



Nutrition and Dementia

Dining is more than just caloric consumption; it remains the dominant social activity. And as part of everyday life it becomes even more important to those of us living with dementia.

Dementia is a syndrome affecting memory, thinking, and behavior; and impacts our ability to perform everyday activities. Usually chronic and progressive by nature, dementia is linked to several underlying brain pathologies, of which Alzheimer's disease, vascular, Lewy-Body, and frontotemporal dementias are the most common.

Mechanistic evidence and animal models suggest that nutrients can be directly implicated in modifying brain damage. Micro and macro-nutrients are natural antioxidants that can reduce oxidative stress levels in the brain. Moreover, some micro-nutrients and fatty acids modulate the production and activity of neurotransmitters, have vaso-protective effects, and favor the clearance of β amyloid. Sufficient nutrient intake is required to avoid micro-nutrient deficiencies potentially harmful to the brain.

The following brief list summarizes the benefits of nutrients associated with the improvement of cognitive impairment and dementia.

● B vitamins

Researchers have long demonstrated their interest in studying the link between neurological disorders and levels of vitamin B complex. B vitamins play key roles in cell metabolism. B6, folate and B12 play demonstrable and critical roles in cognition. Folate and vitamin B12 serve in the metabolism of DNA and protein synthesis. Both are essential for homocysteine metabolism. Folate or vitamin B12 deficiency leads to a rise in the level of homocysteine, which may contribute to amyloid and tau protein accumulation and neuronal death. Homocysteine stimulates neurotoxicity leading to nerve cell death, and platelet activation which contributes to vascular injury. Clinical trials have shown that B vitamin supplementation can consistently reduce the level of homocysteine thus providing protection of our central nervous system.

● Antioxidants

Neural inflammation and oxidative damage are thought to be key mechanisms in the development of dementia, and in particular of Alzheimer's disease. Oxidative stress directly damages cell components, initially damaging synapses resulting in nerve cell death. Antioxidants are thought to act against neuro-degenerative effects by limiting free radical damage. Much research investigating the relationship between antioxidants and cognitive function has focused on vitamin E which plays an important role in cell signaling, enzymatic activities and neurological function. Studies also showed an inverse association between vitamin E levels and the incidence of cognitive decline and dementia. The role of flavonoids and vitamin C has also been scrutinized. Vitamin C is essential for connective tissue maintenance, and helps protect cells. Flavonoids also possess strong antioxidant properties, and help support vitamin C and inflammation control. Studies indicated intake of vitamin C and flavonoids significantly reduced the risk of developing Alzheimer's disease, or any type of dementia.

● Omega-3 fatty acids

Alpha linolenic acid (ALA, plant source), eicosapentanoic acid (EPA, animal source), and docosahexanoic acid (DHA, animal source) are all omega-3 polyunsaturated fatty acids (PUFAs). Brain tissue is made primarily by lipids and DHA is the most abundant structural omega-3 PUFA in the brain. The function of cerebral cell membrane is modulated by their fatty acid composition. Dietary omega-3 PUFAs are also implicated in neuronal growth and influence synapse formation, thus also effecting neuron interaction. There are several potential mechanisms for the protective effect of dietary omega-3 PUFA in dementia.

- 1 **Cardiovascular and cerebrovascular protection:** Omega-3 PUFAs possess anti atherogenic effects, and may improve endothelial function benefiting the integrity and health of arteries. Moreover, omega-3 PUFAs lower blood pressure levels and improves serum lipid profiles, both of which are implicated in dementia risk.
- 2 Omega-3 PUFAs directly reduce cytokine synthesis (pro-inflammatory functions), which in turn can reduce the brain inflammation that accompanies brain damage.
- 3 Omega-3 PUFAs, particularly DHA, are key components of the phospholipids that form cell membranes and preserve the integrity and function of neuronal membranes.
- 4 Omega-3 PUFAs modulate the metabolism of amyloid precursor protein and may reduce β -amyloid formation and favor the clearance of this main component of the extracellular plaques deposited in Alzheimer's disease.

● Ginkgo biloba

The herb Ginkgo biloba has also demonstrated potential memory enhancing effects in the elderly. Ginkgo effectively promotes circulation, increases brain cell oxygen content while simultaneously decreasing cell degeneration. Ginkgo can protect and stimulate brain nerve cells, prevent nerve cell oxidation damage, and even protect against neuron death caused by ischemic injury. Research showed ginkgo significantly increased the cognitive ability of healthy young adults. A study treating middle-aged patients with 60 mg of ginkgo biloba extract daily for 12 weeks showed significantly improved memory.

