

Nutricheck



Vitamin/Mineral Symptom Guide

The Neurotransmitters

Please Note: This *Neurotransmitters Symptom Check* is not intended to be a recommendation for self-medication, or to replace medical services.

THE NEUROTRANSMITTERS

USE ONLY UNDER THE GUIDANCE OF A HEALTH PRACTITIONER

SEROTONIN

Serotonin is a major neurotransmitter of the CNS. It is synthesised from the essential amino acid Tryptophan via a 2-step enzyme pathway and the rate-controlling co-enzyme for this pathway is Vit B6 (pyridoxal-5-phosphate). Synthesis of serotonin by serotonergic nerve cells is dependent on adequate CNS levels of L-tryptophan and Vit B6 and is also affected by inadequate tissue levels of magnesium and zinc. Tryptophan uptake into the CNS tissue is, in turn, dependent on a) dietary tryptophan intake b) concomitant dietary intake of neutral amino acids and c) concomitant dietary intake of carbohydrates. Thus, CNS uptake of tryptophan can be inhibited by foods that are high in protein (contain competing neutral amino-acids) and low in carbohydrate. Conversely, tryptophan uptake can be enhanced by consumption of a high-carbohydrate meal. As CNS synthesis of serotonin is directly dependent on tissue levels of L-tryptophan, dietary meal composition and L-tryptophan supplementation can exert a direct and substantial impact on brain serotonin levels.

The following symptoms and signs have been associated with a deficiency of Serotonin:

Sugar or starch-craving, insomnia (difficulty getting to sleep), non-refreshing sleep, irritability, aggressive behaviour, anxiety or nerviness, obsessiveness or excess worrying, Obsessive-Compulsive Disorder, unipolar Depression, possibly Schizophreniform Disorder. Increased pain sensitivity has been reported with serotonin depletion due to lowering of the spinal-cord and thalamic pain threshold.

Supplemental Dosage:

L-tryptophan 100mg to 300mg daily

Rich Natural Sources:

Soy protein, brown rice, cottage cheese, fish, beef, liver, lamb, peanuts, pumpkin, sesame seeds and lentils.

Therapeutic Dosage:

L-tryptophan 250mg to 3000mg per day -preferably on an empty stomach with a high-carbohydrate snack or drink. Doses can be spread over the day, with a larger fraction given at night. To enhance conversion to serotonin, Vit B6 and magnesium plus additional Vit B3 should also be administered.

Signs of Toxicity:

Side-effects may occur in patients who are deficient in Vit B6, B3 and Magnesium and, especially, dopamine. Common side-effects noted are: lightheadedness, dizziness, spaciness, excessive drowsiness, sleepiness, occasional agitation. Tryptophan supplementation may aggravate bronchial asthma, high blood pressure and bladder contractility. It should be used with great caution in patients with cancer, diabetes, SLE and during pregnancy. L-tryptophan supplements were recently withdrawn due to the occurrence of fatal Eosinophilic Myalgia, which has now been conclusively shown to be due to a contaminant introduced during the manufacturing process, and only affecting one manufacturer, and NOT due to Tryptophan itself. Tryptophan should be used with great caution in patients on MAO inhibitor drugs or the new antidepressant SSRI drugs, such as Prozac.

DOPAMINE

Dopamine is a major neurotransmitter, being synthesised by the dopaminergic neurones of the brain and spinal cord and also specific nerve cells of the enteric plexus. It is synthesised from the amino-acid L-tyrosine and the rate-controlling co-enzymes for this pathway are Vit B6, magnesium and zinc. Dopamine is further converted to

noradrenalin and adrenalin in specific neuronal cells and the adrenal medulla cells. Dopamine synthesis can be enhanced by increasing brain tissue levels of Vit B6, zinc and magnesium AND supplementation with L-tyrosine but this will only occur if the dopaminergic neurones are physiologically active, hence, exercise or mental arousal is also required. Brain tyrosine uptake is inhibited by competition from other neutral amino-acids (similarly to L-tryptophan) and is thus enhanced by concomitant feeding of a high-carbohydrate snack or drink. Dopamine and its related catecholamines generally have a stimulatory activity on the brain and cardiovascular system, whilst in the gastrointestinal system they generally induce inhibition.

Deficiency of Dopamine may be associated with the following clinical signs and symptoms:

Lethargy, tiredness, excessive drowsiness or sleepiness, apathy, depression, bowel irritability, lowered pain threshold with increased pain sensitivity, motor retardation, tremor, Parkinson's Disease, Unipolar Depression.

Rich Natural Sources:

Red meat, fish, cheese, liver, lamb, soy protein extracts, yeast,

Therapeutic Usage:

L-tyrosine 500mg to 3000mg daily -preferably given throughout the morning, on an empty stomach with a high-carbohydrate snack or drink.

Signs of Toxicity:

Tyrosine can induce toxic effects at doses above 2000mg per day. The common side-effects noted are constipation and agitation, whereas toxic effects are blistering and ulceration of peripheral digits and suppression of growth. Tyrosine supplements are contraindicated in patients on MAO inhibitor drugs.

ENDORPHINS

The endorphins are a heterogeneous group of oligopeptides which stimulate the opioid receptors of neuronal cells, inducing pain relief, mood elevation, stress-relief, optimism and euphoria. The major endorphins are dynorphin, B-endorphin, met-enkephalin and leu-enkephalin and are secreted in response to sympathetic nervous system stimuli, pain stimuli and substance P release. They are deactivated by the enzymes carboxypeptidase A and enkephalinase. Brain levels of endorphins have been found to be depleted in depressive states, chronic stress conditions and chronic pain syndromes. Tissue endorphin activity can be enhanced by supplementation with dl-phenylalanine (DLPA), a combination of isomers of the essential amino-acid phenylalanine, which has been shown to actively inhibit the activity of the endorphin-degrading enzymes and thus facilitate prolonged endorphin effects. DLPA does not interfere with the transmission of normal pain impulses, so the normal defence mechanism of the body is not compromised. Only the pain-relieving mechanism is enhanced.

The following symptoms and signs have been associated with a deficiency of Endorphins:

Increased pain sensitivity, Chronic Pain Syndromes, pessimistic outlook, fear, gloominess and depression.

Supplemental Dosage:

Recommended Phenylalanine intake is approximately 16mg/kg bodyweight - equivalent to 1200 - 2200mg daily

Rich Natural Sources:

All first-class proteins (about 73mg per gram) -fish, meat, poultry, cottage cheese, soybean, almonds, Brazil nuts, pecan nuts, pumpkin and sesame seeds, legumes.

Therapeutic Dosage:

In chronic pain states-750mg 3 times a day, about 30-40 min before meals. This dose can be doubled after 3 weeks if no pain relief occurs.

Signs of Toxicity:

No specific toxic effects have been noted but DLPA should be used with caution in patients with hypertension, Bipolar Depression and mania.

ACETYLCHOLINE

Acetylcholine is the most widespread neurotransmitter chemical in the brain and body and is required for normal central and peripheral nerve function. It is synthesised by the acetylation of the chemical choline in a reaction catalysed by choline acetyltransferase and requires abundant tissue levels of acetyl-CoA. Supplementation with choline or phosphatidylcholine has been shown to substantially increase brain levels of these chemicals with enhanced synthesis of the neurotransmitter, acetylcholine.

The following symptoms and signs have been associated with a deficiency of Acetylcholine & choline:

Short-term memory loss, impaired concentration and learning, impaired comprehension, decline in cognitive function, emotional instability, susceptibility to stress, impaired bowel function with constipation, impaired digestion, fat intolerance, gastric ulcer and dyspepsia, dysautonomia, depression, dementia, Alzheimer's disease, Mania.

Supplemental Dosage:

Choline is synthesised in the body and is also derived from foods - no known recommended intake.

Rich Natural Sources:

egg yolk, fish, soy lecithin, legumes, grains

Therapeutic Dosage:

Phosphatidylcholine concentrate 1200mg caps -dose: 2-3 capsules twice a day.

Signs of Toxicity:

Commonest side-effects are: nausea, increased bowel irritability, diarrhoea and lightheadedness. May increase blood pressure and bronchial airways contraction, use with caution in patients with hypertension and asthma.

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