

Simplexa Neuro Nutrition

Alpha-glycerophosphocholine (GPC):

Glycerophosphocholine is a precursor of choline, which is a precursor of acetylcholine.

Acetylcholine is the neurotransmitter most severely affected in Alzheimer's disease. Clinical trials have shown that GPC improves cholinergic neurotransmission, i.e., supports the brain circuits that are damaged in dementia. Drugs such as donepezil (Aricept) also support cholinergic neurotransmission (though through a different mechanism).

Uridine monophosphate: Uridine monophosphate is one of the four main building blocks of ribonucleic acid (RNA). However, it has biological effects beyond its role as a messenger for DNA.

Dietary supplementation with uridine monophosphate increases brain levels of acetylcholine, dopamine release, and the sprouting of neurons. In other words, uridine monophosphate increases the levels of the neurotransmitter that is deficient in Alzheimer's disease, releases a neurotransmitter that is important for reinforcing learning (among other things), and helps neurons form new connections with each other. Taken together these suggest that uridine monophosphate exerts several cognitive benefits.

N-acetyl-L-carnitine arginate: N-acetyl-L-carnitine arginate is to the brain as L-carnitine is to muscle. The advantage of N-acetyl-L-carnitine arginate over L-carnitine is that it can readily cross the blood brain barrier. N-acetyl-L-carnitine arginate, or simply acetyl-L-carnitine, improves energy metabolism in the brain and increases the levels of certain neurotransmitters including glutamate, GABA, norepinephrine and serotonin. The supplement also protects against neurotoxicity and experimental memory deficit in animal studies. In laboratory animals, acetyl-L-carnitine protected nerve cells that are destroyed in Parkinson's disease and Alzheimer's disease.

Gastrodia elata: Gastrodia elata is an herb used in Sichuan cuisine and traditional Chinese medicine. The natural product is neuro-protective and blocks oxidative damage. *Gastrodia elata* also improved performance on tests of learning and memory. In addition, the herb increases

levels of the neurotransmitter GABA, which explains its anti-anxiety effect.

Pyroglutamic acid: Pyroglutamic acid is related to two amino acid neurotransmitters, glutamine and glutamate. However, this amino acid has several unique effects in the brain. For example, pyroglutamic acid stimulates the release of acetylcholine, the major neurotransmitter that is negatively affected in Alzheimer's disease. Interestingly, pyroglutamic acid is able to bind to receptors that are important for learning and memory (i.e., glutamate receptors) but does not cause neurotoxic effects like excess glutamate and other similar molecules. In other words, pyroglutamic acid may enhance cognition without over-stimulating nerve cells.

Sodium R-lipoate: R-lipoate, or R-lipoic acid, is the naturally occurring form of lipoic acid. Lipoic acid is a cofactor for various enzymes including alpha-ketoglutarate dehydrogenase, pyruvate dehydrogenase and glycine decarboxylase. It is best known as a potent antioxidant and for its ability to restore glutathione levels. Lipoic acid can block damage caused by oxidative molecules and can improve mitochondrial function. Recent research has revealed that lipoic acid can improve memory and protect against age-related cognitive dysfunction.

L-phenylalanine: L-Phenylalanine is best known as an essential amino acid, but it has curious effects in the brain. Phenylalanine selectively blocks the glycine co-receptor site of the NMDA receptor. Glycine is critical for the function of NMDA, the major excitatory neurotransmitter in the brain. In essence, phenylalanine is able to block the effects of NMDA in the brain; importantly, NMDA over-activity has been implicated in virtually all neurodegenerative disorders, including Alzheimer's disease and Huntington's disease.

Synergistic effects: Every ingredient in Neuro Nutrition is able to block, counteract or compensate for the effects of neurodegeneration. Glycerophosphocholine and uridine monophosphate increase brain levels of acetylcholine, the neurotransmitter that is significantly depleted in Alzheimer's disease. Pyroglutamic acid accentuates this effect by

stimulating the release of acetylcholine from nerve cells. Thus, GPC and UMP help accumulate acetylcholine in cells that are being destroyed by Alzheimer's disease and pyroglutamic acid enhances release from the remaining cells. Taken together, these substances may improve cognitive functioning in people with Alzheimer's disease.

Neurodegenerative diseases are thought to occur as a consequence of excitotoxicity and oxidative damage in the brain. Excessive stimulation of NMDA receptors leads to abnormally high nerve cell activity, which eventually kills the cells. L-Phenylalanine can block NMDA receptor activity and potentially reduce this damaging effect. Sodium R-lipoate may improve energy production in neurons and perhaps extend the life of excessively stimulated cells. *Gastrodia elata* is also neuro-protective, but likely by a different mechanism. It also increases levels of the brain's main *inhibitory* neurotransmitter, GABA. N-acetyl-L-carnitine arginate appears to be specifically helpful in blocking nerve cell destruction in Parkinson's disease and Alzheimer's disease.