

## **Botanical Support for Cognitive Impairment in the Aging Adult**

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As we age, our memories can get sketchy and mental alertness and acuity can dull. When asked, many elders have stated their most important health concern is not cancer or heart disease but cognitive impairment. They want to remember the moments in their lives and draw upon that wisdom that life experience brings. Cognitive disorders & dementia destroys memory and undermines personality and emotional stability.

Mild cognitive impairment (MCI) is defined by mild memory deficits that don't significantly impact daily functioning. Writing reminders, keeping a calendar, and taking notes will allow a person to compensate and still function independently. This level of memory loss may remain stable for years. MCI does not automatically mean one is going to get Alzheimer's Disease (AD) but according to the statistics, 10% will. With AD, there is a gradual decline and is considered intellectual impairment that can interfere with social & professional careers.

With the present array of AD drugs that display more adverse reactions than benefits, one can see how prevention is the best strategy. Most of the current drugs for treating AD are acetylcholinesterase inhibitors, they increase the neurotransmitter acetylcholine by inhibiting its breakdown in the synaptic cleft, but they have pronounced side effects (hepatotoxic). As herbalists, we have generations of safe and effective uses of our beloved plant medicines.

### ***What role do genetics play?***

AD, a type of dementia, does seem to follow some genetics and some may be more predisposed to it than others. However looking at it from a more holistic point of view, it may be more 'familial' than solely hereditary. Diet and lifestyle choices are imprinted early in life. The disease can progress slowly, without any noticeable symptoms for 30 to 40 years and by the time signs and symptoms become apparent, the person is already in early stages Alzheimer's. AD is one type of brain reaction to cumulative metabolic, hypoxic and neurotoxic insults over time and may be enhanced by genetics or immunologic factors.

From ages 65 to 85, the percentage of Alzheimer's goes up to 20% of the population, 50% in individuals over 85, and 55% of elders over the age of 95. (Phytotherapy Review & Commentary by Kerry Bone, Townsend Letter for Doctors & Patients, July 2002).

### ***Cell biology factors***

The brain is extremely sensitive to free radical damage, pharmaceutical influence, poor circulation and poor blood sugar balance. Individuals with chronic inflammatory stress and arterial restriction will have difficulty with memory recall, cognitive function and brain fog.

More than 100,000 chemical reactions occur every second in the brain and large amounts of energy is necessary. This energy comes in the form of glucose. If glucose is deprived, havoc can follow with altered brain functions. Examples include dietary indiscretions, refined processed foods, sugar intake or oral diabetic drugs. The brain although only weighing 2% of total body weight, requires 25% total blood glucose and oxygen for energy. Any dips or spikes will register as interference to normal brain function.

How well the cardiovascular system functions may be directly related to dementia. When hypertension, diabetes, atherosclerosis, metabolic syndrome and stroke are part of the

symptom picture, the risk for AD is greatly increased. Inflammation, both chronic & acute is associated with cognitive impairment and may be part of the reason for the development of beta-amyloid plaques.

Beta-amyloid plaques (40 amino acid long protein fragments scattered throughout the cerebral cortex and hippocampus) and tau protein tangles (neurofibrillary-twisted dead nerve endings) that form in the brains of AD patients may be damaging to the cells and interfere with cell to cell communication. The hippocampus is very vulnerable to injury caused by neurotoxins, lack of nutrition and oxygen which causes it to shrink. This is the area critical to memory. The more plaques and tangles found in the cerebral cortex (gray matter), the more severe the dementia.

The brain is also dependent on a continual & adequate supply of oxygen. Lung & heart disease, smoking, prolonged sleep, frequent air travel, severe migraine spasms and cerebral blood vessel diseases are all factors that can reduce O<sub>2</sub> levels.

There is also possible links between electromagnetic radiation and dementia. According to the American Journal of Epidemiology, it was confirmed that exposure to higher levels of electromagnetic radiation increases the risk of developing AD.

Mitochondria are cell organelles often called the power packs and are in charge of cell differentiation, cell signals, cell growth, reproduction and programmed death. ATP, cellular energy, is generated here (adenosine triphosphate). Pesticides and environmental influences can cause mitochondrial abnormalities which can in turn pass through genetics from mother to child. The membranes are porous and some toxins can cripple and cause oxidative stress.

Certain food additives are classed as neuroexciters or neurotoxins, like MSG and aspartame, and can injure and destroy nerve cells. Aspartame in particular can be observed to cause confusion, memory loss, headaches, and changes in dopamine levels. MSG causes a rapid destruction of brain cells.

### ***Aluminum and other heavy metals***

Like aluminum which is toxic to brain cells, heavy metals directly enhance the formation of dangerous free radicals which progressively damage delicate cell membranes surrounding neurons. Aluminum binds to an iron carrier protein known as transferrin and concentrates in brain regions.

Aluminum containing products such as cookware, anti-antiperspirants, antacids, baking powder, non-dairy creamers and hair dyes have all been linked to cognitive impairment. Several studies that have linked the conditions to overexposure to aluminum to destruction of the blood-brain barrier and interferes with glucose metabolism and accumulates in the tissues which causes failure in the areas of memory and reasoning. (Townsend Letter for Doctors & Patients, D. Perlmutter, July 2002).

### ***Nutritional support***

If your food is your medicine, that's less medicine one has to take. Consuming organically grown food is important for many reasons, these include more essential nutrients and less or no pesticides with neurotoxic chemicals. Blood levels of DDT are showing up 4x higher in AD patients. Although it's banned in the US, Mexico still uses it and in the US, it is trying to make a come back under a new name through our good friends, the Mansantos, who produce

Roundup Ready. They are neurotoxins on insects, it may affect us as well.

A healthy diet is one that balances blood sugar, provides antioxidants and essential fatty acids with complex carbohydrates and complete protein. Look to a diet that includes soaked or sprouted whole grains, soaked/sprouted legumes, nuts and seeds, vegetables, and if not vegetarian then organic meats, wild fish, fresh fruits, and healthy fats from essential fatty acids. The brain is composed of 60% fat, a deficiency in quality fats causes impairment of mitochondrial transmembrane potential and electron transport functions.

### ***Antioxidants***

Vitamin E, an antioxidant found in wheat germ oil, sunflower seeds & oil, almonds, leafy greens like watercress, kale and dandelion, avocados, and olives will lower the likelihood of developing dementia. Vitamin E protects the cardiovascular system and helps beneficial fats used to make brain cells. If one only eats fast food french fries and that is the main source of fats the body has access to, the brain will use it as well, so avoid or eliminate trans fatty acids & hydrogenated vegetable oils. Vitamin E also protects essential fatty acids from oxidation. When taken with vitamin C, these two antioxidants may greatly reduce the risk of Alzheimer's by as much as 78% (Archives of Neurology).

Polyphenols as micronutrients are antioxidants, protect the cardiovascular system and decrease inflammation in the brain, and protect nerves cells from damage. They are found in brightly colored plant foods; grapes, green tea, turmeric (curcumin prevents the clumping of proteins that eventually turn into beta-amyloid plaques), dark chocolate (improves blood flow to the brain as well), darkly colored berries, blueberries, cherries, strawberries, bell peppers, blackberries are all rich in polyphenols that help protect the brain. Resveratrol, a polyphenol that is found in grapes, red wine, peanuts and some berries is a potent brain antioxidant that protects against beta amyloid plaquing and is effective in restoring glutathione.

Glutathione is different from other antioxidants in that it is an intercellular free radical scavenger and the brain and the heart are especially vulnerable to oxidative insult. It is high in fresh parsley, onions, garlic and cruciferous vegies, avocados, tomatoes and squash. One way to maintain high glutathione levels is through the use of two powerful antioxidants, lipoic acid and acetyl-L-carnitine.

Alpha lipoic acid is a powerful antioxidant that is rapidly absorbed from the gut and readily enters the brain to protect neurons from free radical damage. It recycles vitamin E & C and regenerates glutathione. It is also a metal chelator to cadmium and free iron and facilitates their excretion. Although it is high in brewer's yeast, organ meats and some vegies, it's not very absorbable and better as a supplement, up to 600 mg a day.

Acetyl-L-carnitine fuels the mitochondria and removes toxic byproducts of brain metabolism necessary for brain survival and converts into acetylcholine. Naturally made in the body from the amino acid lysine. Clinical data indicates that it also may slow age-related mental decline. Dr. Weil recommends 500 – 1,500 mg per day.

Quercetin, a flavonoid, is found in many foods including citrus, apples, red onions, parsley, sage, tea and red wine. It protects from apoptosis and inhibits cancer progression and strengthens the mitochondrial membrane.

Lycopene from tomatoes (red pigment) has a neuroprotective effect of mitochondrial nerve cells, as an antioxidant. It is also found in olive oil, grapes, dark cherries and dark berries such as blueberries and blackberries.

Coenzyme Q10 has also been shown to improve brain health and reduce the severity and frequency of migraine headaches. Additionally, low CoQ10 is linked to degenerative neurological diseases such as Alzheimer's, dementia and Parkinson's. Supplementing with CoQ10 has been shown to strengthen the neuronal cell mitochondria and be a potent defense against neurological degeneration. It enhances energy production in brain neurons therefore improving function. There is a direct correlation between CoQ10 levels and longevity.

Endogenous synthesis and dietary intake appear to provide sufficient CoQ10 although tissue levels seems to decline with age. Animal products, nuts and seeds are the highest sources.

(Quercetin | University of Maryland Medical Center

<http://umm.edu/health/medical/altmed/supplement/quercetin#ixzz3BL4iMsKA>)

### ***Fatty acids***

Reducing arachidonic acid forming foods like excess animal products in the diet will help lower free radicals. There is a need to reduce excess omega-6 fats in processed oils like corn, cottonseed, safflower, processed foods & conventionally-raised meat and increase omega-3s. Balanced omega-3 improves memory in both young & old brains & lowers beta-amyloid protein in the blood. Good sources are cold-water wild fish, walnuts, flax, borage and hemp oils. These will help lower inflammatory responses.

DHA (docohexaenoic acid) is the alpha of omegas and shows cardio benefits in triglyceride reduction as omega-3s improve cholesterol levels and coagulation. DHA accounts for 40% of the membranes in the brain and helps the neurotransmitters work more efficiently. Best sources for DHA is oily fish like mackerel, herring, sardines and salmon, eggs and meats. For vegetarians it is found in much smaller amounts in nuts, seeds, whole grains and dark green leafys.

### ***Phospholipids***

The phospholipids phosphatidylserine (PS) and phosphatidylcholine (PC) are frequently used supplements for older adults with memory complaints. Because aging is associated with changes in lipid composition in the brain, supplementation with phospholipids, which are fundamental components of neuronal membranes, has been suggested to be effective therapy for preventing cognitive decline.

The body makes phospholipids from phosphorus & lipids. They are the key building blocks for cell membranes related to cognitive dysfunction & dementia in the elderly as the brain is mostly comprised of fats. Lecithin is sometimes referred to as phosphatidylcholine (the phosphorous portion of lecithin), and is the most abundant phospholipid and provides the raw materials for choline to help produce acetylcholine, the major "memory" neurotransmitter, improving intellectual skills, concentration and the overall health of the brain. PC is incorporated into all the neuronal cell membranes and makes up a large part of the volume of the brain cell membranes. It is high in egg yolks, cauliflower, cabbage, whole grains, soy and sea food.

Phosphatidylserine (PS) is a fat soluble phospholipid found in the lipid layer of cell membranes and it plays a key role in the function of neuronal membranes, such as in signal transduction, cell-to-cell communication and cell growth regulation. It is found in every cell

of the body, high in soy lecithin, and is particularly vital for proper functioning of brain cells. The mechanism of action is believed to be enhanced fluidity of nerve cell membranes, indirectly resulting in increased brain levels of many important neurotransmitters. Supplemental typical dosages are 300 mg/day.

## **Botanical Therapies**

### **role of adaptogens**

This class of herbs is meant to help the body adapt to stress and invigorate tissues and systems lacking energy and strength. They are supportive in whatever manner is needed.

*Withania somnifera*– Ashwaganda balances cortisol surges/stress pathways, making it good for adrenal fatigue. It potentiates a type of glutamate receptor that triggers long term changes in synapses involved in memory & learning. It also has glycine mimetic action, improving memory consolidation in the hippocampal neurons.

*Panax quinquefolium*- American ginseng raises the level of mental work improving concentration and conditional reflexes. It lowers serum cholesterol and raises HDLs, improves memory, and enhances cholinergic activity.

*Eleutherooccus senticosus* -Eleuthro nourishes the adrenal glands and helps to minimize harm from stress.

*Schisandra chinensis* is a cognitive enhancer and energy balancer.

*Bacopa monniera* -Brahmi enhances memory in elderly & diseased states with neural protectant ability, enhances acetylcholine and improves learning retention.

*Uncaria tomentosa* -Cat's claw is shown to prevent the deposition of B-amyloid, better mixed with Ginkgo, Rosemary and Gotu Kola as a formula.

### **nervine tonics**

*Polygonum multiflorum* -He Shou Wu contains agents that regenerate nerve cells and contains resveratrol, a brain antioxidant.

*Vinca minor* -Periwinkle improves memory and is specific on neurons, promoting cerebral blood flow and enhancing ATP synthesis (helps promote energy production).

*Huperzia serrata*- Huperzia is used to treat mild cognitive impairment that occurs with normal aging, promotes acetylcholine synthesis. It reversibly inhibits acetylcholinesterase.

*Salvia officinalis*- Sage increases cholinergic capacity, improves mental & emotional stability in the elderly & longevity and quickens the senses, improving basic awareness.

*Rosemarinus officinalis*- Rosemary, the Herb of Remembrance is an anti-oxidant with neuroprotective effects by helping to regulate healthy levels of acetylcholine.

*Centella asiatica* -Gotu Kola carries nutrients for transport, feeding the brain. It rejuvenates brain cells, thins capillaries & increases circulation finding usefulness in amnesia & senility and clears systemic toxins.

### **GABA agonists**

This class of plants promote GABA (gamma amino butyric acid) and relaxes whatever the nerves are innervating, sometimes called gabanergic.

*Passiflora incarnata* -Passion Flower is a blood pressure normalizer, useful in anxiety, insomnia, and muscle tension.

*Hypericum spp.* -St. Johnswort improves receptor sites for GABA, making them easier to recognize. It is also a serotonin effector with a broad profile.

*Valeriana spp.* - Valerian contains valerianic acid, an essential oil that binds to the same brain receptors as tranquilizers. It binds to GABA receptors, neurotransmitters that block arousal receptors causing relaxation and inhibiting the breakdown of GABA.

### ***Serotonergics***

This group of plants are used to treat depression. SSRIs are the leading category of drugs for depression. When serotonin is released, it causes stimulation of downstream nerves to fire & improves mental/emotional outlook. It causes serotonin to stay in the synaptic cleft for a longer period of time before reuptake.

*Hypericum spp.*- St. Johnswort is a perfect remedy for the blues, sadness, irritability and increases nighttime production of melatonin.

*Lophophora williamsii*- Peyote (mescaline) causes serotonin and melatonin to flood in the brain. This cacti increases the ability to receive light for day & night cycles, reestablishing natural circadian rhythms. Good for seasonal affective disorders.

*Ginkgo biloba*- Maidenhair Fern prevents age related decline of serotonin and is good for cognitive impairment due to aging of the brain.

### ***gut/brain connection***

Neurotransmitters leaving the gut going to the brain outnumber the neurotransmitters headed to the gut from the brain. It's vitally important to keep the digestive system optimally functioning.

*Mahonia spp./Berberis spp.* Barberry/oregon grape root improves digestion and nerve transmission and affects cell membrane transport & motility related functions, represses gene expression, affecting mitochondria metabolism. It promotes DNA replication, repair & transcription in human host cells making it able to interact with nucleic acids.

### ***Antioxidants/anti-inflammatories***

*Curcuma longa* -Turmeric prevents amyloid plaquing and acts as renal & hepato-protectant, protecting mitochondrial DNA from damage.

### ***Aromatherapy***

Of our five senses, scent is the only one directly linked to the limbic lobe of the brain & the amygdala (emotional memories), controlling memory, stress levels & hormone balance, blood pressure, breathing and heart rate. Smell directly activates the hypothalamus or the 'master gland'. Distilled essential oils, smudging sacred herbs or even the oils that one can smell from a cup of tea can quickly raise the body frequency restoring normal health.

*Rosemary* slows the breakdown of acetylcholine in the brain. This important neurotransmitter is found at low levels in Alzheimer's patients.

Smudging with *sage, cedar, juniper, sweetgrass, osha* or *copal* has a very relaxing and balancing effect on the body and mind. Ancient memories can surface.

Memory stimulating blend: 4 oz. Almond oil to 10 drops lavender; 10 lemon; 5 rosemary; 1 cinnamon

### ***Flower essences***

We now know that within the human body there is a fine tuned holographic vibrational grid work called the cytoskeleton. The cytoskeleton sits between cells & tissues and is a communication network. Like a spider's microscopic web, it is composed of microtubules, threads of information rich proteins that form a matrix. They are bio-proteins that establish vibratory frequencies throughout the body in charge of vibratory attunement at lightning quick speed and responds to stimuli & signals by changing shape & transmitting information instantaneously. It offers structural support and induces cellular response as much as the

nervous system does.

Flower essences work by charging water molecules vibrations, all connected to the web with a capacity to change bio-chemistry in the body. Cells are energetically influenced via the cytoskeleton, which is an intelligent bigger picture director. Proteins will change (confirmation) if the cytoskeleton detects a slight shift.

*Rabbitbrush* – for dealing with the details while holding the big picture.

*Madia elegans*- for focus & concentration, for those easily distracted or 'spacey'.

*Dill*- confusion from the intensity of too many experiences.

*Cosmos* -stimulates mercurial qualities of the mind; integrate thoughts with speech

*Honeysuckle*- being in the present time, rather than dwelling in the past.

*Indian Pink* -holding focus while being surrounded by intense activity.

*Peppermint* -stimulates healthy mental alertness; overcoming mental sluggishness.

*Sage* -inner wisdom of life experiences, understanding the meaning of life.

*Rosemary* -poor memory, not feeling fully anchored in the body.

*Morning glory* -dull & unresponsive in the morning.

*Chaparral* – for those not able to see but a narrow band of awareness.

### ***Summing it up***

Exercise, maintain ideal body weight, stay sharp with mind/body exercises with yoga and Tai Chi Chuan. Eat a nutritional diet with added nutrients from supplements and herbal support. Practice mental gymnastics - work the brain with crossword puzzles, reading, learn new skills. Maintain good adequate sleep habits.

Many of the traditional indigenous people of the world have always treated elders with respect for their wisdom and knowledge. We could learn much from them and need to uphold this view and honor our elders for their value and contribution on the planet.

***We are all connected***

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