Minocycline reduced Cyclooxygenase-2 (COX-2) expression in Lipopolysaccharide (LPS)-induced neuroinflammation rat model

Entesar Yaseen Abdo Qaid 1, Zuraidah Abdullah 1, Rahimah Zakaria 2, Idris Long 1*

1Biomedical Science Programme, School of Health Sciences, Universiti Sains Malaysia, Kelantan, Malaysia
2Physiology Department, School of Medical Sciences, Universiti Sains Malaysia, Kelantan, Malaysia

Corresponding author: idriskk@usm.my

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Abstract

Lipopolysaccharide (LPS) was used to induce neuroinflammation in rats and the expression of brain cyclooxygenase-2 (COX-2) is the marker for the neuroinflammation process [1]. The effect of minocycline on neuroinflammation-induced LPS is not clearly elucidated.

The objective of this study was to determine the effects of minocycline (MIN) on LPS-induced COX-2 expression and compared it with a clinically approved drug for Alzheimer's disease named memantine. A total of fifty male Sprague Dawly rats were divided into five groups (n=10): (i) control, (ii) LPS, (iii) LPS-treated with minocycline 25 mg/kg, (iv) LPS-treated with minocycline 50 mg/kg, and (v) LPS-treated with memantine 10 mg/kg. Minocycline and memantine treatments were administered intraperitoneally once daily for 2 weeks and LPS (5 mg/kg) was injected once on day 5. Immunohistochemistry and Western blot for COX-2 protein were performed to measure its expression and level in the hippocampus and cortex.

Results showed LPS significantly increased COX-2 expression and its level in the hippocampus and cortex compared to other groups (p<0.05). Minocycline treatment, dependent on dose, reduced COX-2 expression and its level (p<0.05) comparable to the memantine effect (Figure 1).

Figure 1: COX-2 expression in hippocampus and cortex tissue of lipopolysaccharide-induced neuroinflammation rat model.
Keywords
COX-2, Lipopolysaccharide, Memantine, Minocycline, Neuroinflammation

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References