Inhaled gaseous superoxide suppresses the endogenous oxidative stress and improves the lung functions in asthmatic patients

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Abstract

To investigate the effect of adaptive oxidative training with inhaled gaseous superoxide (GS) on endogenous oxidative stress (EOS) and lung function in asthmatics the repeated short-term inhalation of GS was used. The study involved 27 patients (median age 42 [34; 44]) with atopic bronchial asthma and a median disease duration of 130 [120; 180] months prior to investigation, and 8 healthy volunteers aged 20.5 [18; 25]. The generation rate of the GS at a distance of 1 cm from the source was 0.25 μmol/min. Participants inhaled GS nasally over 15 minutes per session, on average twenty times over two periods of 4 weeks each. Spirometric studies, a methacholin challenge test, salbutamol test and blood cell count were performed, and blood antioxidant components were investigated. We found evidence that inhalations of GS in asthmatics cause an adaptive oxidative training and promote reduction of EOS as well as an activation of antiinflammatory mechanisms and improved spirometric parameters.