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REPORT

Nutritional Strategies to Preserve Memory and Cognition

By Laurie Barclay, MD



In numerous studies, neuroscientists warn that the United States and other Western nations face a tidal wave of mind-destroying dementia that threatens to decimate the “golden years” of the soon-to-be-retired baby-boom generation.

In the US alone, dementia is already epidemic among the elderly: nearly one third of adults over the age of 80 are literally losing their minds.^{1,2} This shockingly high number is expected to skyrocket further in the coming decades.

More evidence that Alzheimer’s is spreading like wildfire comes from the landmark Cognitive Function and Aging study, which found that fully one third of elderly subjects who died with no clinical signs of dementia had autopsy evidence of Alzheimer’s disease. In other words, these adults were likely spared the afflictions of Alzheimer’s only because they died of other causes before memory loss became apparent!³

The good news is, declining brain function during aging is not inevitable. In fact, “senile” dementias may merely reflect wholly preventable biochemical processes that are commonly seen with advancing age. Middle-aged adults who have yet to experience the onset of forgetfulness or mild cognitive impairment should act now to avoid it. Those who are already experiencing these symptoms should implement strategies to prevent the onset of full-blown dementia.³

Ensuring attention to enhanced brain nutrition may help preserve brain tissue and function with age. In this article, we present a two-pronged strategy that involves fueling brain cells with the nutrients needed for optimal nerve function, while quelling the inflammatory fires that ignite Alzheimer’s disease and vascular dementia.^{4,5} Many of these nutrients are currently in use throughout Europe as prescription medications, but are available as dietary supplements in the US. Targeted nutritional strategies may well be our best bet for maintaining ideal brain health with aging and averting the coming epidemic of dementia.

BRAIN NUTRITION BASICS

There is still no cure for senile dementias once they develop, and our risk of acquiring these dreaded diseases climbs steeply with increasing age. Therefore, it is essential to take preventive action against cognitive decline as soon as possible.^{3,6} Fortunately, recent breakthroughs in understanding brain function—and how it is compromised both during aging and in specific dementias—can help us choose therapeutic agents that support robust brain health, even with advancing age.

Nutritional supplements that optimize cognitive health and function include those required for the synthesis and preservation of acetylcholine—a neurotransmitter central to memory function—as well as those with anti-inflammatory and anticoagulant properties:

Alzheimer’s dementia disrupts nerve pathways that utilize acetylcholine, resulting in memory loss, cognitive impairment, and sleep disturbances.^{7,8}

Furthermore, in Alzheimer’s disease, accumulation of the toxic beta-amyloid protein inflames vital brain structures.⁹

Finally, by preventing blood clots and “thinning” the blood, anticoagulants can help prevent strokes that result in disabling vascular dementia, while improving sluggish circulation in brain areas deprived of the oxygen and glucose they require for daily functioning.

We will now examine several nutritional supplements that play critically important roles in supporting brain health. Uridine boosts brain energy while protecting nerve cells and promoting their regeneration. GPC (glycerophosphocholine) and phosphatidylserine increase acetylcholine synthesis. Vinpocetine is a powerful anti-inflammatory and anticoagulant agent. Ashwagandha prevents

the degradation of brain cells and acetylcholine. Blueberries and grape seed extract fight inflammation and toxic beta-amyloid buildup in the brain.

URIDINE: BOOSTING BRAIN CELL COMMUNICATION

One of the most promising biological compounds for enhancing healthy brain structure and cognitive function is uridine. Found in living organisms ranging from humans to bacteria, uridine is a nucleoside, or a combination of a sugar (ribose) with uracil. Nucleosides such as uridine are building blocks for RNA, the biochemical cousin of DNA that serves as a template in gene expression. Uridine is so important to brain development that it is included in human infant formulas. Animal experiments have demonstrated that rats incorporate uridine in their brain RNA during learning exercises.¹⁰ However, uridine is essential for effective brain function throughout the human life span.^{11,12}

When orally ingested, uridine crosses the blood-brain barrier to reach brain cells. Once this happens, it increases levels of CDP-choline, which is required for the synthesis of phosphatidylcholine and ultimately of the essential neurotransmitter acetylcholine. Evidence suggests that increased brain levels of phosphatidylcholine improve cognitive function.^{13,14} Growing evidence also indicates that uridine is a major building block for the synthesis of nerve cell membranes, suggesting that it could play a role in managing various neurodegenerative diseases.¹⁵

Neuroscientists consider gerbils to be an excellent animal model for studying diseases of the human brain. When gerbils were given a combination of uridine, choline, and the omega-3 fatty acid DHA (docosahexaenoic acid)—all important components of cell membranes—their brain levels of phosphatidylcholine rose an impressive 45%.¹⁶ Because Alzheimer's patients demonstrate damaged synapses and depleted levels of uridine, DHA, and choline, this finding is particularly striking. Phosphatidylcholine is crucial for nerve cell growth and repair, and specifically for optimal function of the synapses, the junctions where nerve cells communicate with nerve and other types of cells.¹⁷ This supplement combination also increased proteins critical to nerve function by 38-102%, suggesting that it actually increased the number of nerve cell membranes containing synapses.¹⁶



Since the brains of Alzheimer's patients contain fewer, smaller synapses, reduced levels of synaptic proteins, and decreased cell membrane components—including choline and DHA—it stands to reason that supplementing with these agents may be useful in treating the disease.¹⁶ Scientists are now conducting human clinical trials to assess the effects of this nutrient combination in treating Alzheimer's.

Uridine also enhances the growth of neurites, which are projections from nerve cells that facilitate the cells' connections with other brain cells. Uridine also helps stabilize nerve cell membranes¹⁸ and enhances their release of the crucial neuro-transmitter dopamine, boosting the brain's ability to transmit messages.¹⁷

Animal experiments suggest that uridine promotes optimal cognitive function even in instances of memory impairment. In rats with hypertension-induced memory loss, supplemental uridine and choline improved their selective attention and spatial learning abilities.¹⁹ Similarly, uridine protected against malnutrition-induced impairment of memory and learning by preventing adverse changes in the hippocampus,²⁰ the brain area considered essential for long-term memory and associated with the degenerative changes seen in Alzheimer's disease.

Another animal study suggests that in addition to its effects on brain structure and function, uridine may help promote improved mood. Rats given uridine and omega-3 fatty acids displayed improved performance on a behavioral test demonstrated to predict antidepressant effects in humans. Remarkably, the combined antidepressant effect was similar to that of prescription antidepressant agents.²¹

Abundant evidence thus suggests that uridine supports healthy nerve cell membranes and neurite outgrowth, as well as the release of brain neurotransmitters. These effects have been linked with improvements in memory, learning ability, and mood, and hold promise in preventing and managing neurodegenerative diseases such as Alzheimer's.

GPC: STABILIZING AND REVERSING COGNITIVE IMPAIRMENT

GPC (glycerophosphocholine), a compound related to phosphatidylcholine, has the remarkable ability to forestall, stabilize, and even partially reverse cognitive impairment in the early stages of senile dementia.^{6,22} Available in Europe only as the prescription drug Gliatilin®, GPC can be obtained over the counter as a dietary supplement in the US. GPC has been found to be well tolerated, with few side effects.⁶

Medically, Alzheimer's is usually treated with drugs such as donepezil (Aricept®) and rivastigmine (Exelon®) that block the enzyme acetylcholinesterase from breaking down acetylcholine at the synapse, or connection between two nerves. Known as

acetylcholinesterase inhibitors, these medications allow acetylcholine to act at the synapse for longer periods, thereby counteracting the reduced activity in nerve pathways that use acetylcholine.

Unlike drugs that inhibit the breakdown of acetylcholine, GPC actually stimulates the manufacture of new acetylcholine.

Promising animal studies suggest that GPC may help prevent memory loss in humans. Compared to controls, aging rats fed GPC lose fewer nerve connections in the hippocampus, the brain region crucial for memory and learning.²³⁻²⁵ The GPC-fed rats were also protected against a decline in nerve pathways utilizing acetylcholine²⁶ and impairment of higher learning and memory capacities.²⁷

GPC may protect and enhance communication between nerves via its effect on nerve growth factor, a naturally occurring substance that regulates acetylcholine receptors. With aging, nerve growth factor receptors typically decrease. GPC promotes the growth, repair, and increased expression of nerve growth factor receptors in the cerebellar cortex, a brain region responsible for coordination and movement control.²⁸

GPC demonstrates its versatility by boosting brain function via several mechanisms. It stimulates release of the neurotransmitter GABA (gamma-aminobutyric acid), making more GABA available to brain cells. Dwindling levels of GABA in the elderly may partly account for early cognitive impairment, contributing to the dementia, mood disorders, and psychoses seen in degenerative brain conditions such as Alzheimer's and Huntington's disease.²⁹

Clinical trials have confirmed the benefits of GPC seen in the laboratory studies. In a multicenter study of patients with probable Alzheimer's disease, GPC improved cognition and was well tolerated.³⁰ In another large, multicenter Italian study of more than 2,000 patients with recent stroke or "mini-stroke" (transient ischemic attack) who received GPC for six months, 71% had normal cognitive function or only mild forgetfulness when the study ended. The authors concluded that the trial confirms GPC's efficacy in supporting the cognitive recovery of patients with acute stroke or mini-stroke.³¹



In a well-controlled, multicenter study in Mexico, GPC significantly improved cognitive function in 261 patients with mild-to-moderate Alzheimer's disease.³² The patients were randomly assigned to receive either 1200 mg of GPC or placebo daily for six months, and both groups were similarly impaired before entering the study.

On several standardized psychological tests of cognitive function, patients who received GPC scored better than those who received placebo. A measure of cognitive function substantially improved in the GPC group, but worsened in the placebo group. Compared to placebo, the GPC group also fared better in behavioral improvement and standardized physician ratings. The study findings support GPC's efficacy in treating the cognitive symptoms of dementia

disorders such as Alzheimer's.³²

What makes these results particularly encouraging is that they resemble those obtained through the use of Alzheimer's drugs such as Aricept® and Exelon®. Unlike those drugs, however, GPC is easy to tolerate, with fewer side effects.³²

In a review of 13 published clinical trials involving 4,054 patients with age-related memory loss or vascular dementia caused by stroke or mini-stroke (transient ischemic attack), scientists concluded that GPC produced consistent improvements in memory and attention, and significantly improved patients' clinical condition, even when tested in a variety of experimental settings.⁶

The scientists also noted that GPC effectively relieved the cognitive symptoms of chronic cerebral deterioration. Furthermore, patients using GPC demonstrated clinical results that were equivalent or superior to control groups under active pharmaceutical treatment. The researchers hope to conduct further studies to examine GPC's role in supporting the recovery of patients who have suffered a stroke.

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PHOSPHATIDYLSERINE: A VERSATILE MEMORY ENHANCER

Phosphatidylserine plays an extraordinarily varied role in supporting brain health. It enhances the availability of acetylcholine,³³ lowers levels of the stress hormone cortisol, and promotes the release of dopamine, an important neurotransmitter known to improve mood and movement control.

Phosphatidylserine also supports the function of many vital enzymes, acts as an antioxidant to combat free-radical damage, and quells inflammation that can exert deleterious effects in the brain.³⁴ In Europe and Japan, phosphatidylserine is sold as a prescription drug to treat memory and learning dysfunction, but it is available as a nutritional supplement in the United States.

Humans manufacture phosphatidylserine to maintain the structure and function of cell membranes, but its production in the body declines with advancing age. Aged rats with cognitive deficits have demonstrated decreased phosphatidylserine in the hippocampus,³⁵ and subjects with a genetically determined type of cognitive deficit exhibit low phosphatidylserine levels in nerve cell membranes.³⁶

When aged rats were given phosphatidylserine for two months, their performance on an age-related memory impairment test improved significantly, indicating better memory function. Phosphatidylserine supplementation restored the rats' acetylcholine release and energy metabolism in nerve endings to levels typically seen in young rats.³⁷

Further animal studies suggest that phosphatidylserine acts as an antidepressant agent.³⁸ This finding could have far-ranging implications for elderly humans, in whom depression is often confused clinically with cognitive impairment.

By stimulating acetylcholine production,³⁹ phosphatidylserine has proven useful in clinical trials of patients with cognitive impairment.⁵ These include an open study in patients with age-related cognitive decline,⁴⁰ well-controlled, randomized trials in patients with senile dementia,⁴¹ and a study in Alzheimer's patients who exhibited the stiffness and rigidity associated with Parkinson's disease.⁴²

A review of the available research indicates that while phosphatidylserine may help improve memory in elderly patients,⁴³ its effects may be most pronounced in early cognitive impairment⁴⁴—an observation that underscores the vital importance of beginning supplementation with brain-nourishing nutrients like phosphatidylserine early in life.

A leading scientist at the Alzheimer's Prevention Foundation has suggested that phosphatidylserine may be a useful component in a lifestyle and nutrition program aimed at preventing Alzheimer's disease.⁴⁵ He concludes that memory loss is not an inevitable consequence of aging, and that Alzheimer's can be prevented or reversed using an integrated approach that includes phosphatidylserine and other brain-supportive nutrients.

Although phosphatidylserine is generally safe and well tolerated,^{46,47} it may increase the blood-thinning effect of heparin, and therefore should not be used with medications that thin the blood without consulting a physician.⁴⁸

NUTRITIONAL STRATEGIES TO PRESERVE MEMORY AND COGNITION: WHAT YOU NEED TO KNOW

As adults age, they become increasingly vulnerable to impaired memory and cognitive function, which can foreshadow the development of Alzheimer's disease and other forms of dementia.

Scientists have made great advances in unraveling the physiological changes that precipitate and accompany the declining health of the brain and central nervous system. These findings have led to the development of nutritional strategies to preserve and enhance the structure and function of the nervous system with aging.

Uridine contributes to the structure of essential brain cell components while supporting communication between nerve cells, changes that have been associated with improved memory and mood.

GPC (glycerophosphocholine) supports synthesis of the essential neurotransmitter acetylcholine, while boosting memory function.

Phosphatidylserine boosts acetylcholine levels and contributes to healthy brain cell membranes, with benefits for cognition and mood. Phosphatidylserine may be even more effective when combined with the omega-3 fatty acid DHA.

Vinpocetine enhances metabolism and blood flow in the brain, and may provide support for conditions such as vascular dementia and ischemic stroke.

Like drugs used to treat Alzheimer's, the herb ashwagandha helps prevent the breakdown of the brain neurotransmitter acetylcholine. Ashwagandha further enhances the growth of neurites, which facilitate communication among neurons.

Blueberries fight the memory impairment associated with free radicals and beta-amyloid plaques in the brain. Similarly, grape seed extract protects brain cells from the toxic effects of oxidative stress and beta amyloid.

The hormone pregnenolone supports nerve cell growth in the brain's memory center and enhances acetylcholine release.

A proactive approach to preserving and enhancing cognitive function using natural therapies may provide the best protection against mind-robbing dementia and Alzheimer's disease.

PHOSPHATIDYLSERINE AND DHA: SYNERGISTIC SUPPORT FOR BRAIN CELLS

Phosphatidylserine may be even more beneficial for brain and nervous system health when coupled with the omega-3 fatty acid DHA.

DHA is a major structural and functional component of the central nervous system, accounting for 30-50% of the total fatty acid content of the human brain. In infants and children, DHA is essential for the brain's growth and functional development. It also helps support normal brain function in adults, including learning and memory. Low levels of DHA, by contrast, are associated with an increased risk for Alzheimer's.⁴⁹

In the brain, DHA combines enzymatically with phosphatidylserine to form nerve cell membrane components that support healthy nerve function. Substantial laboratory research suggests that phosphatidylserine's ability to improve cognitive skills is greatly increased in the presence of DHA.⁵⁰

Furthermore, the combination of DHA and phosphatidylserine powerfully supports energy production in brain cells. Scientists from the National Institutes of Health believe that phosphatidylserine with attached DHA is among the most critically important molecules for healthy brain function, and that phosphatidylserine works optimally in the presence of abundant levels of DHA.⁵¹

Researchers have developed an innovative phosphatidylserine-DHA (PS-DHA) compound designed to optimally support brain cell structure and function. To evaluate its effects on memory, they examined middle-aged rats with accelerated brain aging. While DHA alone showed minimal effects, PS-DHA substantially protected against the memory-robbing effects of brain aging.⁵²

This unique combination of PS-DHA was also examined in a randomized, double-blind, placebo-controlled study of people with attention deficit hyperactivity disorder (ADHD). At the end of three months, those receiving the PS-DHA compound had a total response to treatment of 47%, compared to just 19% in the placebo group. These findings suggest that the phosphatidylserine-DHA combination may improve behavioral and learning disabilities in ADHD patients.⁵²

VINPOCETINE: ENHANCING CEREBRAL BLOOD FLOW

The brain health benefits of vinpocetine, derived from the periwinkle flower, are widely recognized in Europe, where it is available only by prescription to treat symptoms of age-related memory impairment.

By improving sluggish cerebral blood flow, vinpocetine enhances the brain's use of oxygen and glucose.⁵³ Vinpocetine also increases electrical conductivity between nerve cells and supports the activity of nerve pathways related to mental alertness.⁵⁴ When combined with the popular herb ginkgo biloba, vinpocetine speeds the processing of short-term working memory in normal adults.⁵⁵

By enhancing vasodilation (relaxation of blood vessels), vinpocetine offers targeted benefits for cognitive dysfunction related to vascular disease involving vessels that supply the brain with blood.⁵ In three studies of older adults with memory impairment related to poor brain circulation or dementia, vinpocetine produced significantly more improvement than placebo in tests of attention, concentration, and memory.⁴³

In a well-controlled trial of 203 patients with mild-to-moderate dementia, 30 or 60 mg of vinpocetine taken daily for four months was deemed safe and was associated with substantial improvements relative to placebo in ratings of overall status, cognitive performance, and severity of illness.⁵⁶

By interfering with blood clotting at several points during the chain reaction that ultimately causes ischemic stroke, vinpocetine may even protect high-risk individuals from this devastating disease.⁵⁷ Vinpocetine appears to work by blocking the activation of voltage-sensitive channels for calcium and sodium,⁵⁸ and by preventing release of potentially toxic glutamate and free radicals.^{59,60}



Ginkgo Biloba

Because vinpocetine may inhibit blood clotting, it should not be used with Coumadin® or other blood thinners, except under a doctor's recommendation.

PREGNEOLONE SUPPORTS NERVE HEALTH

One of the most powerful strategies for supporting nervous system health with aging is to ensure optimal levels of the hormone pregnenolone. Synthesized from cholesterol in the mitochondria of all cells, pregnenolone serves as a precursor for numerous essential hormones in the body, including dehydroepiandrosterone (DHEA), estrogens, progesterone, and testosterone.⁸³

As individuals grow older, they experience a dramatic decline in pregnenolone production, as well as in the hormones for which pregnenolone is a precursor.⁸⁴⁻⁸⁶ Declining levels of these essential hormones have been linked with many disorders that commonly accompany aging.

Scientists have noted that levels of pregnenolone are intimately connected with cognitive performance. In fact, pregnenolone directly influences release of the crucial neurotransmitter acetylcholine in several key brain areas involved in memory, learning, cognition, and sleep-wake cycles. Furthermore, administration of pregnenolone reverses the decline in new nerve growth (neurogenesis) that commonly occurs in disorders like Alzheimer's disease. In particular, pregnenolone dramatically enhances nerve cell growth in the hippocampus, the brain region responsible for memory, which undergoes marked deterioration in Alzheimer's patients.^{87,88}

Supplemental pregnenolone helps promote a youthful mind and body by contributing to optimal hormone levels, supporting acetylcholine activity, and promoting nerve cell growth in the brain's memory center.

Since pregnenolone may affect hormone levels, those with hormonally related cancers such as prostate or breast cancer should avoid using pregnenolone.

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ASHWAGANDHA: BRAIN SUPPORT THROUGH STRESS RELIEF

The herb ashwagandha (*Withania somnifera*) has long been used to boost energy and blood supply, reduce inflammation, and increase longevity. Modern science is now uncovering ashwagandha's benefits for cognitive health.^{60,61}

Ashwagandha has been shown to alleviate stress, which not only influences hormonal status and various bodily systems, but also directly affects brain function. In one study, rats were subjected to stress and evaluated for changes in brain cells, particularly in the hippocampus. Control animals kept under stress-free conditions exhibited no changes; however, in the stressed animals, 85% of brain cells examined showed signs of degeneration. When ashwagandha was administered to stressed subjects, the number of degraded brain cells was reduced by 80%.⁶²

Ashwagandha has shown promise in treating Parkinson's and Alzheimer's diseases. For example, a recent study in laboratory animals showed that administering ashwagandha extract significantly and dose-dependently reversed all studied parameters of Parkinson's-type neurodegeneration.⁶³ In treating Alzheimer's, physicians often rely on acetylcholinesterase-inhibitor drugs like Aricept®, which block the degradation of the neurotransmitter acetylcholine in order to slow the symptoms and progression of the disease. Ashwagandha extract likewise acts as an acetylcholinesterase inhibitor, and may thus help to preserve cognitive function and memory by protecting acetylcholine from breakdown.⁶⁴

In any situation of cognitive decline, regeneration of the neuronal network may present a promising therapeutic option. Japanese researchers found that ashwagandha helped promote the regeneration and outgrowth of neurites that facilitate communication between nerve cells. Additionally, ashwagandha produced improvements in memory in a mouse model of Alzheimer's disease.⁶⁵

BLUEBERRIES: ANTIOXIDANT PROTECTION FOR BRAIN HEALTH

Neuroscientists are continually searching for natural agents that can protect brain cells from the devastating effects of oxidative stress and inflammation. Blueberries are rich in the powerful antioxidant phytochemicals known as polyphenols, which include proanthocyanidins that are particularly beneficial for brain health.⁶⁶⁻⁶⁹

A recent report found that blueberry extracts exert the same anti-inflammatory and antioxidant activities as the whole fruit.⁷⁰ Anthocyanidin molecules from such extracts have been shown to cross the blood-brain barrier, making them accessible to neurons.⁷¹

When free radicals attack delicate brain cells, they disrupt optimal cellular function and often cause age-related cognitive decline.⁷² In an experimental rat model, a diet supplemented with plant-derived antioxidants reversed age-related decline in memory and cognition.⁷³ Other studies have shown that increasing dietary intake of antioxidant-rich fruits and vegetables can maintain optimal neuronal function and cognition well into old age.⁷⁴⁻⁷⁶

In one study, scientists discovered that supplementation with blueberries prevented memory loss in aged rats. Researchers fed one group of rats a diet supplemented with blueberries and fed another group a control diet. The animals were then tested for object-recognition memory. The blueberry-fed rats performed significantly better than the control group, suggesting that supplementation with blueberries restored youthful levels of function in the aging brain.⁷⁵

Intriguingly, the researchers also tested for levels of nuclear factor-kappa beta (NFkB) in the rats after supplementation with blueberries. A naturally occurring compound in cells, NFkB increases production of inflammatory mediators that often initiate degenerative diseases. The scientists found that NFkB levels were significantly lower in rats fed blueberries compared to controls, and that when NFkB levels were lower, the rats scored higher on memory tests.⁷⁵

Animal studies also indicate that blueberries help maintain high levels of new cell generation in the hippocampus, the brain area that suffers extensive damage in Alzheimer's disease.⁷⁷

Oxidative stress is a major factor in the development of Alzheimer's, along with overproduction of the beta-amyloid protein, which appears to cause cell destruction. The result is damaged cells that are then unable to manufacture or respond normally to the

neurotransmitter acetylcholine.

A group of scientists sought to determine whether blueberries have a protective effect on rats bred to have Alzheimer's disease.⁷⁸ Astonishingly, they determined that a blueberry-supplemented diet caused Alzheimer's-bred rats to perform normally on tests of memory and motor behavior. A surprising finding was that levels of destructive beta-amyloid protein in the test animals' brains did not differ from those of normal rats. The researchers concluded that a diet incorporating blueberries may help overcome genetic predispositions to Alzheimer's disease.

Other studies of blueberries and cognitive health have found that blueberries provide important protection against destructive inflammation in the brain.⁷⁹ Brain memory regions of young and old rats fed either a blueberry diet or control diet were subjected to an inflammatory challenge and then examined for production of a protein that would indicate a normal protective response to stress. The protein level in the blueberry-fed aged rats was completely restored within four hours of the inflammatory stimulus. This kind of rapid effect suggests that blueberry supplementation could improve neuroprotective responses to diseases with a mixed oxidative and inflammatory cause, such as Alzheimer's.

GRAPE SEED EXTRACT: GUARDING AGAINST SENILE PLAQUE FORMATION

The brain's extraordinarily complex circuitry generates massive amounts of oxygen free radicals that may play an important role in the impairment of healthy brain activity that commonly accompanies aging.

Rich in polyphenols, grape seed extract is considered one of nature's most potent antioxidants. Researchers believe that grape seed's antioxidant properties confer broad-spectrum protection against premature aging, disease, and decay; in fact, grape seed extract packs 20 times more antioxidant power than vitamin E and 50 times more antioxidant power than vitamin C.⁸⁰ These attributes have led many scientists to suggest that grape seed extract is an essential nutrient for maintaining optimal brain health and function.



Grape seed extract not only improves blood circulation by strengthening capillaries, arteries, and veins, but also prevents the formation of senile plaques that can severely damage the brains of those with dementia.⁸¹ For example, South Korean scientists treated the brain cells of rats with grape seed extract before exposing them to the toxic beta-amyloid protein. Beta amyloid promotes the development of plaques that accumulate in the brains of patients with Alzheimer's disease. Treatment with grape seed extract conferred significant protection on the rat brain cells. While the untreated rat brain cells sustained acute free-radical damage and subsequently died, cells treated with grape seed extract suffered little damage.⁸¹

In research published in 2006, Indian scientists sought to evaluate grape seed extract's effects on the accumulation of oxidative DNA damage seen in normal aging. They administered grape seed extract to young and aged albino rats for 30 days. In rats that received the extract, grape seed

extract inhibited the accumulation of age-related oxidative DNA damage in the spinal cord and in various brain regions such as the cerebral cortex, striatum, and hippocampus—the very sites involved in thinking, processing, and memory that are most degraded in neurodegenerative disorders such as Alzheimer's and Parkinson's disease.⁸²

CONCLUSION: PREVENTION IS THE BEST BRAIN MEDICINE

An abundance of scientific evidence indicates that any program to protect the brain from dementia and other ravages of aging should incorporate compounds that have been shown to stimulate brain energy metabolism, boost acetylcholine levels, and protect against inflammation, thrombosis, and oxidative stress. By taking advantage of recent advances in our understanding of nerve cell function, cognition and memory, and how these processes are disrupted during normal aging, health-conscious adults can devise an individualized anti-aging program utilizing the most potent brain-protective nutrients available today.

Supplements such as uridine, GPC, phosphatidylserine, DHA, vinpocetine, ashwagandha, blueberries, and grape seed extract work via numerous mechanisms to provide natural, broad-spectrum support for optimal brain health and function. Because it is so much easier to protect the health of your brain cells than it is to restore their function once damage has manifested, it makes sense to begin a preventive program as soon as possible. When it comes to protecting and preserving brain health, "an ounce of prevention is worth a pound of cure" is truly a no-brainer.

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