

# Large doses of antioxidants may be harmful to neuronal stem cells

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Stem cells are especially sensitive to oxygen radicals and antioxidants shows new research from the group of Anu Wartiovaara in the Molecular Neurology Research Program of University of Helsinki. The research led by researcher Riikka Martikainen was published in *Cell Reports* May 28th 2015.

Mitochondria are cellular power plants that use oxygen to produce energy. As a by-product they produce reactive oxygen. Excessive oxygen radicals may cause damage to cells but they are needed in small quantities as important cellular signaling molecules. One of their main functions is to control function of stem cells. Antioxidants are widely used to block the damage caused by reactive oxygen. To enhance their effect some new [antioxidants](#) are targeted to accumulate into mitochondria.

The current research showed that a small increase in oxygen radicals did not directly lead to cellular damage but disrupted intracellular signaling in stem cells and lead to decrease in their stemness properties. Treatment with antioxidants was able to improve the stemness properties in these cells. However, surprisingly, the researchers found that an antioxidant targeted to mitochondria showed dose-dependent toxic effects especially on neural stem cells.

The use of antioxidants as dietary supplements is common, but little is known of their effects on stem cells. This new research shows that large doses of antioxidants may be harmful to [neural stem cells](#). Additional

research on [stem cells](#) should be done to assess safety of [mitochondria](#) targeted antioxidants.

**More information:** "mtDNA Mutagenesis Disrupts Pluripotent Stem Cell Function by Altering Redox Signaling." *Cell Rep.* 2015 May 27. pii: S2211-1247(15)00521-5. [DOI: 10.1016/j.celrep.2015.05.009](https://doi.org/10.1016/j.celrep.2015.05.009)

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