EFFECT OF NANDROLONE AND STANOZOLOL ON PRO-INFLAMMATORY CYTOKINE PRODUCTION BY HUMAN MACROPHAGES

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The use of anabolic androgenic steroids (AAS) has been related to vascular events and several case reports on sudden death, myocardial infarction, pulmonary embolism, stroke, thrombosis and other atherosclerotic/atherothrombotic events in AAS abusers have been reported.
Recently, basic and clinical studies have elucidated the molecular events linking inflammation with blood coagulation, atherogenesis and thrombosis and has been demonstrated that certain cytokines play a crucial role in the pathogenesis of the atherosclerotic process and of its possible clinical consequences, i.e. thrombosis and acute myocardial infarction.
In this study we evaluated the effect of two AAS, nandrolone and stanozolol, on pro-inflammatory cytokines production by human monocyte-derived macrophages, *in vitro*.
Macrophages are multifunctional cells that act as secretory cells during an injury or inflammation response thereby producing a variety of cytokines.
Blood mononuclear cells (BMC) were selected by centrifugation from the buffy coats fractions on Lymphoprep (Sentinel Diagnostics). For monocytes isolation by plastic adherence, $5x10^6$ BMC per well were distributed into 12-well plates and allowed to adhere in a 5% CO_2-incubator at 37° C for 2 h in 1 ml of RPMI-1640 containing 4 mM L-glutamine supplemented with 10% foetal bovine serum, 100U/ml penicillin and 0.1 mg/ml streptomycin. Non adherent cells were removed and the adherent cells were washed carefully twice with complete medium and cultured for the generation of mature macrophages. Every two days the medium was exchanged with fresh complete medium, After 10 days of culture, macrophages were incubated with nandrolone or stanozolol (10-100 nM and 1 μM) for 24 h at 37° C in the presence or absence of LPS (0.2 μg/ml). TNF-α, IFN-γ, IL-1β, IL-6, IL-8, IL-10 were measured in the medium by ELISA.
Results have shown that both AAS, starting from the concentration of 100 nM, significantly (Student's *t*-test) increased the production of pro-inflammatory cytokines TNF-α, IFN-γ, IL-1β. On the contrary, AAS had no effect on IL-6, IL-8, IL-10.
Our data indicate that AAS are able to provoke an imbalance between the inflammatory and anti-inflammatory cytokines. Thus, it appears that cytokines may play a interesting role in the vascular adverse effects of AAS.

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