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## High Doses of IV Vitamin C Fight Cancer

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(HealthDay News) -- High

doses of vitamin C administered intravenously can fight cancer -- at least in the laboratory, researchers report.

They took another look at the vitamin years after studies first suggested in the 1970s that high doses of ascorbate or vitamin C may help fight cancer. In the wake of those studies, additional studies using the same high doses found no benefit, although some of them used only oral vitamin C, not intravenous doses of the vitamin.

After those initial, failed studies using oral vitamin C, "the conclusion was that this therapy should be shelved, that it doesn't work," said lead researcher Dr. Mark Levine, chief of the molecular and clinical nutrition section and senior staff physician, National Institute of Diabetes & Digestive & Kidney Diseases.

But Levine and his team took another look at the therapy after working for the federal government on the latest recommended daily intake levels for vitamin C.

As part of those studies they examined the body's absorption of the nutrient and found that while oral intake does reach a saturation point, "when you give doses intravenously they go through the roof in the blood and then they are cleared," Levine explained.

According to Levine, a 10 gram dose of vitamin C given intravenously produces bloodstream concentrations more than 25-fold higher than concentrations achieved from the same oral dose.

Some antibiotics are poorly absorbed when given orally but fight infections effectively when given intravenously, and Levine and his team thought that might be the case with vitamin C and cancer.

Working with cell lines in the laboratory, they used high doses of vitamin C that could only be achieved by IV administration.

"At the highest concentration of ascorbic acid, if given intravenously, they don't touch normal cells and they kill lots of cancer cells. We don't know why," Levine said.

According to the study, published in the Sept. 12-16 issue of the *Proceedings of the National Academy of Sciences*, vitamin C led to the formation of hydrogen peroxide, a chemical that can kill cells. This suggests a potential mechanism for therapy, Levine said.

"The mechanism has to be validated in animals -- the effects tested in animals to see if this is true," he said.

The newest study will likely set off another round of investigations about vitamin C's cancer-fighting ability, said Dr. Len Lichtenfeld, deputy chief medical officer for the American Cancer Society. He called the study interesting and noted that it was conducted by respected scientists.

However, he said, laboratory findings are a long way from clinical practice and more study is needed. But the American Cancer Society, after careful evaluation, does note the value of dietary vitamin C in reducing cancer risk, stating that "vitamin C may have a protective role" in reducing the risk for many types of cancer when it is consumed as part of a prudent diet.

If alternative medicine practitioners -- who have continued to use vitamin C treatments for cancer -- provide evidence that it works, this would be the ideal time to step forward with their findings, Lichtenfeld said.

In another study published in the same issue of the journal, researchers from Pennsylvania State University found that retinoic acid, also known as vitamin A, can boost immune system functioning, at least in mice.

Researchers A. Catharine Ross and Yifan Ma found

that injecting mice with the vitamin boosted their production of natural killer cells after they got a tetanus vaccine, improving their immune system response.

Newborns are susceptible to infectious diseases, and because their immune systems are immature often respond poorly to vaccines. Adding the vitamin A may help, although further study is needed, the researchers said.

### **More information**

To learn more about Vitamin C, visit [Ohio State University](#).

SOURCES: Mark Levine, M.D., chief of the molecular and clinical nutrition section and senior staff physician, National Institute of Diabetes & Digestive & Kidney Diseases, Bethesda, Md; Len Lichtenfeld, M.D., deputy chief medical officer, American Cancer Society, Atlanta; Sept. 12-16, 2005, *Proceedings of the National Academy of Sciences*  
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