

## **Protective effects of vitamin E analogs against carbon tetrachloride-induced fatty liver in rats.**

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Recently, it has been reported that  $\alpha$ -tocopherol ( $\alpha$ -Toc) is effective for amelioration of liver damage. However, it is unknown whether other vitamin E analogs are effective. In this study, we investigated the effects of  $\gamma$ -tocopherol ( $\gamma$ -Toc) and tocotrienols (T3) in rats with fatty liver. Rats fed a vitamin E-deficient diet for four weeks were divided into eight groups: Control, carbon tetrachloride ( $\text{CCl}_4$ ),  $\alpha$ -Toc,  $\alpha$ -Toc +  $\text{CCl}_4$ ,  $\gamma$ -Toc,  $\gamma$ -Toc +  $\text{CCl}_4$ , T3 mix, T3 mix +  $\text{CCl}_4$ . After a 24 h fast, the rats were administered 20 mg of each of the vitamin E analogs, respectively. Moreover, the  $\text{CCl}_4$  group were given 0.5 ml/kg body weight corn oil preparation containing  $\text{CCl}_4$  6 h after vitamin E administration. We measured the activities of aspartate aminotransferase and alanine aminotransferase (ALT) in plasma, and the contents of triglyceride (TG), total cholesterol (T-Chol) and vitamin E analogs in the liver. Also, we determined the hepatic expression of mRNA for inflammatory cytokines. The liver TG content in the  $\gamma$ -Toc +  $\text{CCl}_4$  and T3 mix +  $\text{CCl}_4$  groups was decreased in comparison with the  $\text{CCl}_4$  group. Moreover, ALT activity in the T3 mix +  $\text{CCl}_4$  group was significantly lower than  $\text{CCl}_4$  group. These findings suggest that  $\gamma$ -Toc and T3 are effective for amelioration of fatty liver.