

Chronic exposure of arsenic is well known to be the cause of cardiovascular disease such as hypertension. In order to investigate the effect of arsenic on blood vessels, we examined whether arsenic affected agonist-induced contraction of aortic rings in isolated organ bath system. Treatment with arsenite increased vasoconstriction induced by phenylephrine or serotonin in a concentration-dependent manner. Similar effects were also shown in the aortic rings without endothelium, suggesting that vascular smooth muscle played a key role in enhanced vasoconstriction induced by arsenite. Arsenite is the most potent form among arsenic species tested. These alterations were well correlated with myosin light chain (MLC) phosphorylation induced by arsenite in smooth muscles. Direct calcium measurement using fura-2 dye in aortic rings revealed that arsenite enhanced contraction by high K⁺ without further increase in intracellular calcium levels. Calcium-sensitization of contractile machinery, therefore, may contribute to the enhanced vasoconstriction by arsenite. Consistent with these in vitro results, intravenous administration of 1.0 mg/kg arsenite augmented blood pressure increase induced by phenylephrine in conscious rats. These results suggest that arsenite increases agonist-induced vasoconstriction mediated by MLC phosphorylation and calcium-sensitization in smooth muscles was one of the key mechanisms for the arsenite-induced hypercontraction in blood vessels.

[PA3-16] [04/17/2003 (Thr) 14:00 - 17:00 / Hall P]

Evaluation of genotoxic potentials in diesel exhaust particulate matter with the Ames test, the comet assay and the micronucleus assay

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This research was designed to examine the presence of mutagenic/carcinogenic compounds in airborne pollutants in diesel particulate matter using an integrated biological approach. Respirable air borne particulate matter (PM_{2.5}: <2.5mm) was collected from diesel engine exhaust using a high-volume sampler equipped with a cascade impactor. Particulate organic matter was extracted by the dichloromethane/sonication method and the crude extract was fractionated according to EPA recommended procedure into seven fractions by acid-base partitioning and silica gel column chromatography. There are several methods for assessing DNA-damage at the DNA and chromosomal level.

The comet assay and in vitro MN test are newly designed genotoxicity methods. In this study, we assessed genotoxic potentials of diesel exhaust particulate matter with the Ames test, the comet assay and in vitro MN test. This test seems to be sensitive to genotoxins as found in many previous research on air pollution and a promising test for monitoring airborne genotoxins in environments. The results showed the applicability of this genotoxicity tests which reveal different genetic end-points (DNA-damage, point mutation and micronuclei) detected the presence of genotoxins. Positive results were observed in some of fractions using the in vitro MN test and the comet assay. A statistically significant increase in micronuclei was found in aromatic and slightly polar fraction of the revealing the presence of unknown genotoxic compounds.

The results indicated that diesel exhaust particulate matter induced DNA damage in DNA and chromosome levels. Therefore, genotoxic potentials are present in diesel exhaust particulate matter.

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Estrogenic/antiestrogenic potencies in crude and fractionated extracts of diesel exhaust particulate matter(PM) on human breast cancer cell

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