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Changes in mucosal permeability to lipopolysaccharide in the colon of chronic alcoholic rats

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Abstract

AIM: To evaluate the effects of chronic alcohol abuse on mucosal permeability to lipopolysaccharide (LPS) in the colon of rats.

METHODS: *Escherichia coli* LPS (20 mg/L) was injected into the colon of chronic alcoholic rats (n = 10) that had been supplied with Lieber diet every other day for six weeks. Before and 5, 10, 20, and 30 min after LPS injection, portal vein blood samples were obtained and the LPS levels in the blood were measured. The distribution of LPS in the colon tissues was observed with confocal laser scanning microscopy by immunofluorescence technique using a monoclonal antibody specific to the lipid A region of LPS. Normal rats were used as the controls (n = 6).

RESULTS: Before LPS injection, LPS levels in the portal vein blood of chronic alcoholic rats were significantly higher than that of the normal controls (3.56 ± 0.67 ng/L *vs* 2.45 ± 0.15 ng/L, $P < 0.01$). At 5, 10, 20, and 30 min after LPS injection, LPS levels were significantly higher than that before LPS injection (173.56 ± 3.45 ng/L, 154.78 ± 0.57 ng/L, 43.89 ± 0.67 ng/L, 45.38 ± 0.89 ng/L *vs* 3.56 ± 0.67 ng/L, respectively, $P < 0.01$). Most mucosal cells in the chronic alcoholic rats showed strong positive reactions to LPS, but in the normal rats, there were no significant changes in portal vein blood LPS levels and in the fluorescence reactions to LPS in the mucosal cells after LPS injection.

CONCLUSION: Chronic alcohol abuse results in a significant increase in LPS permeability in the colon mucosa cells of rats.

Key words: Colon/metabolism; Lipopolysaccharide/metabolism; *Escherichia coli*; Alcohol; Endotoxins

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