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 (PM2.5: <2.5mm) was collected from diesel engine exhaust using a high-volume sampler equipped with a cascade impactor. Particulate oganic 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.

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

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

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Diesel exhaust is suspected to cause acute and chronic adverse effects on health. In recent, the effect of estrogenic endocrine disruptor in diesel particulate matter was little studied. Therefore, we examined the estrogenic activity of respirable diesel exhaust particulate matter derived from diesel engine motor. PM2.5 diesel exhaust of vehicle was collected using a high volume samples equipped with a cascade impactor. The crude extract was fractioned according to EPA recommended procedure into seven fraction by acid-base patitioning and silica gel column chromatography. The presence of estrogenic and antiestrogenic activity was determined using E-screen assay. The E-screen assay was developed to assess the estrogenicity of environmental chemicals using the proliferative effect of estrogens on their target cell as an end point. The results showed that weak estrogenic-like activities and strong antiestrogenic activities were detected in the crude organic acids fraction, crude extract and moderately polar fractions. Therefore, it was suggested that diesel particulate matter could affect to endocrine system in human and animals.

[PA3-18] [04/17/2003 (Thr) 14:00 - 17:00 / Hall P]

Inhibitory effect of bisphenol A on the mixed lymphocyte reaction and TNF-α production of antigen presenting cells in mice.

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We investigated the effects of bisphenol A (BPA), endocrine disruptor, on the mixed lymphocyte reaction and TNF-α production of antigen presenting cells in mice. Cells from mouse (C57BL/6) bone marrow were cultured with GM-CSF for 8 days and mature dendritic cells (DCs) were prepared. These DCs proliferation in response to Balb/c splenocytes was measured at 72 h of culture with BPA by tritiated thymidine incorporation ([3H]TdR) and [3H]TdR incorporation was determined by scintilation counting. An inhibitory effect was observed in cultures treated with BPA. To investigate the effect of BPA on LPS-induced cytokine production (TNF-α) in vivo and in vitro, serum cytokine levels were measured at 1h post LPS injection in BPA-administered mice, and the peritoneal macrophages collected from naive mice were cultured with BPA plus LPS in vitro. Thereafter, cytokine levels in the cultured supernatants were measured and compared with LPS alone-treated group. Treatment with BPA plus LPS in vivo resulted in decreased serum TNF-α level when compared to LPS alone group. Also, BPA exposure significantly decreased TNF-α production in BPA-LPS treated group compared to LPS alone in vitro. These results indicate that BPA might inhibit the activity of antigen presenting cells.

[PA3-19] [04/17/2003 (Thr) 14:00 - 17:00 / Hall P]

Action mechanism of estrogen potentials of Ginko biloba extracts and its major components in human breast cancer cell.

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The important biological activities of estrogen were reproduction and physiological processes in a number of tissues, including liver, bone, brain, blood vessels, adipose tissue and so on. The regulation of estrogen level is important a prevention of estrogen-related disease. Ginkgo biloba extracts (GBE) are extracted from leaves of the Ginkgo biloba tree. GBE contains 24% phytoestrogen, which are kaempferol, quercetin, and isorhamnetin. The goal of this study was to investigate the potencies of GBE and its major components(kaempferol, quercetin, isorhamnetin) for estrogenic effect, which can confirm the capacity as new HRP(Hormone replacement therapy). In the E-screen assay, GBE induced cell proliferation in ER-positive MCF-7 cell, but