Medical Xpress

Popular antioxidant seems to spread skin cancer cells in mouse research

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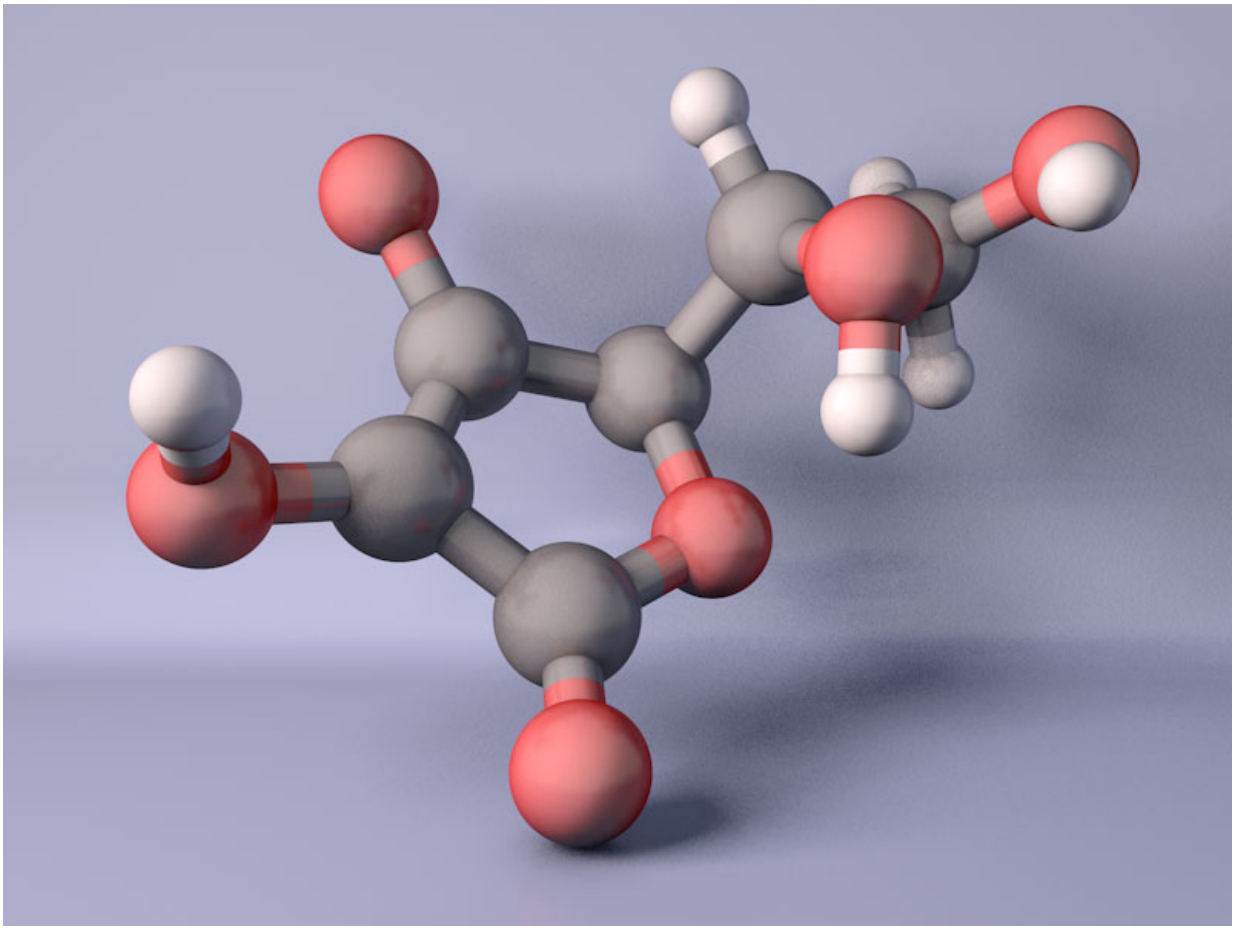

Antioxidants, such as vitamin C (above) and E, are widely consumed as dietary supplements for their supposed anti-cancer benefits. New research in mice suggests that certain antioxidants can actually increase the risk of metastatic melanoma. Credit: C. Bickel / Science Translational Medicine

A man-made antioxidant appears to accelerate the spread of skin cancer in mice, raising questions about its safety in humans, researchers say.

The antioxidant, N-acetylcysteine, is used to relieve mucus production in patients with chronic obstructive pulmonary disease (COPD), said study senior author Martin Bergo, a professor at the University of Gothenburg in Sweden.

It also is used as a supplement by people who believe that the antioxidant can help reduce exercise-related muscle damage, burn fat and prevent fatigue, Bergo added.

But water laced with N-acetylcysteine appeared to speed up the spread of melanoma, the potentially deadly skin cancer, in lab mice, researchers found.

The antioxidant had no effect on the number and size of tumors, but it enhanced the migration and invasion of these tumors to other parts of the body, the research team reported Oct. 7 in the journal *Science Translational Medicine*.

N-acetylcysteine was linked to a doubling of the number of lymph-node tumors in mice who drank the laced water, compared to untreated animals, according to the findings.

Previously, the same research team reported that certain antioxidants can spur lung tumor growth in mice.

Antioxidants are believed to protect healthy cells from damage caused by unstable molecules called "free radicals," according to the U.S. National Institutes of Health (NIH).

However, Bergo believes that antioxidants like N-acetylcysteine also

protect cancer cells from free radicals that might otherwise slow their growth or keep them from spreading to other parts of the body.

Other studies have linked high doses of beta-carotene to increased risk of lung cancer in smokers. High doses of vitamin E may increase risk of prostate cancer, the NIH says.

"For people with an increased risk of cancer, this means that taking nutritional supplements containing antioxidants may unintentionally speed up the progression of a small tumor or premalignant lesion, neither of which is possible to detect," Bergo said.

Bergo said his team decided to focus on N-acetylcysteine because it is a potent antioxidant that dissolves quickly in water, which makes it easy to feed to lab mice.

The researchers also performed follow-up lab tests on human melanoma cells, using N-acetylcysteine and vitamin E. Both antioxidants produced similar results in the human skin cancer cells, increasing their ability to migrate and invade other cells.

The boost provided to skin cancer could come from antioxidants' protective benefits. But the research team also found that the antioxidants activated a protein that regulates cellular processes and is likely involved in promoting the spread of cancer.

Bergo recommends that people with cancer or at high risk for cancer avoid antioxidant supplements.

"For a patient with newly diagnosed lung cancer or melanoma—and potentially other cancer forms—antioxidants could speed up the progression of the disease," he said. "There is no conclusive evidence that antioxidant supplementation would be beneficial for these patients,

and they should be encouraged to avoid this strategy because the risk of worsening the disease is high."

Dr. Len Lichtenfeld, deputy chief medical officer for the American Cancer Society, said that while the study results are interesting, "it's difficult to take this information and directly translate it into recommendations for patients."

The results of animal studies "don't necessarily translate into what happens for people," Lichtenfeld said. "One really has to do the clinical trial in people before you can make conclusions about antioxidants or anything else impacting the course of cancer treatment."

However, Lichtenfeld said cancer patients should make sure their treatment team knows about all supplements they take, so they can get the best advice possible for their particular situation.

"Patients do need to discuss with their doctors and their oncologists not only what traditional medicines they are taking, but alternative medications and vitamins they are consuming," he said. "It's important for the care team to know."

More information: Antioxidants can increase melanoma metastasis in mice, *Science Translational Medicine*, stm.sciencemag.org/lookup/doi/ … scitranslmed.aad3740

antioxidant-skin-cancer-cells.html