

## ORIGINAL ARTICLE

Effect of Acute Ozone Exposure on Airway Vascular  
and Mucosal Permeability in Guinea PigsYukihiro Todoroki<sup>1)</sup>, Takeshi Kaneko<sup>2)</sup>, Harumi Koizumi<sup>2)</sup>,  
Jun Tsukiji<sup>2)</sup>, Masaru Ito<sup>2)</sup>, and Yoshiaki Ishigatsubo<sup>1)</sup><sup>1)</sup> Department of Internal Medicine and Clinical Immunology, Yokohama City University Graduate School of Medicine,<sup>2)</sup> Respiratory Disease Center, Yokohama City University Medical Center, Yokohama, Japan**Abstract**

Effect of acute ozone (O<sub>3</sub>) exposure on both airway vascular and mucosal permeability was examined in the guinea pig trachea *in vivo*. Airway vascular permeability was assessed by measuring extravasation of Evans blue dye, which was injected intravenously. Airway mucosal permeability was assessed by the movement of intratracheally instilled horseradish peroxidase from airway lumen to submucosal vessels. Both vascular and mucosal permeability was assessed after a 30-min or a 2-h exposure to either 3ppm O<sub>3</sub> or air.

We found that a 30-min exposure to 3ppm O<sub>3</sub> caused an increase in both the vascular and mucosal permeability in the trachea. In contrast, a 2h-exposure to O<sub>3</sub> caused only an increase in the vascular permeability but mucosal permeability was unchanged. Morphological studies revealed that a 2h-exposure to O<sub>3</sub> induced a thick mucous layer covering the surface of airway epithelium. These findings indicate that acute O<sub>3</sub> exposure for a longer period of time causes not only an increased vascular permeability but also subsequent exudation of plasma to the airway lumen, which may act as a barrier by restricting free passage of inhaled exogenous substances.

**Key words:** ozone, vascular permeability, mucosal permeability, plasma exudation, guinea pigs, Evans blue dye, horseradish peroxidase

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