

Grapes may aid a bunch of heart risk factors, animal study finds

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Could eating grapes help fight high blood pressure related to a salty diet? And could grapes calm other factors that are also related to heart diseases such as heart failure? A new University of Michigan Cardiovascular Center study suggests so.

The new study, published in the October issue of the *Journal of Gerontology: Biological Sciences*, gives tantalizing clues to the potential of grapes in reducing cardiovascular risk. The effect is thought to be due to the high level of phytochemicals – naturally occurring antioxidants – that grapes contain.

The study was performed in laboratory rats. The researchers noted that while these study results are extremely encouraging, more research needs to be done.

The researchers studied the effect of regular table grapes (a blend of green, red, and black grapes) that were mixed into the rat diet in a powdered form, as part of either a high- or low-salt diet. They performed many comparisons between the rats consuming the test diet and the control rats receiving no grape powder — including some that received a mild dose of a common blood-pressure drug. All the rats were from a research breed that develops high blood pressure when fed a salty diet.

In all, after 18 weeks, the rats that received the grape-enriched diet powder had lower blood pressure, better heart function, reduced

inflammation throughout their bodies, and fewer signs of heart muscle damage than the rats that ate the same salty diet but didn't receive grapes. The rats that received the blood-pressure medicine, hydrazine, along with a salty diet also had lower blood pressure, but their hearts were not protected from damage as they were in the grape-fed group.

Says Mitchell Seymour, M.S., who led the research as part of his doctoral work in nutrition science at Michigan State University, "These findings support our theory that something within the grapes themselves has a direct impact on cardiovascular risk, beyond the simple blood pressure-lowering impact that we already know can come from a diet rich in fruits and vegetables." Seymour manages the U-M Cardioprotection Research Laboratory, which is headed by U-M heart surgeon Steven Bolling, M.D.

Bolling, who is a professor of cardiac surgery at the U-M Medical School, notes that the animals in the study were in a similar situation to millions of Americans, who have high blood pressure related to diet, and who develop heart failure over time because of prolonged hypertension.

"The inevitable downhill sequence to hypertension and heart failure was changed by the addition of grape powder to a high-salt diet," he says.

"Although there are many natural compounds in the grape powder itself that may have an effect, the things that we think are having an effect against the hypertension may be the flavanoids – either by direct antioxidant effects, by indirect effects on cell function, or both. These flavanoids are rich in all parts of the grape - skin, flesh and seed, all of which were in our powder." Bolling explains.

Such naturally occurring chemicals have already been shown in other research, including previous U-M studies, to reduce other potentially harmful molecular and cellular activity in the body.

Although the current study was supported in part by the California Table Grape Commission, which also supplied the grape powder, the authors note that the commission played no role in the study's design, conduct, analysis or the preparation of the journal article for publication.

Seymour also receives funding from the National Heart, Lung and Blood Institute, part of the National Institutes of Health, through a National Research Service Award.

"Though it's true that your mom told you to eat all your fruits and your vegetables, and that we are learning a lot about what fruits, including grapes, can do in this particular model of hypertension and heart failure, we would not directly tell patients to throw all their pills away and just eat grapes," says Bolling.

However, research on grapes and other fruits containing high levels of antioxidant phytochemicals continues to show promise. So does research on the impact of red wine on heart health, though that issue is also far from settled.

The U-M team notes that a clinical research on grapes may be a possibility in the future, but is not currently planned.

In the meantime, Bolling says, people who want to lower their blood pressure, reduce the risk of heart failure, or help their weakened hearts retain as much pumping power as possible should follow tried-and-true advice: Cut down on the amount of salt you get through your food and drink.

"There is, as we now know, a great variability, perhaps genetic even, in sensitivity to salt and causing hypertension," he says. "Some people are very sensitive to salt intake, some are only moderately so, and there are perhaps some people who are salt resistant. But in general we say stay away from excess salt."

He notes that the popular DASH diet, which is low in salt and high in fruits and vegetables, has been proven to reduce mild high blood pressure without medication. The dose of whole table grape powder that was consumed in the study was roughly equivalent to a person eating nine human-sized servings of grapes a day. Currently, five to nine servings of fruits and vegetables are recommended as part of the DASH diet.

The rats in the study were from a strain called Dahl rats, which have been specially bred to all be susceptible to salt-induced hypertension. This allowed the researchers to look at a uniform sample of rats that would be affected in the same way by their diet, so that the effects of the salt level, grape powder and hydrazine could be seen clearly.

Each group of 12 rats was fed the same weight of food each day, with powdered grapes making up 3 percent of the diet (by weight) for rats that received grapes as part of either a low-salt or high-salt diet. The rats that received hydrazine were fed it through their water supply in a dose that has been previously shown to be effective in reducing blood pressure.

The rats in the high-salt grape and high-salt hydrazine groups did develop high blood pressure over time, but they had lower systolic blood pressures than the high-salt rats that did not receive grapes.

The researchers also measured the distortion of the heart size, weight and function that occurred over time – characteristics of heart failure – and found that the high-salt grape group had less of a change than the high-salt hydrazine group. Parameters related to the diastolic blood pressure – an important factor in human heart failure — and to the heart's relaxation during the diastolic phase also changed in just the high-salt grape group. Finally, the grape-fed rats had improved cardiac output, or more blood pumped per unit of time.

The researchers also looked for signs of inflammation, oxidative damage and other molecular indicators of cardiac stress. Again, the rats that received the high-salt grape diet had lower levels of these markers than rats that received the high-salt diet with hydrazine – and even the low-salt grape-eating rats had lower levels than the rats that received a low-salt diet alone.

In all, the researchers say, the study demonstrates that a grape-enriched diet can have broad effects on the development of hypertension and the risk factors that go along with it. Whether the effect can be replicated in humans, they say, remains to be seen.

Source: University of Michigan Health System

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