

Original Article

Oxidative stress after acute exposure of mice to exhaust fumes

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ABSTRACT

This study assesses oxidative damage as a result of acute exposure of mice to carbon monoxide (CO) from exhaust fumes of gasoline powered generator (TIGER, TG950, Suzhou Tiger Power Machine Co., Ltd., China). Thirty six mice were divided into 3 exposure groups and each group subdivided into either control group, which was exposed to room air, or an experimental group that was exposed directly to the fumes for 30 minutes, 1 hour and 2 hour periods in a partially enclosed gas chamber before the neurobehavioral tests. Elevated plus maze (EPM) was used to assess learning and memory. Biomarkers of oxidative stress, specifically malondialdehyde (MDA), superoxide dismutase (SOD), and glutathione peroxidase (GPx) were estimated in the serum using standard kits from Northwest Life Science Specialties Ltd. Carbon monoxide (CO) monitor (Amprobe, CM100) was used to record the dose of CO in parts per million (ppm). The dose of 100 – 150 ppm of CO exposure was maintained throughout the study. The result in general suggests decreased ability of the exposed mice to learn and also recall the learned behaviour. There were also significant increases in the MDA, SOD and GPx in the experimental group when compared to their controls. Our results suggest that acute exposure to CO could be responsible for the significant oxidative damage and impaired learning and memory observed in the experimental mice. Therefore oxidative stress could serve as yet another mechanism of CO toxicity aside hypoxia.

Keywords: Carbon monoxide, Learning and memory, Neurobehaviour, Oxidative stress
