Detection of IL-1β, IL-6 and TNF-α in Sprague-Dawely rats’ atrophic thymus induced by lipopolysaccharide

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Abstract

Objective: This study aimed to investigate developmental changes of the thymus and intrathymic IL-1β, IL-6 and TNF-α expression in weaned Sprague-Dawley rats induced by lipopolysaccharide.

Methods: Forty healthy weaned rats aged 26 days and weighing 83±4 g were randomly and equally divided into two groups. The lipopolysaccharide group was treated daily with a single injection of lipopolysaccharide for 10 consecutive days, and the saline group was treated with an equal volume of sterilized saline. On the 1st, 4th, 7th and 10th day, histological changes and distribution of IL-1β-, IL-6- and TNF-α-positive cells were detected in the thymus by hematoxylin-eosin and immunohistochemistry staining, respectively. Subsequently, the expression levels of IL-1β, IL-6 and TNF-α were evaluated in the thymus by the ELISA method.

Results: Thymus weight and index were significantly smaller in lipopolysaccharide-treated rats than in saline-treated rats (p<0.05), but no substantial changes were found in the thymus microstructure after lipopolysaccharide induction. Moreover, a large number of IL-1β-, IL-6- and TNF-α-positive cells were observed with brownish-yellow color and mainly distributed in the thymus parenchyma, both integrated optical density and average optical density increased significantly in lipopolysaccharide-treated rats than those in saline-treated rats. Compared with the saline group, most of the thymic homogenates had higher levels of IL-1β, IL-6 and TNF-α in the lipopolysaccharide group on different days.

Conclusion: These findings indicate that the thymus atrophied after lipopolysaccharide induction in weaned Sprague-Dawley rats, and excessive production of intrathymic IL-1β, IL-6 and TNF-α was probably involved in the atrophic process.

Key words: lipopolysaccharide, pro-inflammatory cytokines, thymus atrophy, rat

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