

## Abstract

**Background:** Obesity in asthmatics has been associated with higher airway oxidative stress in which dysfunctional mitochondria are a potential contributing source of excess free radicals. Paraoxonase 2 (PON2) plays an important role in reducing mitochondrial-derived oxidative stress and could, therefore, have therapeutic potential in these patients.

**Objectives:** We used primary human bronchial epithelial cells (HBECs) from asthmatics and healthy controls to evaluate: a) protein levels of Paraoxonase 2 and b) to test the potential protective effect of quercetin supplementation in cells under oxidative stress conditions.

**Results:** Compared to lean controls, obese asthmatics had significantly lower PON2 airway epithelial levels (respectively, 1.08 vs. 0.47 relative units normalized by GAPDH) (p-value < 0.006). Treating HBECs in vitro for 24 hrs. with 25 $\mu$ M quercetin significantly increased PON2 protein levels: 15.5 treated cells vs. 9.8 untreated cells (relative units normalized by GAPDH) (p value = 0.004). Notably, compared to untreated cells, quercetin supplementation reduces mitochondrial superoxide and hydrogen peroxide production on HBECs cells exposed to different oxidative stress triggers such as 1-2 Naphthoquinone (1-2 NQ) and hydrogen peroxide, suggesting that PON2 might play a protective role ameliorating oxidative injury on human airway epithelium.

**Conclusion:** Compared to lean controls, obese asthmatics have significantly reduced PON2 levels in airway epithelial cells. Treatment with quercetin in vitro increased PON2 protein levels and prevented oxidative stress from different types of stimuli. Hence, quercetin supplementation may be a potential therapeutic strategy to prevent obesity-mediated airway oxidative stress in obese asthmatics.