Influence of amlodipine and atenolol on lipopolysaccharide (LPS)-induced serum concentrations of TNF-α, IL-1β, IL-6 in spontaneously hypertensive rats (SHR)

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Abstract:
An increasing body of evidence suggests that cytokines may play a role in the pathogenesis of cardiovascular diseases. Immunopharmacological studies provide new information on immunomodulating activity of some drugs, including their effect on the level of pro-inflammatory cytokines. The aim of the present study was to find out whether amlodipine and atenolol, drugs applied in the treatment of arterial hypertension, can modulate lipopolysaccharide (LPS)-induced pro-inflammatory cytokine level (TNF-α, IL-1β, IL-6) in spontaneously hypertensive rats (SHR). The experiments were performed on 4 groups of animals as follows: WKY + MET (control Wistar-Kyoto normotensive rats), SHR + MET (control hypertensive rats), SHR + AML (hypertensive rats receiving amlodipine), SHR + AT (hypertensive rats receiving atenolol). Control rats received 1% solution of metylo kedulalose (1 ml/kg) by a gavage. Amlodipine and atenolol were administered by a gavage at doses of 15 mg/kg and 2.5 mg/kg, respectively. Arterial blood pressure was measured in conscious rats, using the tail-cuff method. Serum tumor necrosis factor α (TNF-α), interleukin (IL)-1β and IL-6 concentrations were measured with enzyme-linked immunosorbent assay kits. Additionally, lipid levels were evaluated. The present data provide the evidence that amlodipine and atenolol act as immunomodulators of pro-inflammatory cytokines in SHR. Amlodipine decreased TNF-α, increased IL-6 and did not affect IL-1β level. Atenolol did not influence TNF-α and IL-1β, but raised IL-6 in SHR. Additionally, amlodipine decreased total cholesterol level without changing HDL cholesterol level whereas atenolol did not influence lipid levels. The identification of additional immunomodulating properties of hypotensive drugs may be important for better understanding of their mechanisms of action.

Key words:
amlodipine, atenolol, cytokines, SHR, LPS