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Portuguese
study finds the beverage triggers chemical reactions inside the stomach

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Red
wine not only goes well with a nice meal, it helps the stomach convert potentially harmful chemicals into less dangerous molecules before they're circulated in the body, according to a new study slated to be published in an upcoming journal of Toxicology. A team of Portuguese researchers found that specific polyphenols in red wine trigger the release of nitric oxide, a chemical that relaxes the stomach wall, helping to optimize digestion.

According
to co-author Dr. João Laranjinha, an associate professor at the Center for Neurosciences and Cell Biology at the University of Coimbra, Portugal, the research bucks current theory. Since the 1990s, many researchers have believed that many of wine's observed health benefits are due to the antioxidative properties of polyphenols. Studies have found wine appears to counteract deleterious, oxidative injury to the body's molecules and cells, as with chronic, inflammatory conditions such as atherosclerosis, a condition in which fatty material collects along the walls of arteries.

Many
of these studies suggest that people would need to consume impossibly large amounts of red wine in order to see any antioxidative benefit, because

polyphenols are extensively metabolized during absorption in the intestines, said Laranjinha. Estimates range anywhere from a couple of bottles per day, to 10,000 per week.

But an earlier study by the same team and published in Free Radical Biology & Medicine in 2008 found that red wine's benefits may begin before it reaches the intestine. "We started to check for beneficial effects occurring before the absorption phase, that is in the stomach," said Laranjinha. "Overall, the observations of the current study suggest a new pathway for the health benefits of wine ethanol and polyphenols in humans, beyond antioxidant activity, via production of nitric oxide."

While in large doses nitric oxide is a pollutant, in smaller amounts it can dilate arteries, helping blood flow. It also has the ability to "relax" the walls of the stomach, allowing nutrients to pass more freely into the bloodstream. In the earlier study, Laranjinha and his team noted that red wine showed a higher level of another chemical, called ethyl nitrite, when compared to non-alcoholic beverages and brandy. Ethyl nitrite, they found, reacts with potentially harmful free radicals, called nitrites, by chemically converting the molecules into nitric oxide. (Nitrites are found in salty and processed meats and can react poorly in the body, forming carcinogens.)

For the current research, the Portuguese researchers used samples of various red-wine polyphenols, such as catechin, epicatechin and quercetin, which are also found abundantly in apples, berries and onions.

To test if these polyphenols reduce the levels of nitrites in the stomach, the scientists examined the combined effect on preserved rodent gastric strips and on a sample of synthetic stomach acid. After 60 minutes of being exposed to the polyphenols, the stomach strips relaxed and the acid showed high levels of ethyl nitrite.

Taking it one step further, they recruited six healthy volunteers to eat a serving of lettuce, which is known to produce nitrites in the stomach, then served them red wine. After 60 minutes the participants would regurgitate into airtight containers so the contents could be examined. The scientists also found high levels of nitric oxide in the stomach acid.

"Both major [components] of red wine, the polyphenols and the ethanol, may induce beneficial effects via production of nitric oxide," said Laranjinha. "Mechanistically, the polyphenols reduce the nitrites consumed in the diet into nitric oxide in the stomach, and the ethanol reacts with nitrite and derived species in the stomach yielding a new molecule, ethyl nitrite, that releases the nitric oxide."