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Orlistat mitigates nitrosative stress and enhances paraoxonase-1 activity in serum and tissues of induced obese rats

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This study examined the effects of orlistat, an anti-obesity medication, on nitrosative stress and paraoxonase-1 (PON-1) enzyme activity in various tissues of rats with experimentally induced obesity. A total of 24 Wistar albino rats were divided into three groups: control, obese, and obese treated with orlistat (ORL). The ORL group received oral doses of 10 mg/kg/day for six weeks following an eight-week high-fat diet. During the study, body weights were monitored weekly, and various biochemical markers, including TNF-alpha, IL-1 beta, nitric oxide, nitrotyrosine, PON-1 enzyme activity, urea, creatinine, lactate dehydrogenase, and creatine kinase, were measured after the rats were sacrificed. The ORL group had significantly lower body weights compared to the obese group ($P < 0.05$). Obesity increased levels of inflammatory markers (TNF-alpha and nitric oxide) in serum, heart, and kidney tissues, as well as nitrotyrosine levels in serum, kidney, and testis tissues, compared to the control group ($P < 0.05$). Orlistat treatment reduced levels of TNF-alpha, IL-1 beta, nitric oxide, and nitrotyrosine in various tissues, as well as urea, creatinine, lactate dehydrogenase, and creatine kinase levels, compared to the obese group ($P < 0.05$). Moreover, orlistat significantly increased PON-1 enzyme activity in the heart, kidney, and testis tissues compared to the obese group ($P < 0.05$). These findings suggest that orlistat reduces inflammation and nitrosative stress and enhances antioxidant activity by increasing PON-1 enzyme levels. While orlistat shows promise as a therapeutic option for obesity, its systemic effects should be carefully considered.

Keywords: Orlistat, Obesity, Nitrosative stress, Paraoxonase enzyme activity

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