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The neurotransmitters that facilitate psychological health—including positive mental outlook, balanced perspective, and the ability to cope with everyday *stress—depend largely on the availability of their amino acid precursors and the accessory nutrients required as enzyme cofactors for their production and degradation. Neurolink™ is a blend of these nutrients, designed to support balanced moods, mental focus, and healthy responses to emotional stress.

The fast pace of the modern world presents human prehistoric genes with sensory and psychological inputs that can be challenging to process. Insufficient sleep, poor diet, compromised digestive function, and the myriad of psychological stressors provide fertile ground for mood disturbances, emotional instability, and difficulty with focusing and attention. When these states are unrelenting and long-term, they can lead to conditions such as anxiety, depression, and attention deficit hyperactivity disorder (ADHD).*

Neurolink™ May Benefit:

- Mood disturbances
- Anxiety and depression
- Mental focus
- ADHD

Highlights

Gamma-amino butyric acid (GABA)

GABA is the primary inhibitory neurotransmitter in the central nervous system, known largely for its calming effect.¹ Not surprisingly, therefore, it has been shown to be effective in reducing the symptoms of anxiety and ADHD. In a study of subjects who had experienced a major depressive episode (including a subset diagnosed as bipolar), low cerebrospinal fluid (CSF) levels of GABA correlated to the severity of anxiety. Free GABA in the CNS was lower in those with major depressive disorder compared to healthy subjects.²

In a rat model of ADHD, low GABA levels were associated with the ADHD-like behavior.³ Human studies further support this association. Significantly reduced levels of GABA were found in children ages 8-12 diagnosed with ADHD compared to healthy, age-matched controls, when GABA was measured *in vivo* via magnetic resonance spectroscopy.⁴

L-Glutamine

The amino acid L-glutamine is a precursor to GABA in the brain, via the glutamate/glutamine cycle, with glutamate serving ultimately as a precursor to GABA.^{5,6} In addition, glutamine is a conditionally essential amino acid, meaning that during times of stress, illness, or trauma, the amount obtained from food may not be sufficient to meet the body's needs and supplementation may be beneficial.

L-Tyrosine

Tyrosine is a conditionally essential amino acid and the precursor to dopamine, a catecholamine associated with learning, attention, and mood. Research has established a connection between ADHD and disturbances in catecholamine transmission. Patients with ADHD show depleted levels of dopamine and norepinephrine, and some of the stimulatory pharmaceuticals designed to reduce symptoms of ADHD target pathways that suggest the abnormal neurotransmitter function seen in ADHD is primarily catecholaminergic in origin.⁷

Other conditions associated with low dopamine include carbohydrate bingeing (and resulting obesity), pathological gambling, pathological aggression, vulnerability to stress, and certain personality disorders, including risky novelty seeking. Dopamine dysregulation is also associated with autism spectrum disorders.⁸ In addition to low dopamine levels overall, ADHD is also possibly related to polymorphisms in multiple types of dopamine receptors. Supplemental GABA and other dopaminergic agents have improved ADHD symptoms in humans and animal models, and with as many as 30% of ADHD patients unresponsive to stimulant medications, alternative therapies—including amino acids—may be beneficial.⁸ It is noteworthy that tyrosine is also an essential component of thyroid hormone, and a common, well-recognized effect of hypothyroidism (both clinical and subclinical) is depression.⁹⁻¹¹

5-Hydroxytryptophan (5-HTP)

5-HTP is the precursor substance to the neurotransmitter serotonin, commonly regarded as the “feel good” chemical—one that facilitates a positive mental outlook and may help reduce symptoms of depression, seasonal affective disorder, chronic pain, and premenstrual syndrome.¹²

5-HTP is produced from the essential amino acid, tryptophan, which is relatively low in the food supply, even in protein-rich foods. Common antidepressant medications, such as SSRIs and MAOIs, have unpleasant side-effects and can be difficult to fit safely into the pharmaceutical regimen of patients on multiple drugs. 5-HTP has been shown to be as effective as certain drugs in patients with diagnosed depression.

In subjects presenting with their first depressive episode, 5-HTP supplementation was associated with significantly reduced depressive symptoms after just two weeks. Moreover, 5-HTP was as effective as fluoxetine, a popular SSRI antidepressant medication.¹³ Double-blind, placebo-controlled studies show that 5-HTP is, in most cases, more effective than placebos in significantly reducing symptoms of depression. A Cochrane review of 5-HTP supplementation suggests that 5-HTP is as effective as SSRIs and TCAs (tricyclic antidepressants), without many of the unpleasant side effects of the pharmaceutical drugs.¹⁴

5-HTP has a short half-life, which underpins the divided dose recommendation for this product, as this can be effective at maintaining clinically relevant levels. According to the authors of a study that supports 5-HTP administered three times daily (TID), “With less frequent dosing, plasma levels tend to have higher peaks and lower troughs.”¹⁵

Taurine

Taurine is a sulfur-containing organic acid derived from the amino acid cysteine. Taken as a supplement, it has been shown in animal models of anxiety to be anxiolytic without negative effects on sensorimotor and locomotor function.¹⁶⁻¹⁷ Taurine may also be effective for depression, by influencing extracellular signal transduction and phosphorylation of hippocampal enzymes.¹⁸

Inositol

Inositol is a carbohydrate synthesized from glucose (via glucose-6-phosphate), and is recognized for its calming effect, which can be helpful for modulating multiple mood disturbances. In a small, double-blind controlled crossover study involving subjects with panic disorder with or without agoraphobia, inositol supplementation was more effective than placebo in reducing frequency and severity of both panic attacks and agoraphobia. It may also be beneficial for obsessive-compulsive disorder (OCD).¹⁹⁻²⁰

Vitamin B6 (as Pyridoxal-5-Phosphate)

NeuroLink™ includes vitamin B6 as it is required for the biosynthesis of several neurotransmitters, including GABA, dopamine, norepinephrine, and serotonin. B6 is a cofactor for over 100 enzymes, mostly related to protein and amino acid metabolism, including aromatic L-amino acid decarboxylase (AADC), which catalyzes the conversion of 5-HTP to serotonin, and L-DOPA (from tyrosine) to dopamine.^{15,21,22} People with inborn errors of this enzyme exhibit combined deficiency of serotonin, dopamine and catecholamines, along with extraneurological symptoms.²³ Even in individuals without this congenital deficiency, low enzyme activity may benefit from supplemental B6, particularly when combined with the amino acid substrates needed for neurotransmitter production. Supplemental B6 may also be important for patients taking pharmaceutical drugs known to deplete this nutrient, such as oral contraceptives.²⁴ The form of B6 in this formula, pyridoxal-5-phosphate, is the bioactive form required for all transamination reactions and many decarboxylase enzymatic reactions.

Recommended Use: Take six capsules on an empty stomach per day, or as directed by your health care practitioner (divided dosing recommended).

For a list of references cited in this document, please visit:

<https://www.designsforhealth.com/techsheet-references/neurolink-references.pdf>

Dosing recommendations are given for typical use based on an average 150 pound healthy adult. Health care practitioners are encouraged to use clinical judgement with case-specific dosing based on intended goals, subject body weight, medical history, and concomitant medication and supplement usage.

* These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.

To contact Designs for Health, please call us at (860) 623-6314, or visit us on the web at www.designsforhealth.com.

Supplement Facts

Serving Size 6 capsules
Servings Per Container 30

Amount Per Serving	% Daily Value
Vitamin B-6 (as Pyridoxal-5-Phosphate)	30 mg 1765%
L-Tyrosine	1.2 g *
GABA (<i>gamma</i> -Aminobutyric acid)	750 mg *
L-Glutamine	600 mg *
Inositol	600 mg *
Taurine	600 mg *
5-HTP (5-Hydroxytryptophan)	150 mg *

*Daily Value not established.

Other Ingredients: Cellulose (capsule), microcrystalline cellulose, vegetable stearate.