

Plaque study in rabbits

Alpha-tocopherol and astaxanthin decrease macrophage infiltration, apoptosis and vulnerability in atheroma of hyperlipidaemic rabbits.

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The composition of atherosclerotic plaques, not just macroscopical lesion size, has been implicated in their susceptibility to rupture and the risk of thrombus formation. By focusing on the quality of lipids, macrophages, apoptosis, collagen, metalloproteinase expression and plaque integrity, we evaluated the possible anti-atherosclerotic effect of the antioxidants alpha-tocopherol and astaxanthin in Watanabe heritable hyperlipidemic (WHHL) rabbits. Thirty-one WHHL rabbits were divided into three groups and were fed a standard diet, as controls (N =10), or a standard diet with the addition of 500 mg alpha-tocopherol per kg feed (N =11) or 100 mg astaxanthin per kg feed (N =10) for 24 weeks. We found that both antioxidants, particularly astaxanthin, significantly decreased macrophage infiltration in the plaques although they did not affect lipid accumulation. All lesions in the astaxanthin-treated rabbits were classified as early plaques according to the distribution of collagen and smooth muscle cells. Both antioxidants also improved plaque stability and significantly diminished apoptosis, which mainly occurred in macrophages, matrix metalloproteinase three expressions and plaque ruptures. Although neither antioxidant altered the positive correlations between the lesion size and lipid accumulation, the lesion size and apoptosis were only positively correlated in the control group. Astaxanthin and alpha-tocopherol may improve plaque stability by decreasing macrophage infiltration and apoptosis in this atherosclerotic setting. Apoptosis reduction by alpha-tocopherol and astaxanthin may be a new anti-atherogenic property of these antioxidants.

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