

Summary of California Table Grape Commission GI Health Studies

PUBLISHED RESEARCH

Dave, A., Park, E.-J., Beyoglu, D., Idle, J.R., and Pezzuto, J.M. (2023). Influence of grape consumption on the human microbiome, *Scientific Reports*, 13-7706.

This study analyzed the microbiome composition as well as urinary and plasma metabolites in human subjects that had consumed 2 1/4 cups of grapes per day for two weeks within an eight-week study. Changes were seen in the amounts of bacteria detected and in enzyme levels and biological pathways. Analysis of a subgroup of subjects showed unique patterns of microbe distribution.

Nguyen, A.V., Marinez, M., Stamos, M.J., Moyer, M.P., Planutis, K., Hope, C., & Holcombe, R.F. (2009). Results of a phase I clinical trial examining the effect of plant-derived resveratrol and grape powder on Wnt pathway target gene expression in colonic mucosa and colon cancer. *Journal of Cancer Management and Research*, 1, 25-37.

In a phase-1 human pilot trial normal colonic mucosa and colon cancer tissue examined pre- and post-exposure to grape powder by oral consumption. Grape powder inhibited target gene expression in normal colonic mucosa. The greatest effect was seen following ingestion of 80 g grape powder/day.

Nguyen, A.V., Marinez, M., Stamos, M.J., Moyer, M.P., Planutis, K., Hope, C., & Holcombe, R.F. (2009). Effect of a grape-supplemented diet on proliferation and Wnt signaling in the colonic mucosa are greatest for those over age 50 and with high arginine consumption. *Journal of Cancer Management and Research*, 1, 25-37.

In this study, healthy subjects were assigned to eat either 1/3, 2/3 or 1 lb. of grapes every day for two weeks. Researchers found that grape consumption at all levels inhibited the activities of target genes involved in cancer promotion. The benefits observed were most significant for two groups of people with a higher incidence of colon cancer: older individuals and those whose diet was high in arginine, a specific amino acid. This study reinforces previous findings that suggest a potential protective role for grapes against colon cancer.

Yang, J., Kurnia, P., Henning, S.M., Lee, R., Huang, J., Heber, D., & Li, Z. (2021). Effect of standardized grape powder consumption on the gut microbiome of healthy subjects: A pilot study. *Nutrients*, 13(11), 3965.

Human subjects consuming the equivalent of 1.5 cups of grapes per day for four weeks showed increased microbial diversity as measured by the Shannon Index. Among the beneficial bacteria that increased was Akkermansia, which has been linked to beneficial effects on glucose and lipid metabolism and on the integrity of the intestinal lining.

Baldwin, J., Collins, B., Wolf, P.G.,...& McIntosh, M.K. (2015). Grape consumption reduces adiposity and markers of hepatic lipogenesis and alters gut microbiota in butter fat-fed mice. J of Nutritional Biochemistry, Jan; 27:123-35.

Animals consuming a grape-enriched diet (3%) for 11 weeks exhibited an increase in some beneficial gut bacteria (*Akkermansia muciniphila*) and a decrease in detrimental bacteria (sulfidogenic *Desulfobacter* spp. and the *Bilophila wadsworthia*-specific dissimilatory sulfite reductase gene.) Further, the grape-enriched diet mitigated high-fat-induced impairment to the intestine, commonly known as “leaky gut.” Grape-fed mice at either the 3 or 5% diet showed reduced total body and inguinal fat, and displayed lower liver weights and triglyceride levels. The grape diet had a minor effect on impact on markers of inflammation or lipogenesis in adipose tissue or intestine.

UNPUBLISHED RESEARCH

Focus: Suppression of colon carcinogenesis by grape powder through mitigation of inflammation and induction of apoptosis of colon cancer stem cells. PI: Vanamala, Jairam K.P., Penn State University.

In this study, a grape-enriched diet (at either 3% or 6% w/w) decreased the number of intestinal polyps by 55%, providing greater protection than aspirin (at 200 ppm; human equivalent dose), which decreased colon polyps by 42%. The grape-enriched diet also ameliorated the weight loss typically seen with colon tumor development. Control mice displayed significant weight loss, but the aspirin-consuming mice had the greatest amount of weight loss. The animals consuming the grape-enriched diet also displayed improved neurological functioning and behavior compared to the control and aspirin mice.

Focus: Evaluation of cancer chemoprevention potential of standardized grape preparation. PI: Pezzuto, JM, University of Illinois at Chicago.

Dose-selection studies showed that up to 5000mg/kg grape powder could be added to the animal diet with no adverse effects. No significant effect was observed against the carcinogen.

Focus: Interactive and synergistic effects of grape powder, grape seed extract, proanthocyanidins, resveratrol and quercetin in a colon cancer model. PI: Exon, J.H., University of Idaho.

In this study animals were treated with a carcinogen at the onset of starting a grape-enriched diet. A trend toward decreased number of Aberrant Crypt Foci was observed, but not statistically significant.