

# High doses of antioxidant supplements induce stem cell genetic abnormalities

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High doses of antioxidant nutritional supplements, such as vitamins C and E, can increase genetic abnormalities in cells, which may predispose supplement-takers to developing cancer, according to a new study from the Cedars-Sinai Heart Institute.

The study, led by Eduardo Marbán, M.D., Ph.D., director of the Cedars-Sinai Heart Institute, was published online today in the medical journal *Stem Cells*. The study also will appear in the journal's July printed edition.

Marbán and his team accidentally discovered the danger of excessive antioxidant doses while seeking a way to reduce the [genetic abnormalities](#) that occurred naturally when the scientists sought to multiply human cardiac stem cells.

Marbán stressed that the study's finding applies only to excessive [nutritional supplements](#) and not to foods that are rich in antioxidants, such as milk, oranges, blueberries and peanuts. In recent years, multiple studies have touted the benefits of foods rich in antioxidants.

"Taking one multivitamin daily is fine, but a lot of people take way too much because they think if a little is good, a lot must be better," said Marbán, who is also the Mark Siegel Family Professor at Cedars-Sinai. "That is just not the case. If you are taking 10 or 100 times the amount in a daily multivitamin, you may be predisposing your cells to developing cancer, therefore doing yourself more harm than good."

In laboratories, stem cells are often grown in a Petri dish culture than is composed of 20 percent oxygen, whereas cells growing inside human tissue are exposed to just 3 to 5 percent oxygen. But Marbán's team of researchers became frustrated because the higher concentration of oxygen in lab-grown stem cells resulted in 9 percent of the cells being rejected because of genetic abnormalities.

"We sought to counter that oxidation problem by adding high doses of antioxidants directly to the cells," Marbán said. "That's when we made the serendipitous discovery that there is a danger zone for the cells exposed to antioxidants to develop genetic abnormalities that predispose to cancer."

Marbán is leading an ongoing, groundbreaking clinical trial in which heart attack patients undergo two minimally-invasive procedures in an effort to repair and re-grow healthy muscle in a heart injured by a heart attack. First, a biopsy of each patient's own heart tissue is used to grow specialized heart stem cells. About a month later, the multiplied [stem cells](#) are then injected back into the patient's heart via a coronary artery.

The two-step procedure was completed on the first patient in June 2009. The results of the trial are expected in early 2011.

Recently, Marbán received a \$5.5 million grant from the California Institute for Regenerative Medicine to continue developing cardiac stem cell therapies.

**More information:** The complete study is available at [www3.interscience.wiley.com/jo ... rnal/121640180/issue](http://www3.interscience.wiley.com/jo...rnal/121640180/issue)

Provided by Cedars-Sinai Medical Center

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