Sesamol against atherogenic LDL signaling through LOX-1 and reduces LDL electronegativity in Syrian hamsters

芝麻酚藉由抑制 LOX-1 對抗致病性低密度脂蛋白的細胞傷害並降低陰電性低密度脂蛋白在倉鼠血液中的表現

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The most electronegative type of LDL, called L5, induces endothelial cell (EC) apoptosis and has been implicated in the initiation and progression of atherosclerosis and cardiovascular disease. The aim of this study was to examine whether sesamol, a natural organic compound and component of sesame oil, prevents EC apoptosis induced by L5 and to investigate the underlying mechanisms. Syrian hamsters, which have a low-density lipoprotein (LDL) profile similar to humans, were fed a normal chow diet (control), a high-fat diet (HFD), or a HFD supplemented with 50 or 100 mg/kg sesamol (HFD+sesamol) for 16 weeks (n=8 per group). Agarose gel electrophoresis of total LDL and anion-exchange purification of L5 by using fast protein liquid chromatography showed that the HFD group had more electronegative LDL and higher plasma L5 levels than did the control group. However, compared with the HFD group, the HFD+sesamol groups had reduced LDL electronegativity and plasma L5 levels that were dependent on the dose of sesamol. Oil Red O staining showed that atherosclerotic lesion size was markedly increased in the aortic arch of the HFD group but not in that of the HFD+sesamol groups when compared with the control group. Apoptosis studies in human aortic ECs showed that sesamol (0.3-3 mM) blocked L5-induced apoptosis in a dose-dependent manner. Furthermore, sesamol markedly inhibited an L5-induced pro-apoptotic signaling pathway via the lectin-like oxidized LDL receptor-1 (LOX-1). **In conclusion**, our findings suggest that sesamol is anti-atherogenic and may protect against the development of cardiovascular disease in humans.