

Taurine and GABA, The Amino Acid That Isn't and The One That Is... But Isn't

Stress. I don't know many people who like that word, especially when it describes their current state of mind. As far as your body is concerned, however, stress is not a new phenomenon. To your body, the stress of the job hunt is very similar to the stress of the forest hunt centuries ago. As such, your body has a well-developed system for helping the body naturally cope with stress.

While stress commonly feels very physical, i.e. headaches, nervousness, fatigue, etc., these stress responses are commonly the result of stimulation of the central nervous system originating in the brain. The brain has a safety mechanism that prevents it from 'overloading the circuits' with too much stimulation. Various nutrients and substances act as inhibitory neurotransmitters.

Arguably, the most important of these specialized neurotransmitters is *gamma-aminobutyric acid*, GABA for short. GABA is important because it controls the actions of the other inhibitory neurotransmitters: dopamine, epinephrine and norepinephrine. When a stressful situation occurs and the brain neurons experience heightened stimulation, the natural response is to increase the activity of GABA and thereby apply a calming effect on the nervous system. Most healthy individuals have a sufficient amount of GABA available to handle infrequent and short-term stress

incidents. Individuals who suffer from prolonged periods of stress, have a poor diet, or have a genetic impairment in GABA synthesis can develop a GABA deficiency. GABA deficiency has been linked to anxiety disorders, panic attacks, addiction, Parkinson's syndrome, cognitive impairment, insomnia, headaches, and seizure disorders like epilepsy.

Needless to say, it is important to maintain an adequate amount of GABA for those times when excessive stress can affect your health. Unfortunately, GABA can be taken directly as a supplement because it would never reach the brain. The way to increase GABA in the brain is by supplementing its precursors properly, namely Pyridoxal Phosphate, the active form of vitamin B6. For more information about B6, refer to the earlier newsletter, *Pyridoxine, The Vitamin of Dreams*.

While B6 is the primary cofactor for GABA production, other nutrients are essential in ensuring that GABA can effectively function. One of the key modulators of GABA is Taurine. Taurine, itself a powerful inhibitory neurotransmitter helps balance and control the effectiveness of GABA in the brain. In fact, a study published in *Advances in Experimental Medicine and Biology* in 2003 showed that taurine is so effective that it can actually *prevent* epileptic seizures. This is accomplished through its own inhibitory abilities as well as its effect on other neurotransmitters like GABA.

Excessive GABA levels, on the other hand, can lead to excessive neuronal

inhibition, which can result in sedation, anesthesia, and loss of coordination. Taurine plays an important role in maintaining this delicate balance.

What is interesting to note is that taurine is commonly referred to as an amino acid in scientific texts, but technically speaking it is not a full-fledged amino acid. It is actually an amino acid derivative that is produced from the amino acid cysteine. GABA, on the other hand, is an amino acid, by chemical definition, but it is almost never referred to as one because it is not one of the twenty-two “standard” amino acids that make up proteins. Quite an interesting duo.

If one wanted to ensure adequate supply of GABA in the brain with sufficient taurine to stabilize it, how would one go about such a task? Taurine proponents often claim that taurine is able to cross the blood brain barrier. If this were true, one could simply supplement taurine along with sufficient B6 and call it a day. Unfortunately, taurine can *technically* cross the blood brain barrier but it has a very difficult time due to its chemical composition. Taurine can be synthesized in the brain so if sufficient precursors were supplied, similar to B6 for GABA, the brain would be able to make its own taurine. This would require cysteine.

In order to get cysteine into the brain requires a special form of cysteine called N-acetyl cysteine. This form of cysteine attached to the N-acetyl “brain train” allows the cysteine amino acid to enter the brain where normally it would encounter the

same difficulty crossing as taurine. By using N-acetyl cysteine, the brain is able to simultaneously synthesize taurine while it also synthesizes GABA, assuming B6 was also supplemented.

Those of you who like to read labels have probably noticed taurine is a common ingredient in energy drinks like Red Bull. Taurine is not, strictly speaking, an “energy booster” or used for producing energy in any significant manner. It is, however, required in order for skeletal muscle to function properly. In a 2004 study at the Heinrich Heine University in Dusseldorf, Germany, researchers studied mice that had a genetic impairment that created taurine deficiency. They found that the mice’s ability to exercise was 80% less than normal mice. Since the heart is one of the most important muscles in the body, the researchers were quite surprised that cardiac function was not significantly impaired.

The cause for surprise was because of the vast number of studies showing the relationship between cardiovascular health and adequate taurine levels. Several studies conducted throughout the 1980s by Azuma J, Hasegawa H, Sawamura A, et al. showed that taurine supplementation was an effective treatment for congestive heart failure. Taurine improves the condition of the heart muscle and protects it from oxidative stress. Taurine acts as an antioxidant in a number of circumstances, as shown in a study published in 2008 where mice were poisoned with sodium fluoride, a poison that predominantly

affects the heart and circulatory system. Taurine protects this system by neutralizing the toxins.

Taurine has also been shown to lower blood pressure, and in the reduction of substances that produce VLDL and LDL (bad cholesterol), which effectively protect the cardiovascular system from atherosclerosis and coronary heart disease.

It is because of these well-known and widely researched effects of taurine on the heart that the German researchers were so surprised. Nonetheless, the importance of taurine in the skeletal muscle, cardiovascular system, and the central nervous system are undeniable.

The combination of taurine and GABA in combating the effects of stress is very powerful. Those of us who have experienced severe stress understand how debilitating it can be. Not only do you have to deal with the external causes of stress, work, family, bills, responsibilities, these are then compounded by body somatics that only add to the stress. Some people are less fortunate and resort to unhealthy and even self-destructive means of coping with stress and hardship.

One of the better approaches of dealing with the stress is to improve one's ability to tolerate the stress by removing the added complications created by a suffering body. Taurine and GABA help to calm the mind and nerves, protect the heart, and maintain the physical strength of your skeletal muscle so you can

remain alert and confident to be better able to face and tackle the real sources of stress.

To summarize: an effective strategy to combat stress using taurine and GABA is by supplementing both pyridoxal phosphate (B6) and N-acetyl cysteine. Since oxidative stress often accompanies other forms of stress caused by the outside world, it may also be beneficial to include additional antioxidants in your supplement regimen such as catechins from green tea. This is merely a recommendation and as such it is important to always consult a qualified medical professional before making any major changes in your diet or supplement regimen.

Taurine is called an amino acid, but it isn't one. GABA is an amino acid, but isn't called one. You might be called a nervous wreck, but you aren't one. The person that you are under stress is not the real you. By handling the effects of stress on your body first, you can return to being the real "you" that can handle anything.



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