

Summary of California Table Grape Commission Brain Health Studies

PUBLISHED RESEARCH

Lee, J.K., Torosyan, N., & Silverman, D.H. (2017). Examining the impact of grape consumption on brain metabolism and cognitive function in patients with mild decline in cognition: A double-blinded placebo-controlled pilot study. *Experimental Gerontology*, 87 (Pt A), 121-128.

In a pilot study of people with early memory decline, subjects were either fed whole grape powder equivalent to just 2 ¼ cups of grapes per day – or a placebo powder. The results showed that consuming grapes preserved healthy metabolic activity in regions of the brain associated with early Alzheimer’s disease, where metabolic decline takes hold. Subjects who didn’t consume grapes exhibited significant metabolic decline in these critical regions. Additionally, those consuming the grape-enriched diet showed beneficial changes in regional brain metabolism that correlated to improvements in attention and working memory performance.

Parande, F., Dave, A., Park, E. J., McAllister, C., & Pezzuto, J.M. Effect of dietary grapes on female C57BL6/J mice consuming a high-fat diet: Behavioral and genetic changes. *Antioxidants* 2022, 11, 414.

This study investigated the effect of grape consumption in female C57BL6/J mice consuming a high-fat diet and measured the results using behavioral assays and high throughput genome-wide RNA transcriptome analyses. The results showed that grape consumption altered gene expression in the brain. Additionally, grape consumption had positive effects on behavior and cognition that were impaired by a high-fat diet without grapes.

Wang, Q., Simonyi, A., Li, W., Sisk, B.A., Miller, R.L., MacDonald, R.S., ...& Sun, A.Y. (2005). Dietary grape supplement ameliorates cerebral ischemia-induced neuronal death in gerbils. *Molecular Nutrition and Food Research*, 49, 443-451.

In this study, animals were fed a control diet or a grape-enriched diet at one of two levels: low and high amounts of grapes. Both grape diets helped protect against neuronal damage caused by loss of oxygen in the brain. Animals not receiving a grape-enriched diet had extensive damage. Grapes also reduced inflammation in the support cells to the neurons.

Allam F., Dao, A.T., Ghugh, G., Bohat, R., Jafri, F., Patki, G., ...& Salim, S. (2013, June). Grape powder supplementation prevents oxidative stress-induced anxiety-like behavior, memory impairment, and high blood pressure in rats. *Journal of Nutrition*, 143(6), 835-842. doi: 10.3945/jn.113.174649

This animal study investigated the role of oxidative stress in the combined occurrence of anxiety, cognitive impairment, and hypertension, using a model of oxidative stress. The grape-fed animals exhibited a reduction in anxiety-like behavior and no increase in blood pressure or

memory impairment, which the researchers attributed to the antioxidant capacity/activity of the grape polyphenols.

Patki, G., Allam, F.H., Atrooz, F., Dao, A.T., Solanki, N., Chugh, G., ... & Salim, S. (2013, September). Grape powder intake prevents ovariectomy-induced anxiety-like behavior, memory impairment and high blood pressure in female Wistar rats. *PLoS ONE*, 8(9), e74522. doi: 10.1371/journal.pone.0074522

A second, and similar study by the same research team, investigated the role of diminished estrogen influence at menopause and its association with oxidative stress and resulting cognitive decline, heightened anxiety, and hypertension. The control animals had increased blood pressure, anxiety-like behavior, and learning memory impairment. They exhibited increased oxidative stress in the brain, serum, and urine, and lower amounts of an antioxidant enzyme in the brain. Those consuming the grape-enriched diet reversed these effects.

Solanki, N., Alkadhi, I., Atrooz, F., Patki, G., & Salim, S. (2015, January). Grape powder prevents cognitive, behavioral and biochemical impairments in a rat model of post-traumatic stress disorder. *Journal of Nutrition Research*, 35(1), 65-75. doi: 10.1016/j.nutres.2014.11.008

This third study by this research group looked at the effects of a grape-enriched diet on post-traumatic stress in animals. In this study, the animals consuming grape powder reversed the behavioral and memory problems that were observed in those not receiving a grape-enriched diet. The researchers attributed these benefits to both gene activation and enhanced antioxidant activity resulting from grape intake.