Changes of superoxide dismutase in cultured rat aortic smooth muscle cells(A7r5) by an incubation of vitamin E

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Abstract

Supplementation of antioxidants such as vitamin E and vitamin C as health promotion food is popular recently. Epidemiological studies supported the beneficial effect of these antioxidants because oxygen free radicals have been linked to the process of diseases and aging. The present study evaluated the effect of alpha-tocopherol (vitamin E) on the changes of superoxide dismutase (SOD) in cultured rat aortic smooth muscle cells (A7r5) after a short-term (2 days) or long-term (7 days) incubation. Incubation of A7r5 cells with vitamin E at a concentration of 50 micromol/l for 2 days caused an increase of both the activity and mRNA level of SOD. At higher concentrations, such as 100 or 200 micromol/l, vitamin E failed to enhance SOD more effectively. However, after incubation for 7 days, vitamin E caused a decrease in both the activity and mRNA level of SOD in a concentration-dependent manner. Otherwise, the protein amount of SOD remained the same in these samples regardless of the concentration of vitamin E or the duration of incubation. The obtained results suggest that vitamin E can increase the effect of SOD to result in the beneficial influence of this antioxidant only at low concentration under a short-term supplementation because a down-regulation of SOD was observed in cells receiving a long-term incubation.