

COMMITTEE ON CARCINOGENICITY OF CHEMICALS IN FOOD, CONSUMER PRODUCTS AND THE ENVIRONMENT (COC)

Statement on vitamin E and the risk of prostate cancer

Lay summary

Vitamin E is a nutrient that is necessary for healthy functioning of the body and helps prevent cell damage through its antioxidant activity. Vitamin E can be found in a range of fatty foods from vegetable and animal origin. Vitamin E is also commonly taken in supplement form either on its own or in multi-vitamins.

Vitamin E is actually the collective term for a family of different molecules which all have slightly different chemical structures. There are at least eight different types of vitamin E that have biological activity: alpha-, beta-, gamma- and delta- (α -, β -, γ - and δ -) tocopherol and alpha-, beta-, gamma- and delta- (α -, β -, γ - and δ -) tocotrienol. The form with traditional vitamin E activity is α -tocopherol and this is also the most common form absorbed into the body from the diet. The other forms are absorbed by the body but are less active as vitamin E. There is, however, some evidence that γ -tocopherol could have anti-cancer properties and animal studies have suggested an anti-cancer role for γ -tocopherol in the prostate. There is some evidence that γ -tocopherol and α -tocopherol may compete against each other and therefore stop each other from carrying out their function in the body.

A number of studies have been carried out looking at the relationship between vitamin E consumption and the development of prostate cancer. These include laboratory studies using animal or human cells in culture, studies in whole animals and studies in human population groups. The vast majority of these studies have found vitamin E to either be protective against prostate cancer or to have no effect on prostate cancer incidence.

The SELECT study was a large study of 35,553 men from the US, Canada and Puerto Rico with no signs of having developed prostate cancer. The study was designed to find out whether α -tocopherol, selenium or the combination could reduce the risk of prostate cancer occurring. The group was divided into four, with the following treatment regimens: 1) placebo (a sham or inactive treatment); 2) selenium; 3) Vitamin E or 4) selenium + vitamin E. After following up the participants for 7 years, the group who had consumed the vitamin E alone had a 17% relative increase in cases of prostate cancer compared to the placebo group.

The concerns raised by this study prompted the Food Standards Agency to request that the Committee on Carcinogenicity in Foods, Consumer Products and the Environment review the literature available on vitamin E and prostate cancer with a focus on the SELECT study.

The Committee identified a number of short-comings in the SELECT study which may have contributed to the unexpected results. These included the following:

- 1) The doses of α -tocopherol used in the SELECT study were very high. As with all substances in the body, too much vitamin E can cause adverse effects at high levels. This means that there is an optimal dose of vitamin E which may be exceeded in the SELECT study.
- 2) There is some evidence that high doses of the α -tocopherol as were used in the SELECT study could inhibit the anti-cancer activity of γ -tocopherol.
- 3) The placebo used was soya bean oil; this may not have been as inactive as a placebo should be, as it is known to be rich in γ -tocopherol and could have been more protective against prostate cancer than the selenium and vitamin E supplements which were being investigated. Therefore the perceived increase in prostate cancer in the vitamin E group may actually be due to a reduction in prostate cancer in the placebo group.

Other differences between the study designs make it difficult to compare the SELECT study with other studies looking at vitamin E intake and prostate cancer. These include the way that vitamin E intake is calculated and other lifestyle factors such as obesity and smoking, which are known to affect the risk of prostate cancer occurring, but were not always taken into account.

Overall, the Committee concluded that the available evidence does not indicate that vitamin E supplementation increases the risk of prostate cancer. The Committee has not reviewed possible associations with other types of cancer. The Department of Health advises that the best way for most people to get the required vitamin E is by eating a balanced, varied diet.