

Ozone Induces Nerve Growth Factor Expression in Tracheal Epithelial Cells in Early Postnatal Life

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Nerve growth factor (NGF) is known to be located in the airway epithelium. The purpose of this study was to determine if ozone, a chemical irritant associated with air pollution, induces changes in NGF RNA message levels specifically in tracheal airway epithelial cells at early postnatal ages. Fisher-344 rat pups were exposed to 2ppm ozone or filtered air for 3 hours on postnatal days (PD) 6, 10, 15, 21 or 28. Twelve hours after exposure, tracheal epithelial cells were isolated and treated with IgG to reduce immune cell contamination. Cells collected by cytopsin were treated with a mouse anti-rat CD45 primary antibody and goat anti-mouse FITC secondary antibody to determine the purity of the extracted cell population. The resulting cell population contained 96.03% \pm 1.02 (n=3) epithelial cells and 3.97% \pm 1.02 (n=3) immune cells. The changes in mRNA expression observed in this study were therefore changes in the rat tracheal epithelial cells. To determine changes in NGF mRNA expression, total RNA was extracted and transcribed into cDNA. NGF mRNA expression was amplified using the real-time PCR system and analyzed via the comparative threshold method. The NGF mRNA was expressed relative to endogenous B-actin message. NGF mRNA expression in tracheal epithelial cells was detected in both air and ozone exposed rats at all postnatal days. At PD 6, the relative NGF mRNA expression in ozone treated rats showed a significant 2-fold increase in comparison to the air treated animals ($p < 0.05$, n=3 per group). At PD 15 (n=7 per group), PD 10 (n=4 per group), PD 21 (n=3 per group), and PD 28 (n=4 per group), there were no significant changes in NGF mRNA expression between ozone and air treated animals. Thus, the increase in NGF mRNA levels in the rat tracheal epithelial cells in response to ozone exposure was specific to PD 6.