6th International Symposium on Nanotechnology, Occupational and Environmental Health

The aim of the symposium is to provide a scientific forum for researchers and practitioners to present and discuss the latest researches on occupational and environmental health issues of nanotechnology.

Date: October 28 (Mon) → 31 (Thu), 2013

Place: Nagoya, Japan

Venue: Nagoya Congress Center

Topics

- **Nanomaterial processing and characterization**
- **Health effects and toxicity (in vivo, in vitro)** of manufactured nanomaterials
- **ADME** (Absorption, distribution, metabolism and excretion) and methodology for **kinetic study** of manufactured nanomaterials
- **Environmental toxicity** of manufactured nanomaterials
- **Exposure assessment** in the workplaces producing or handling manufactured nanomaterials
- **Risk assessment** of manufactured nanomaterials
- **Risk management** of manufactured nanomaterials
- **Outreach** for occupational and environmental health in nanotechnology
- **Epidemiology** on the workers exposed to manufactured nanomaterials
- **Worker protection**: Identifying and training the nanomaterial workforce




Organizers

Japan Committee for the 6th International Symposium on Nanotechnology, Occupational and Environmental Health / Planning Committee for the International Symposium on Nanotechnology, Occupational and Environmental Health

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O-30-B-35 Particle and noise exposure of highway maintenance workers: cardiovascular short term health effects

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Highway maintenance workers are constantly exposed to traffic-related particle and noise emissions that both have been linked to increased cardiovascular morbidity and mortality. To investigate particle and noise related short term health effects we monitored 18 maintenance workers, each for up to 5 times, during a total of 50 observation days. We measured their exposure to fine particulate matter (PM2.5), ultrafine particles and noise and assessed cardiopulmonary health endpoints. Blood pressure, pro-inflammatory and pro-thrombotic markers in the blood as well as lung function and fractional exhaled nitric oxide (FeNO) were measured approximately 15 hours post work, heart rate variability was assessed for a sleep period approximately 10 hours post work. PM2.5 exposure was related to increased C-reactive Protein and Serum Amyloid A levels and a decrease of TNFα. No significant effect could be observed on von Willebrand and Tissue Factor. PM2.5 and noise exposure during work were both related to an increase in heart rate variability. Increased high frequency power indicated a stronger parasympathetic influence on the heart. Blood pressure increased as a consequence of elevated noise levels during recreational time after work and we could see a trend towards higher blood pressure in relation to particle exposure. No effects could be observed on lung function and FeNO. Our results show that combined exposure to particles and noise during highway maintenance work poses a cardiovascular health risk. Actions to reduce these exposures could lead to a better health of this worker population.

This abstract does not necessarily represent US EPA policy.

O-30-B-36 Effects on Respiratory and Cardiovascular Systems in Workers Handling Titanium Dioxide Particles

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Titanium dioxide (TiO2) is widely used as pigment, sunscreen, and photocatalyst. The present study assessed exposure levels in a factory handling TiO2 particles and the effects of such exposure on respiratory and cardiovascular systems. The diameter of primary particles collected on filters set in TiO2-handling factory in China was measured using scanning electron microscopy. Real time size-dependent particle number concentration was monitored and Holter monitors were attached to four workers before and during work. Health examination focusing on the respiratory and cardiovascular systems was conducted in the workers. The primary particle diameter ranged from 46 to 560 nm. The number concentration of particles with a diameter of more than 10, 5 to less than 10, 3 to less than 5, and 1 to less than 3 μm correlated negatively with the number concentration of nano-scaled particles. Multiple regression analysis showed that nano-scaled particle number and age correlated significantly with the ratio of low frequency to high frequency heart rate variability, a parameter of sympathetic function. One worker showed pleural thickening on chest X-ray, but its association with exposure to TiO2 particles was not clear. The present study did not show clear abnormality in respiratory function in individuals who had worked for 10 months to 13 years in a factory with ambient mass concentration of TiO2 particles of 10-30 mg/m3. The study generated the hypothesis that aggregation of particles might reduce nano-scaled particles by absorption mechanism and that exposure to particles might affect sympathetic function in elderly workers.