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Difference between periportal and pericentral Kupffer cells in lipopolysaccharide uptake in rats

Xian-Ming Chen, Jin-Chun Liu, Rei-Ling Xu, Xue-Hui Ma, Yuan-Chang Zhao, De-Wu Han

Xian-Ming Chen, Rei-Ling Xu, Xue-Hui Ma, Yuan-Chang Zhao, De-Wu Han, Institute of Hepatology, Shanxi Medical University, Taiyuan 030001, Shanxi Province, China

Jin-Chun Liu, First Teaching Hospital of Shanxi Medical University, Taiyuan 030001, Shanxi Province, China

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Correspondence to: Dr. Xian-Ming Chen, Institute of Hepatology, Shanxi Medical University, Taiyuan 030001, Shanxi Province, China

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Abstract

AIM: To reveal the difference in the ability of Kupffer cells in the periportal and pericentral regions of the liver to uptake lipopolysaccharides (LPS) injected into the portal vein.

METHODS: Male Wistar rats were divided into two groups: normal control group (n = 6) and $GdCl_3$-treated group (n = 8). Sixteen hours before the experiment, rats in the $GdCl_3$-treated group were injected with $GdCl_3$ *via* the tail vein to eliminate Kupffer cell function specifically in the periportal region. LPS at a dose of 20 μg/100 g body weight was injected into rats of both groups *via* the portal vein. Zero, 2, 5, 10, 30, and 60 min after LPS injection, liver samples were obtained and the distribution of LPS in Kupffer cells was observed by immunofluorescence imaging of monoclonal antibody-specific LPS staining using a confocal laser scanning microscope.

RESULTS: In the normal control group, positive reactions to LPS were found in Kupffer cells in the periportal region with the peak at two minutes after LPS injection. Kupffer cells in the pericentral region showed the peak at five minutes after LPS injection, but its fluorescent intensity to LPS at the peak time in the cytoplasm was significantly lower than that of Kupffer cells in the pericentral region. In the $GdCl_3$-treated group, Kupffer cells in the pericentral region showed the peak at two minutes following LPS injection, and the LPS fluorescent intensity showed no significant difference from that of the normal control rats at the peak point. No significant changes of LPS fluorescent intensities were found in Kupffer cells in the periportal region at various time points following LPS injection in $GdCl_3$-treated rats.

CONCLUSION: Kupffer cells in the periportal and pericentral regions showed differences in LPS uptake *via* the portal vein.

Key words: Liver/metabolism; Kupffer cells; Lipopolysaccharides/metabolism; Portal vein; Endotoxins; *Escherichia coli*

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