IN VITRO ATEROPROTECTIVE EFFECTS OF FUCOXANTHIN

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Fucoxanthin (FXC) is a carotenoid found as a pigment in the chloroplasts of brown algae. Several evidences shown that this compound has antioxidant and anti-inflammatory activities, however, its antiatherogenic activity has not yet been investigated. It has been reported that oxidized low density lipoprotein (oxLDL) are involved in the pathogenesis of atherosclerosis. Macrophages, as well as other cells of the arterial wall, can oxidize LDL depending on the balance between intracellular pro-oxidant generation and antioxidant defense efficiency. One possible method to prevent atherosclerotic diseases would be the administration of antioxidant substances thereby making LDL less sensitive to this oxidative process or prevent its oxidation. In the present work, we tested the potential ateroprotective effects of fucoxanthin (FCX) in preventing isolated LDL from oxidation as well as oxLDL-induced reactive oxygen species (ROS) generation in murine J774A.1 macrophage cells. The potential prevention of Cu²⁺-induced LDL oxidation by FCX was evaluated in vitro by the formation of conjugated dienes and tryptophan (Trp) fluorescence. The production of ROS in J774A.1 macrophage cells was evaluated by DCFH-DA. FCX caused a concentration-dependent inhibition of isolated LDL oxidation evidenced by the increasing of the lag phase of lipid peroxidation and decreased the lipid oxidation rate (Vmax). The protein moieties from isolated LDL were also protected from Cu²⁺-induced oxidation. Moreover, the FCX efficiently decreased oxLDL-induced ROS production in macrophage cells. The antioxidant effect of FCX may be related to the presence of a long polynye chain in its molecule. Considering the powerful effect of FCX against LDL-induced toxicity, developing of new therapeutic approach to preventing and treating atherosclerosis could be considered.

Keywords: atherosclerosis; antioxidants; fucoxanthin.