

Scientists discover new role for vitamin C in the eye -- and the brain

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Nerve cells in the eye require vitamin C in order to function properly — a surprising discovery that may mean vitamin C is required elsewhere in the brain for its proper functioning, according to a study by scientists at Oregon Health & Science University recently published in the Journal of Neuroscience.

"We found that cells in the retina need to be 'bathed' in relatively high doses of vitamin C, inside and out, to function properly," said Henrique von Gersdorff, Ph.D., a senior scientist at OHSU's Vollum Institute and a co-author of the study. "Because the retina is part of the central nervous system, this suggests there's likely an important role for vitamin C throughout our brains, to a degree we had not realized before."

The [brain](#) has special [receptors](#), called GABA-type receptors, that help modulate the rapid communication between cells in the brain. GABA receptors in the brain act as an inhibitory "brake" on excitatory neurons in the brain. The OHSU researchers found that these GABA-type receptors in the retinal cells stopped functioning properly when vitamin C was removed.

Because retinal cells are a kind of very accessible brain cell, it's likely that GABA receptors elsewhere in the brain also require vitamin C to function properly, von Gersdorff said. And because vitamin C is a major natural antioxidant, it may be that it essentially 'preserves' the receptors and [cells](#) from premature breakdown, von Gersdorff said.

The function of vitamin C in the brain is not well understood. In fact, when the human body is deprived of vitamin C, the vitamin stays in the brain longer than anywhere else in the body. "Perhaps the brain is the last place you want to lose vitamin C," von Gersdorff said. The findings also may offer a clue as to why scurvy — which results from a severe lack of vitamin C — acts the way it does, von Gersdorff said. One of the common symptoms of scurvy is depression, and that may come from the lack of vitamin C in the brain.

The findings could have implications for other diseases, like glaucoma and epilepsy. Both conditions are caused by the dysfunction of [nerve cells](#) in the retina and brain that become over excited in part because GABA receptors may not be functioning properly.

"For example, maybe a [vitamin C](#)-rich diet could be neuroprotective for the retina — for people who are especially prone to glaucoma," von Gersdorff said. "This is speculative and there is much to learn. But this research provides some important insights and will lead to the generation of new hypotheses and potential treatment strategies."

Scientists and students in von Gerdorff's lab in OHSU's Vollum Institute are dedicated to basic neuroscience research. The [vitamin C](#) research work was done using goldfish retinas, which have the same overall biological structure as human retinas.

Provided by Oregon Health & Science University

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