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생쥐배양 메산지움 세포에서의 헴옥시게네이즈를 매개로한 유기수은 독성의 방어작용

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차 석 호

Attenuation of Methyl Mercury Induced-cytotoxicity Mediates Heme Oxygenase-1 in Cultured Mouse Mesangial Cells

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Heme oxygenase [HO; EC 1.14.99.3] is a microsomal enzyme, which catalyzes the first and rate-limiting step in catalytic oxidation of heme. Nowadays, three distinct HO isoforms have been identified: HO-1, HO-2, and newly identified HO-3. There have been reported that HO-1 induced by varying stimulants e.g. its substrate heme, hypoxia, inflammatory cytokines, pyrrolidine dithiocarbamate, diethylmaleate and buthionine sulfoximine, ethanol and heavy metals. Among heavy metals, mercury and methyl mercury (MeHg) are environmental toxins that cause severe neurological and renal complications in humans and experimental animals. Methyl mercury is considered a more toxic compound to mercuric chloride. Therefore we investigated the relationship between MeHg-caused cytotoxicity and HO-1 expression using molecular biological techniques in cultured mouse mesangial cells. The expression levels of HO-1 mRNA and protein were increased concentration- and time-dependent manner by the treatment of MeHg, The increased HO-1 mRNA and protein expressions were attenuated by the treatment of actinomycin D, an inhibitor of transcription, but no expressional change induced by MeHg was observed by the treatment of zinc protoporphyrin IX (ZnPP), an endogenous heme analogue that inhibits HO activity. In cell viability test using MTT assay, MeHg-induced cytotoxicity was increased time-dependently. This MeHg toxicity was enhanced by the treatment of ZnPP. These results show HO-1 induction takes part in protection to MeHg toxicity in cultured mouse mesangial cells.

Key Words : 유기수은, 헴옥시게네이즈, 메산지움세포
Methyl mercury, Heme oxygenase, Mesangial cell