

# We should be confused about Vitamin E

by Michael Smith, PhD MDsc

Recent media announcements have confused many people about the benefits of vitamin E. Unfortunately, most journalists know little about this important vitamin so have an inability to properly inform us about its many benefits.

There are four different types of vitamin E, designated alpha, beta, gamma, delta, and each type can exist in 8 different varieties for a grand total of 32 forms of vitamin E. The amounts of each vitamin we ingest are quite dependent upon the food source. For instance, soybeans deliver high amounts of beta, gamma and delta tocopherol, while sunflower is almost exclusively the alpha variety. These different forms of vitamin E are called isomers<sub>1</sub>. It is usually thought the alpha isomer is required by cells for protection against oxidants; preventing propagation of free radicals in cell membranes and in fats. It has been shown that alpha tocopherol decreases the oxidation of low density lipoprotein (LDL), improves blood vessel dilation and even lowers the amount of isoprostanes (bad boys from COX-1) when given to subjects deficient in vitamin E. Additionally, most studies of the health of thousands of human subjects tend to report better health for those taking vitamin E<sub>2</sub>. So then why do we still read and hear that some studies do not show a reduction of heart disease when humans were given daily doses of vitamin E and followed for years at a time? There are reasons for these results and we shall quickly examine some.

**1** Let's define a meta-study. Often used for reports in medicine but never in science, it's a study of published reports on a topic and does

not include new study data based upon new ideas. The thought behind publishing a meta-study is the results are collected from a very broad range of studies, which may possibly not be researched otherwise. The strength of a meta-study is that one might discover effects of the treatment that may otherwise go unnoticed. The weakness is that it can often give credence to a minor study that was badly designed, improperly performed, with poorly kept records, etc. Meta-studies are sometimes written by people without direct experience in that very field or who feel overconfident because they know a little statistics but may not understand the physiology or biochemical implications of the topic. Meta-studies also need to have defined limits. For instance, should a study done with both vitamin C and E be included? Should only studies reported after 1990 be chosen?

**2** What form of vitamin E was used? Since the percent of E isomers differ between sources, and each form is unique, the results might depend upon the isomer. Should studies not specifying the exact isomer(s) of tocopherol supplement given be included? It has been reported that the gamma isomer might also be important because it reduces COX-2 activity in immune cells and the important cells lining arteries and veins. The gamma isomer of vitamin E retards the activity of the

COX-2 enzyme and thus is expected to prevent and reverse inflammation, and chronic inflammation can lead to high blood pressure, atherosclerosis and eventually heart disease<sub>3</sub>. So are studies of only alpha tocopherol as important as studies supplementing with mixed vitamin E from soybeans?

**3** Patient selection. Studies of the effects of E have been performed on smokers, non-smokers, the elderly, etc. People are generally notoriously bad at 100% compliance with medical instructions. Those who volunteer for clinical studies are not necessarily representative of the population as a whole, especially in wide-ranging samplings. (For instance, there are tens of thousands of rabid Boston Red Sox fans, but these people definitely do not represent normal Americans. However, many would gladly volunteer for most any study that would guarantee a repeat World Series win!) Perhaps the patients selected have been recently hospitalized and this population will have a high death rate no matter what the treatment. In other words, the atherosclerosis is so far advanced that no form of intervention will keep them alive.

**4** What is the real intent of the people calculating the results of the meta-study? Some people "throw out" studies as being too small (less than 40 subjects) or not properly

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randomized or not double-blind (the person giving the supplementation does not know the contents of the prescription as well as the “blind” subject.) Those doing the meta-study may as well include all studies reporting deaths, without researching the individual cause of death. Accidental death should not usually count as a death for a nutritional supplementation study but may well be important for a clinical trial of a drug modifying behavior. Finally, people reporting and publishing the meta-study may really wish to make a “splash”<sup>4</sup>. The appeal of 20 seconds of TV airtime is sometimes too alluring. Reports of the opposite conclusion—proper vitamin supplementation supports health— almost never are awarded TV airtime.

Finally, I am always suspicious of meta-studies as being scientific, when they are as much based upon statistics of unknowns rather than detailed inspection of all the raw data. For me, I know that vitamin E is required for life as a mammal—not a single mammal can synthesize vitamin E.

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So I always take vitamin E daily, just in case I become weak-willed and succumb to a burger-rich day.

### References

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