

Nutrition Review

Updates on Natural Anti-Inflammatories, Heart and Intestinal Health

By VRP Staff

Tocotrienols Inhibit a Mutagenic Process Also Linked to Eye and Autoimmune Health

The form of vitamin E known as tocotrienols can stop angiogenesis, the development of new blood vessels that feed cancerous tumors, researchers have found in a new two-part study. The finding may also be relevant to rheumatoid arthritis and diabetic retinopathy, since both of these concerns also are linked to increased angiogenesis.

First, in an *in vitro* study, the researchers investigated which components of food might act as an anti-angiogenic compound in both bovine aortic endothelial cells and human umbilical vein endothelial cells. Endothelial cells are cells that line the walls of vessels. Through this testing, the scientists determined that tocotrienols could inhibit angiogenesis *in vitro*.

Then, the scientists undertook an *in vivo* mouse and chick egg study. They fed tocotrienols to tumor-implanted mice and noted the effect of the vitamin E component. Their findings indicated that angiogenesis in the animals that received tocotrienols was suppressed compared to the group that did not receive the tocotrienols. Mice given 10 mg of tocotrienol-rich oil per day (equivalent to 4.4 mg tocotrienols per day) experienced a 44 percent reduction in angiogenesis, compared to controls.

In the chick embryos, tocotrienols inhibited new blood vessel formation. At the same time, the tocotrienols also increased the area containing no blood vessels by 36 to 50 percent.

The researchers also conducted a separate third study to determine the mechanism of action behind tocotrienols' anti-angiogenic effects. This *in vitro* study showed that tocotrienols regulated growth of fibroblasts, cells that change cell signaling and induce programmed cell death (apoptosis) in endothelial cells.

Reference:

Nakagawa K, Shibata A, Yamashita S, Tsuzuki T, Kariya J, Oikawa S, Miyazawa T. In Vivo Angiogenesis Is Suppressed by Unsaturated Vitamin E, Tocotrienol. *J Nutr.* 2007 Aug;137(8):1938-1943.