Atherosclerosis-Inducing Cytotoxin 7-Ketocholesterol Is Mitigated by Exposure to 70-Kilodalton Heat Shock Protein in THP-1 Human Monocyte Cells

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The 70-kilodalton heat shock protein (HSP70) is a cytoprotective protein produced at an elevated concentration in individuals afflicted with atherosclerosis and has been linked to reduced risk of coronary artery disease. In contrast, 7-ketocholesterol (7KC) and other oxysterols have been implicated in accelerating the onset of atherosclerosis by inducing apoptosis in foam cells. As such, the goals of this study were to determine 1) whether HSP70 ameliorates the cytotoxic effects of 7KC on THP-1 human monocyte cells; 2) what dose of HSP70 maximizes cell viability; 3) whether incubation of cells in HSP70 before exposure to 7KC (“before” treatment) improves viability relative to simultaneous application of HSP70 with 7KC (“with” treatment). Cells were exposed to varying concentrations of HSP70 and 7KC and assayed for viability using a Trypan blue stain. Data indicate that the optimal concentration of HSP70 occurs at 0.8 μg/ml. The “before” treatment was not significantly better than the “with” treatment in the presence of 7KC; however, in the absence of 7KC, the “before” treatment improved cell viability. These results show that HSP70 opens a possible avenue of pursuit towards atherosclerosis therapy aimed specifically towards limiting the cytotoxic effect of 7KC.

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