfort (e.g., emesis, diarrhea).
- Reduction in platelet aggregation (rare)
- Skin reactions (very rare)

Caution with the following:

- Anti-cough medications. Do not give NAC along with anti-cough medications (such as cough syrup) as the decreased cough reflux may lead to more bronchial secretions (i.e. mucous or fluids in the bronchial tubes in the lungs).

- Oral antibiotics. If taking oral antibiotics, then oral antibiotics and NAC should be given at least 2 hours apart from one another. Giving both oral antibiotics and NAC together may result in decreased antibiotic activity.
- Bronchospasm. If patients have bronchial asthma, NAC should be stopped to prevent possible sudden tightening of the airway muscles (bronchospasm).

Warning in the following situations:

- NAC should not be given in children < aged 2, as mucolytics can cause increased bronchial secretions, leading to bronchial obstruction.
- Nitroglycerin (NTG). Avoid giving NAC and nitroglycerin closely together, as this can trigger low blood pressure (hypotension).

Where to Find it?

NAC can be found in drug stores, natural health foods stores and online retailers.

As NAC is a supplement, note that NAC is not regulated in the same manner as standard conventional medications might be. There may be significant variations between manufacturers in terms of purity and the active ingredient.

Summary

NAC is a nutritional supplement that shows promise in certain mental health conditions. However, research is in its early stages. One should always use other more established treatments that have more evidence. NAC should be used under the guidance of a qualified medical professional.

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About this Article

Written by the health professionals at the Children's Hospital of Eastern Ontario (CHEO) in Ottawa, Ontario, Canada. Special thanks to Dr. Paul Arnold for information about NAC dosages in adolescents. Conflicts of interest: The authors have no competing interests to declare.

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