

## **Biomarkers of Oxidative Stress Study: Are Plasma Antioxidants Markers of Ozone Exposure?**

### **Abstract**

*Rationale:* Oxidative stress and antioxidant status have been repeatedly investigated in animal models and in humans, but there is a considerable lack of studies validating whether antioxidants may be used as biomarkers to assess oxidative stress.

*Objective:* To determine whether the oxidative effects of ozone would result in losses of antioxidants from plasma and possibly bronchoalveolar lavage fluid (BALF). This research is part of a comprehensive, multilaboratory validation study searching for noninvasive biomarkers of oxidative stress

*Methods:* Male Fisher rats were exposed to either 2.0 ppm or 5.0 ppm ozone inhalation for 2 h. Blood plasma and BALF samples were collected 2 h, 7 h, and 16 h after the exposure.

*Measurements and Main Results:* Ascorbic acid in plasma collected from rats after the high dose ozone exposure was lower at the earliest time point but not later. BALF concentrations were decreased at both 2 and 7 hr post. Concentrations of tocopherols, GSH, GSSG, the ratio GSH/GSSG and cysteine/cystine remained unchanged. Uric acid was significantly increased by the low dose at the early point and the high dose of ozone at the 7 h time point. This effect is probably due to the accumulation of blood plasma in the lung due to ozone increased alveolar capillary permeability.

*Conclusions:* Antioxidants measured in blood plasma and are not sensitive biomarkers for oxidative damage induced by the ozone. The present study suggests that monitoring of plasma antioxidant substances is not a sensitive indicator of ozone induced oxidative stress in animal models or humans..

**Key words:** ozone, rat, plasma, tocopherols, ascorbic acid, glutathione, uric acid.