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Versatile cancer weapon in grapes

Worldwide, cancer kills some 6 million adults each year, more than any other disease. A team of Chicago-area researchers has now stumbled upon a constituent of grapes that may play a natural role in fighting the development of this scourge. Not only present in the fruit's skin, this compound -- resveratrol -- also shows up in the fruit's juice and in wines, especially reds.

The natural role of this compound in plants remains pretty much a mystery. However, it appears to be one of those compounds produced during episodes of stress, probably to help a plant ward off predation, says John M. Pezzuto, a cancer researcher at the University of Illinois at Chicago, who headed the new study.



Over the past few years, his pharmacognosy program has been screening about 1,000 plants -- collected from all over the world -- for medicinal properties. When an extract from the root of a Peruvian tree (*Cassia quinquangulata*) showed good activity in a test-tube anticancer assay, Pezzuto's team isolated the chemical responsible.

It turned out to be resveratrol, a constituent of grape skins that had been hailed as a promising dietary agent for preventing heart disease (SN: 7/18/92, p. 47). Says Pezzuto, this was the first evidence that the compound might also show promise against cancer.

In subsequent tests, Pezzuto's group ran the compound through a series of additional assays and animal tests to identify how the chemical functions and what part of the three-step cancer process -- initiation, promotion, and progression -- it might halt. Their findings, reported in the Jan. 10 *SCIENCE*, show it has promise in assays modeling all three stages of carcinogenesis, Pezzuto says, which makes it "very unusual."

Their tests uncovered clues to the mechanism by which resveratrol may fight cancers. It functions as a moderate antioxidant, allowing it to quench the biologically dangerous free-radical reactions that have been linked to several cancers (SN: 3/23/96, p. 182). The chemical also proved a potent inflammation-fighting agent. Pezzuto suspects that part of resveratrol's anticancer activity traces to this anti-inflammatory properties, which should allow it to block the body's production of certain chemicals, known as prostaglandins, that have been linked to fostering the transformation of precancerous lesions into malignancies. Its anti-inflammatory potency is in the ballpark of some prescription drugs used to fight cancer, such as indomethacin, but in animal tests it doesn't show their side effects or toxicity, he notes.

This compound has been identified in more than 70 plants other than grapes -- many of them also a part of the human diet. For instance, relatively high concentrations have been found in peanuts, perhaps because of this legume's constant fight against fungal infections, Pezzuto says.

Because grapes remain the richest known food source of resveratrol, Pezzuto says that foods and juices derived from grapes should be investigated as possible natural cancer preventatives. However, he cautions that one might have to consume hefty quantities. For instance, his back-of-the-envelope

calculations indicate that you would probably have to consume the equivalent of about 250 liters of wine at a time to get the dose of pure resveratrol that he used to establish the agent's anti-inflammatory attributes. "That doesn't mean that smaller doses wouldn't have an effect," he told SCIENCE NEWS ONLINE, "we just haven't looked at that yet."

He strongly suspects that if it's to find therapeutic use in the future, it probably would be not consumed solely in natural foods but taken as a dietary supplement, as an additive used to fortify processed foods, or as a prescription drug to fight cancer recurrence.

Indeed, he says, resveratrol "appears to be a good candidate for a cancer-intervention trial." The National Cancer Institute has already expressed interest in investigating the compound's promise in animals that model colon-cancer development. His own lab is beginning a rat study to probe its activity against breast cancer.

References:

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