Title
Synergistic effects of inhaled ozone and nitrogen dioxide on lung damage in rats

Permalink
https://escholarship.org/uc/item/8892v80m

Journal
Federation Proceedings, 44(4)

ISSN
0014-9446

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Publication Date
1985

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Sprague-Dawley rats (n=10 per group) were exposed while exercising for 3.0 h to 1) clean air, 2) 0.35 ppm O₃, 3) 0.6 ppm NO₂, or 4) 0.35 ppm O₃ + 0.6 ppm NO₂. Relative humidity was 40%. Exercise (running at 15 m/min and 20% grade) elevated metabolic gas exchange by a factor of 2.5 over resting metabolism. 48 h post exposure, lungs were removed, fixed, sectioned, and stained. Sections were scored for % area of parenchyma involved in focal lesions induced by the pollutants. Exposure to NO₂ alone resulted in no detectable difference in lung tissues compared to clean air control animals. Exposure to O₃ induced focal parenchymal lesions. However, O₃ in combination with NO₂ resulted in increases in lesion areas by a factor of 2 over those for O₃ alone. The mixture of oxidants formed HNO₃ vapor at a concentration of 0.05 mg/m³ during the exposure. The synergistic response observed between O₃ and NO₂ in the mixture may be due to the presence of nitric acid vapor, or to other possible reaction products such as N₂O₅ and nitrate radical.

Supported by California Air Resources Board A2-129-33.