

# Vitamin E deficiency linked to embryo damage, death

January 31 2017

---



Credit: Oregon State University

Researchers for the first time have explained how deficient levels of vitamin E can cause neurologic damage to an embryo, failure to normally develop and ultimately death – a process that in women can be one cause of miscarriage.

The research was published by scientists from Oregon State University in *Free Radical Biology and Medicine*. It answers some questions about the biologic activities of vitamin E that have been debated since 1922, when this essential micronutrient was first discovered, in part for its role

in preventing embryonic mortality.

The research also made clear the importance of vitamin E status for any woman who is planning to, or might become pregnant, scientists said.

The study, done with zebrafish embryos, showed that severe vitamin E deficiency causes the depletion of essential fatty acids, especially the omega-3 fatty acid DHA, which has been shown to be of critical importance to health in multiple studies in recent years.

When this happens, cells use glucose to prevent or reduce damage. Lacking glucose for energy, many physical and neurologic features, especially the brain, simply don't get built, and death can be the result. Restoration of glucose can repair some of the damage, but some physical deformities remain.

In the growing embryo of a zebrafish – which goes from a cell to a swimming fish in about five days – a severe vitamin E deficiency causes 70-80 percent mortality, the study showed.

"Vitamin E has many biologic roles, only one of which is to serve as an antioxidant," said Maret Traber, a professor in the OSU College of Public Health and Human Sciences, and Ava Helen Pauling Professor in the Linus Pauling Institute.

"In the growing embryo, vitamin E plays a major role in protecting essential fats such as DHA. Loss and oxidation of these fats can begin a chain reaction that involves glucose, depletes the cell of other antioxidants such as vitamin C, robs the cell of energy, and ultimately has a lethal outcome."

When vitamin E is deficient, the embryonic brain is literally starved of necessary energy and nutrients, particularly DHA and choline, the

researchers concluded in their study.

The neurological development of zebrafish is very similar to that of humans, Traber said, which make them a good model for this research.

"The importance of vitamin E in embryonic development, the very earliest days of vertebrate life, is part of what actually led to its discovery," Traber said. "Since then we've learned much more about the need for this micronutrient in women. One study done in Bangladesh, for instance, showed that pregnant women with lower levels of vitamin E had double the risk of miscarriages as another group with adequate nutrition."

Nutrition surveys suggest that about 96 percent of women in the U.S. have inadequate intakes of vitamin E in their diet, Traber said. The problem may be of even greater concern in young adult women who avoid high-fat foods and may not have a diet rich in oils, nuts and seeds, some of the foods with the highest levels of this micronutrient. The human body can create DHA from some foods, but not vitamin E.

In a human fetus, some of the most critical periods for neurologic and brain development are in the first few weeks of pregnancy. Given the difficulty of obtaining vitamin E in the diet, this would suggest that any woman who is planning to or may become pregnant should take a multivitamin with the recommended daily allowance of [vitamin E](#) and some other micronutrients, Traber said.

**More information:** Melissa McDougall et al. Lethal Dysregulation of Energy Metabolism During Embryonic Vitamin E Deficiency, *Free Radical Biology and Medicine* (2017). [DOI: 10.1016/j.freeradbiomed.2017.01.020](#)

Provided by Oregon State University

Citation: Vitamin E deficiency linked to embryo damage, death (2017, January 31) retrieved 24 April 2024 from

<https://medicalxpress.com/news/2017-01-vitamin-deficiency-linked-embryo-death.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.