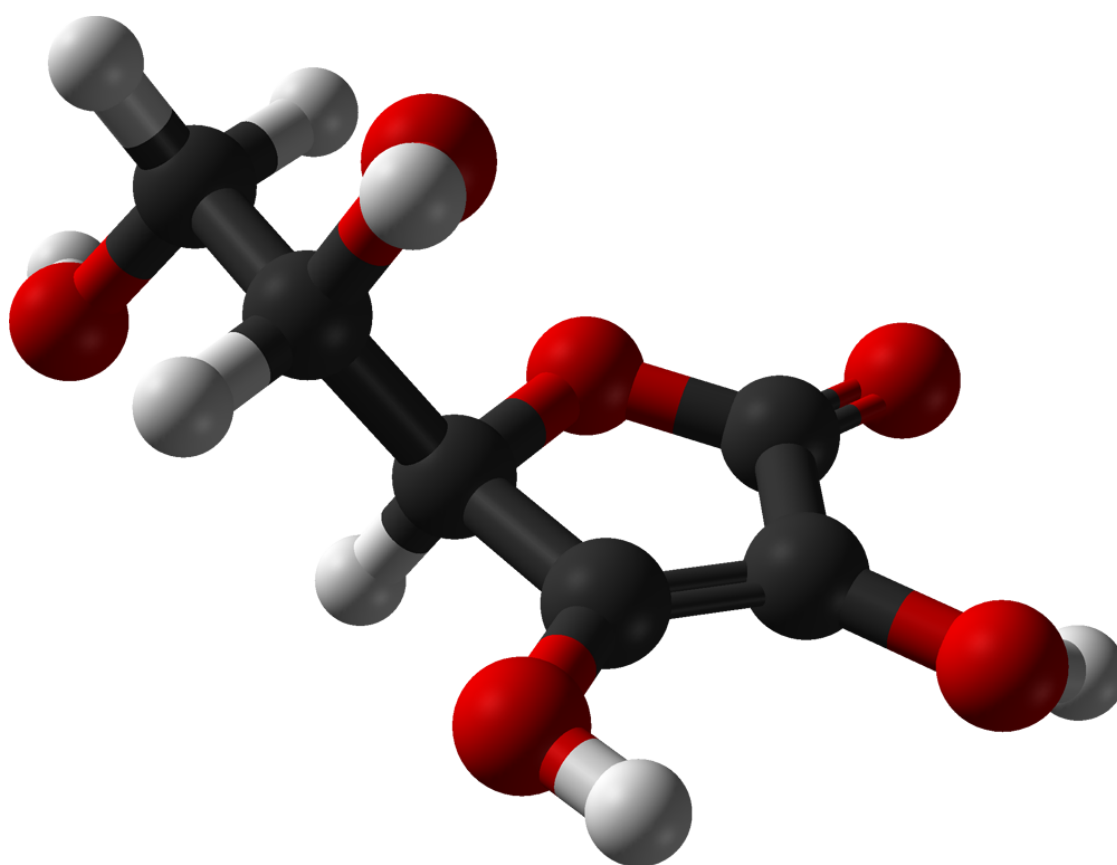


Vitamin C could help reduce toxic side effects of common cancer treatment

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Ball-and-stick model of the L-ascorbic acid (vitamin C) molecule, $C_6H_8O_6$, as found in the crystal structure. Credit: public domain

A study conducted in rats suggests that taking vitamin C may help to counteract the muscle atrophy that is a common side effect of the chemotherapy drug doxorubicin. Although clinical studies would be needed to determine the safety and effectiveness of taking vitamin C during doxorubicin treatment, the findings suggest vitamin C may represent a promising opportunity to reduce some of the drug's most debilitating side effects.

"Our results suggest vitamin C as a potential adjunct therapy to assist in the management of peripheral muscle disorders after treatment with doxorubicin, thereby improving functional capacity and quality of life and reducing mortality," said Antonio Viana do Nascimento Filho, a master's student in medicine at University Nove de Julho (UNINOVE) in Brazil, first author of the study. Nascimento Filho will present the findings at the American Physiological Society annual meeting during the Experimental Biology (EB) 2022 meeting, held in Philadelphia April 2–5.

Doxorubicin is an anthracycline chemotherapy drug that is often used along with other chemotherapies to treat [breast cancer](#), [bladder cancer](#), lymphoma, leukemia and several other cancer types. While it is a potent anti-cancer drug, doxorubicin can cause serious heart problems and [muscle atrophy](#), with lasting impacts on survivors' physical stamina and quality of life.

These side effects are thought to result from an excessive production of oxygen reactive species or "free radicals" in the body. Vitamin C is a natural antioxidant that can help to reduce oxidative stress, the type of damage caused by free radicals.

In a previous study conducted with the University of Manitoba in Canada, the research group found that vitamin C improved markers of heart health and survival in rats given doxorubicin, mainly by reducing

oxidative stress and inflammation. In the new study, they assessed whether vitamin C could similarly help to prevent doxorubicin's adverse effects on skeletal muscle.

The researchers compared skeletal muscle mass and markers of oxidative stress in four groups of rats with eight to 10 animals in each group. One group received both vitamin C and doxorubicin, a second group received only vitamin C, a third group received only doxorubicin and a fourth group received neither. The mice that received vitamin C along with doxorubicin showed evidence of reduced [oxidative stress](#) and better muscle mass compared with mice that were given doxorubicin but no vitamin C.

"It is exciting that the vitamin C prophylactic and concurrent treatments given for just one week before and maintained for another two weeks after the use of doxorubicin was sufficient to attenuate the side effects of this drug on [skeletal muscle](#), contributing to a hugely positive impact on the health of the studied animals," said Nascimento Filho. "Our work demonstrated that vitamin C treatment can mitigate the loss in muscle mass and improve many markers of free radicals' imbalance in rats subjected to doxorubicin administration."

The scientists noted that further research, including randomized [clinical trials](#), would be needed to confirm whether taking vitamin C during doxorubicin treatment would be helpful for [human patients](#), and to determine the appropriate dosage and timing. Previous studies have suggested vitamin C could interfere with the effects of chemotherapy drugs, so patients are not advised to take vitamin C supplements during cancer treatments unless directed to do so by their doctor.

More information: Conference: www.apsebmeeting.org/eb2022/

Abstract: www.eventscribe.net/2022/EB202...?posterTarget=466371

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