

# Response of oxidative stress and inflammatory biomarkers to a 12-week aerobic exercise training in women with metabolic syndrome

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**Background:** Evidences have been highlighted the relationship among metabolic syndrome, chronic low-grade inflammation, oxidative stress and several diseases. In this sense, the aim of this study was to investigate the effects of aerobic exercise training on oxidative stress and inflammatory parameters on women with metabolic syndrome (MS). **Methods:** Twenty-three untrained women ( $51.86 \pm 6.58$  years old, BMI  $30.8 \pm 4.3$  kg/m<sup>2</sup>) completed a 12-week treadmill exercise training, without modifications on dietary pattern. Advanced oxidation protein products (AOPP), thiobarbituric acid-reactive substances (TBARS), total thiol content (T-SH) and nitrite and nitrate (NO<sub>x</sub>) levels were assessed in plasma while the levels of interleukin-1 beta (IL-1 $\beta$ ), interleukin-6 (IL-6), interleukin-10 (IL-10), tumor necrosis factor alpha (TNF- $\alpha$ ) and interferon-gamma (IFN- $\gamma$ ) were evaluated in the serum. The RNA expression (mRNA) of IL-1 $\beta$ , IL-10, TNF- $\alpha$ , IFN- $\gamma$ , insulin receptor

substrate 2 (IRS-2) and matrix metalloproteinase-9 (MMP-9) were performed in peripheral blood mononuclear cells (PBMC) of a subset with eight women with MS using real-time polymerase chain reaction (qPCR). Results: The intervention resulted in decreased serum levels of IL-1 $\beta$ , IL-6, TNF- $\alpha$ , IFN- $\gamma$ , AOPP and TBARS, besides increased levels of IL-10 and T-SH (P < 0.001). NOx concentrations were unchanged, similarly to mRNA expressions quantified in PBMC. Conclusions: Twelve weeks of AT improved systemic oxidative stress and inflammatory biomarkers in women with MS, although PBMC mRNA expression for inflammatory pathways appeared to be unchanged. This may indicate that AT induced beneficial effects not only in physical fitness but also on health promotion through decreased oxidative damage and proinflammatory status. © 2015, Farinha et al.; licensee Springer.

Advanced Oxidation Protein Product

Aerobic Exercise Training

Cardiorespiratory Fitness

Exercise Training

Metabolic Syndrome