Summary of California Table Grape Commission Eye Health Studies

PUBLISHED RESEARCH

Hu, W., Zheng, R., Feng, Y., Tan, D., Chung-Tsing, G.C., Su, X., and Kim, J.E. (2023). Impacts of regular consumption of grapes on macular pigment accumulation in Singapore older adults: a randomized, controlled trial. Food Funct. 14, 8321-8330. Doi: 10.1039/d3fo02105j.

In a randomized, controlled human study, 34 human subjects consumed either grapes (equivalent to 1 ½ cups of grapes per day) or a placebo for 16 weeks. The grape eaters showed a significant increase in Macular Pigment Optical Density (MPOD), plasma antioxidant capacity, and total phenolic content compared to those on placebo. Those who didn't consume grapes saw a significant increase in harmful ocular advanced glycation end products (AGEs), as measured in the skin.

Yu, C.-C, Nandrot, E.F., Dun, Y., & Finnemann, S.C. (2011). Dietary antioxidants prevent age-related retinal pigment epithelium damage and blindness in mice lacking the αvβ5integrin, *Free Radic. Biol. Med.,* 52:660-670.

In an animal model of vision loss similar to human macular degeneration, the grape powder diet significantly decreased HNE-adduct content, lipofuscin granule buildup and prevented age-related cone and rod photoreceptor dysfunction. The grape diet was protective when fed at a younger age (3-6 months or 6-9 months), but offered no protection when fed at 9-12 months. The grape powder was significantly more protective than lutein.

Kanavi, M.R., Darjatmoko, S., Wang, S., Azari, A.A., Famoodian, M., Kenealey J.D…& Polans, A.S. (2014). The sustained delivery of resveratrol or a defined grape powder inhibits new blood vessel formation in a mouse model of choroidal neovascularization. *Molecules*, 19:17578-17603.

In a controlled feeding trial in mice grape powder significantly reduced the formation of harmful blood vessels (choroidal neovascularization) associated with models of the exudative form of age-related macular degeneration (AMD), a leading cause of blindness in the industrialized world

Patel, A.K., Davis, A., Esperanza Rodriguez, M., Agron, S., & Hackam, A.S. (2016). Protective Effects of a grape supplemented diet in a mouse model of retinal degeneration. Nutrition, 32:384-390.

In a mouse model of retinal degeneration, freeze-dried grape powder (FDGP) preserved retinal structure and function compared to a sugar-matched control. In addition, retinal thickness and photoreceptor numbers were preserved by the FDGP-supplemented diet compared to controls.

UNPUBLISHED RESEARCH

Focus: Effects of grapes on retinal microvascular function. PI: Lott, Mary E.J., Penn State University, Hershey

This study examined the short-term effects of grape ingestion on microvascular function and oxidative stress across the diabetes continuum in humans. In this study grape consumption resulted in improvements in microvascular vasodilation of the retinal blood vessels in individuals with prediabetes and type 2 diabetes; reductions in diastolic blood pressure in healthy middle-aged individuals; and reductions in oxidative stress in healthy individuals and those with prediabetes. Consuming grapes led to no change in glucose homeostasis of individuals with prediabetes and diabetes but did improve the secretion of insulin in Type 2 diabetics.

Focus: Grapes and Cataract Prevention. PI: Hongli Wu, University North Texas Health Center

This study looked at the impact of grape consumption for 3 months on cataract formation in mice. A dose responsive protective effect was seen at all levels, where a 15% grape diet significantly inhibited the onset and severity of cataracts, resulting in clear lenses.

Focus: Neuroprotection in age-related macular degeneration with grapes. PI: Rohrer, Medical University of South Carolina.

This study found that mice consuming a 10% grape diet showed significant improvement in photoreceptor function and were protected from photoreceptor cell loss.