



Concord Grapes and Cognitive Health

Researchers have begun investigating the role of Concord grapes in cognitive function. The research in this area is very preliminary. However, emerging science suggests that Concord grapes may offer certain health benefits for the mind.¹⁻⁵

Science indicates that the polyphenols in Concord grapes help support flexible arteries⁶⁻¹⁰ which, in turn, may help promote healthy blood flow to the mind.¹¹

- According to a review by Nash and Fillet published in the *American Journal of Cardiology* (2006), cardiovascular risk factors appear to play a role in the development of cognitive decline.¹¹

Oxidative stress, caused by free radicals in the body, can have a damaging effect on the brain.¹² The brain is particularly vulnerable to oxidative damage because of its high use of oxygen relative to its size and few antioxidant defense systems, among other factors.¹² Oxidative damage can affect enzymatic activities in many proteins including glutamine synthetase, which converts glutamate to glutamine. Glutamate is neurotoxic, and thus a buildup of this amino acid can be harmful. In the brain, oxidative damage affects important neurochemical processes such as dopamine synthesis.¹² Polyphenols help neutralize free radicals and thus may help to combat the effects of oxidative stress.

- In a 2004 double-blind, crossover study in 20 adults with coronary artery disease (CAD), Albers and colleagues found drinking Concord grape juice daily for two weeks (7 mL/kg/d) decreased superoxide production (a free radical) and a marker of inflammation (platelet-dependent), possibly due to the juice's polyphenol antioxidant content.¹³ These findings were supported by a similar study conducted by Freedman and colleagues on healthy adults, which found that platelet aggregation (clotting) was inhibited, superoxide release was decreased, and drinking grape juice stimulated the production of nitric oxide by platelets, which has a relaxing effect on blood vessels.⁹
- Several literature reviews have looked at the effects of a variety of polyphenol sources, such as Concord grape juice, on cognitive health. A review published in *Nutrition & Aging* by Lamport et al. concluded that the consumption of berry juice, such as Concord grape juice and blueberry juice; cocoa, and polyphenol supplements such as resveratrol may be most closely associated with improved immediate spatial working memory, among various cognitive health benefits.¹⁴ A second review by Lamport et al. looked only at 100% juices and found that consumption of fruit juices, such as Concord grape juice, can be beneficial for memory in certain populations.¹⁵ Two reviews, by Joseph et al. and Spencer, elaborate on potential mechanisms by which polyphenolic compounds, like those found in Concord grapes and other fruits and vegetables, may support cognitive function. They suggest that, while more science is necessary, the ability of polyphenols to potentially reverse the damaging effects of progressive oxidative stress is related to protecting, enhancing, and stimulating neuronal development.^{16,17}

Recent studies suggest that Concord grape juice may help slow the progression of age-related memory decline and motor function in older adults.²⁻⁵

- A randomized, double-blind, placebo-controlled pilot study of 12 older adults with early memory deficits (i.e., forgetfulness, prospective memory lapses) by Krikorian et al. found cognitive improvements after 12 weeks of Concord grape juice consumption. Five subjects consuming Concord grape juice (6-9 mL/kg/d) experienced significant improvement in list learning and trended toward improved verbal recall and spatial memory compared to controls. The 12 weeks of juice consumption did not have an effect on mood. Also, neither weight nor waist circumference were impacted by the intervention; however, there was a slight increase in fasting insulin for those consuming the grape juice.²
- Building on this earlier research, Krikorian and colleagues demonstrated that Concord grape juice can increase blood flow to certain regions of the brain, as well as improve memory function compared to those consuming a grape-flavored placebo. In this study, 21 older adults (average age = 77) were given either Concord grape juice or the placebo daily for 16 weeks, and were tested in various areas related to long-term memory. Those who drank Concord grape juice were less susceptible to distraction when asked to remember what they had previously learned. Test scores in other areas like learning and retention did not improve with the juice.³
 - Also, using functional magnetic resonance imaging (fMRI), researchers monitored specific areas of the brain in a subset of eight study participants while they performed a working memory task. The researchers found that the group consuming Concord grape juice had increased neural activity (indicating an increase in blood flow) in two regions of the brain involved in working memory, compared to the placebo.³
- Laboratory studies indicate that Concord grape juice has a positive impact on short-term memory and motor function. In a 2006 study by Shukitt-Hale et al., aged rats were treated with either: 0% (sugar water), 10% or 50% dilutions of Concord grape juice. The Concord grape juice-treated groups experienced beneficial results in cognitive performance (10% dilution) and in psychomotor function (50% dilution), compared to those receiving the placebo. These findings suggest that it takes a higher concentration of grape juice to enhance motor function. The authors hypothesized that the potential reversal of neuronal and behavioral effects may be related to cell-signaling, as well as antioxidant properties of Concord grape juice.⁴

Additional research with grape seed extract and other grape-derived polyphenol extracts have shown positive results in slowing progression of neurodegenerative diseases, such as Alzheimer's disease, in laboratory studies through preventing build-up of certain proteins in the brain associated with such diseases.^{5,18-21} Whether these findings extend to grapes and other grape products, as well as in humans, remains to be determined.

- Wang and Ho et al. have conducted research on polyphenols extracted from grapes. These researchers concur that, subject to further research, grape polyphenol extracts, including extracts from Concord grapes, have the potential to positively impact cognitive deterioration in certain groups.^{5,18-21}
 - The presence and accumulation of amyloid- β peptides play a key role in the development of Alzheimer's disease. *In vivo* and *in vitro* research presented by Ho and colleagues at Experimental Biology in 2010 found that select polyphenols from red wine and Concord

grape juice may have the ability to inhibit the production and accumulation of amyloid- β peptides.⁵

- Previous reports from their laboratory have shown that polyphenol extracts from grape seeds reduced the generation and accumulation of amyloid β -protein in *in vitro* and *ex vivo* (mice) models of Alzheimer's disease.²¹ A possible mechanism they've discovered suggests that grape seed extract interferes with certain protein (tau) aggregation, which is ultimately involved in the development of neurodegenerative disorders.¹⁸
- In a mini-review, these researchers summarize their laboratory findings supporting the hypothesis that grape seed polyphenol extract may play a role in slowing the progression of certain neurodegenerative disorders, such as Alzheimer's disease.¹⁹ However, they stress that further trials are needed to explain potential benefits in humans.

Bottom Line: Studies suggest that a diet rich in antioxidants, such as those found in fruits, vegetables, and their juices, can help slow and possibly even reverse age-related cognitive decline.¹⁵ The findings presented are exciting, but most research has taken place in a laboratory setting. More clinical research needs to be conducted to truly understand if Concord grapes can impact cognitive health in humans.

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