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Alpha-Tocopherol and Osteoporosis: The Devil in the Details 6 Mar 2012



A recent study that has attracted considerable attention is written by a Japanese group lead by [Fujita](#), published in *Nature Medicine*. They describe a series of experiments performed in mice and in cell-based assays that look at the role of alpha-tocopherol (vitamin E) in osteoclast activity. The bone remodeling process occurs continuously and involves a balance between bone-building cells called osteoblasts, and bone-absorbing cells called osteoclasts. This research is relevant because when the activity of osteoclasts outpaces osteoblasts, bone loss occurs.

In the abstract, the researchers state “wild-type mice or rats fed an alpha-tocopherol–supplemented diet, which contains a comparable amount of alpha-tocopherol to supplements consumed by many people, lost bone mass.” TalkingNutritionDSM does not usually comment on animal studies; however given the amount of media attention this story is getting, we feel compelled to respond.

For some background data about vitamin E, current dietary reference intakes for humans are around 4–15 mg per day for adults with an upper limit of 1000 mg. Recommended intakes are based on induced deficiency that causes red blood cell damage. There are eight naturally-occurring forms of vitamin E, but only levels of one form, alpha-tocopherol, are maintained in plasma, according to the [Institute of Medicine](#).

In the section of the article by Fujita *et al.* reporting on the method used for the animal studies, it appears that wild type mice and rats were fed with a diet supplemented with 600 mg per kg body weight. This is a huge dose. It is equivalent to 42,000 mg for a 70 kg human. The dose is so high that it is unrealistic: 2800 times more than the DRI. The authors also do not report the amount of vitamin E in the standard mouse food. Clearly, the dose used is actually much higher than is even found in high-dose supplements, and it exceeds the tolerable upper limit of vitamin E by such a wide margin. One wonders also how well the results can be translated to humans. The details of this study show that unlike what is suggested by the abstract, the dose is not comparable at all with alpha-tocopherol amounts provided by supplements. It is unfortunate that this experiment has linked vitamin E intakes from supplements with a negative health outcome when over 93% of people in the USA do not meet even the lower Estimated Average Requirement of 12 mg, according to [Fulgoni and associates](#).

Main reference:

Fujita K. et al. Vitamin E decreases bone mass by stimulating osteoclast fusion. *Nature Medicine*. doi:10.1038/nm.2659. Published online 04 March 2012

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