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Up-regulation of Superoxide Dismutase Gene Expression by Catechin Incubation in Cultured Aortic Smooth Muscle Cells

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ABSTRACT

Atherosclerotic cardiovascular disease is still the leading cause of death in Western countries. Reactive oxygen species are considered to be intimately involved in the development of atherosclerosis. Antioxidants may help to protect mammalian cells from the damage induced by these reactive oxygen species. Many reports have indicated that antioxidants used in the treatment or prevention of disease can modify the levels of superoxide dismutase (SOD). However, the effects of long-term antioxidant treatment on the levels of SOD in smooth muscle cells (SMC) are still unclear. In this study, the effects of the hydrophilic antioxidant, catechins on the activity and gene expression of superoxide dismutase in SMC were evaluated. After a 2-day (short-term) incubation with different concentrations (1, 10, or 100 M) of catechin, the activity and mRNA levels of SOD were significantly increased in rat aortic smooth muscle cells (A7r5). This phenomenon was observed similarly in SMC after a 7- day (long-term) incubation with catechin. Since catechin is a natural antioxidant present in significant quantities in green tea (*Camellia sinensis*), our data may shed further light on the phenomenon that consuming green tea in significant quantity may reduce mortality from coronary heart disease.

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INTRODUCTION

Reactive oxygen species (ROS) are implicated in organ injury in a wide spectrum of human diseases.[1] In the cardiovascular system, attention has been focused on the role of ROS in the production of ischemia/reperfusion myocardial injury[2] and/or atherosclerosis.[3] The role of ROS in myocardial injury caused by ischemia/reperfusion is apparent.[4] ROS induce changes in cell membranes and cell membrane lipids, and depletions of intracellular scavengers of free radicals, including superoxide dismutase (SOD). These effects can contribute to reperfusion injury, along with OFR-induced activation of the complement system, generation of chemotactic peptides, and migration and activation of polymorphonuclear cells.[5] Involvement

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