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Exposure to welding fumes is associated with acute systemic inflammatory responses

2005-11-02

The acute systemic inflammatory response to welding fume exposure was investigated. The median PM2.5 concentration for welders was 1.66 mg/m³, which was significantly greater than that for controls (0.04 mg/m³). Compared to non-smokers, smokers had a significantly higher baseline WBC count, but comparable levels of CRP and fibrinogen. In non-smokers, welding fume exposure was associated with a significant increase in WBC and neutrophil counts immediately following exposure. A significant decrease in fibrinogen levels was observed in non-smokers. No significant changes in WBC, neutrophil, and fibrinogen levels were found in smokers. 16 hours after welding exposure, CRP levels were found to be significantly increased in both non-smokers and smokers. PM2.5 concentrations were found to be significantly associated with absolute neutrophil counts in non-smokers, and CRP levels in both non-smokers and smokers. High levels of welding fume exposure induce acute systemic inflammation in a relatively young, healthy working population. These results also suggest that smoking may modify the effect of welding fume exposure on specific inflammatory markers.

Authors: Kim, J. Y.; Chen, J.-C.; Boyce, P. D.; Christiani, D. C.


Impact of fluoride on worker’s skeleton density and serum AKP and SOD

2005-11-02

The effect of long-time fluoride exposure was studied on the skeleton density and serum AKP (alkaline phosphatase) and SOD (superoxide dismutase). Thirty-five workers with fluoride exposure (A group) and 30 workers with no-fluoride exposure (B group) were analyzed. The tired and dream symptoms of the A group were higher than those in the B group obviously. The fluoride in blood and in urine was higher in the A group than those in the B group. The serum AKP and SOD in the A group were higher than those in the B group. The effect of low density fluoride (0.66-2.23 mg/m³) on the bone density was minor, but the effect on AKP and SOD activity was obvious.

Authors: Li, Kejun; Fu, Qiangzu; Guan, Zhijian

Full source: Gongye Weisheng Yu Zhiyebing 2003, 29(5), 293-294 (Ch)

Terephthalic acid occupational exposure and its effect on organ functions in fiber workers

2005-11-02

This study investigates the exposure to terephthalic acid (TPA), and evaluates its effects on organ function including the potential risk factors for uroliths and bladder tumor to TPA. Increased urinary excretion of TPA (0-5 mmol/mol Cr after the shift) reflected occupational workers TPA exposure. Authors also observed the exposure-response relations for the intensity of TPA exposure and the urine variables. Increased serum aspartate aminotransferase (AST) and lactate dehydrogenase (LDH) but within normal range is not increased. The slightly increased serum angiotensin-converting enzyme activity (SACE) was considered to be related to particulate of airborne TPA dust inhalation. No difference between referents and workers exposed to TPA was found for haematological variables. No clinical organ dysfunctions were found in this investigation working with TPA. However, special precautions are still necessarily taken to avoid excessive or prolonged contact.
A chemosorptive cylindrical denuder designed for personal exposure measurements of isocyanates—evaluation on generated aerosols of 4,4’-methylenediphenyl diisocyanate

2005-11-02

A denuder/filter system constructed for solvent-free personal exposure measurements was evaluated for separation of vapor and particulate 4,4’-methylenediphenyl diisocyanate (4,4’-MDI) generated from heated PUR-foam. The two different phases were collected in the denuder and on the filter, respectively, by chemisorption on a polydimethylsiloxane (SE-30)-dibutylamine (DBA) stationary phase. Both repeatability and the total mass concentration of 4,4’-MDI were similar to that obtained from the reference method, in this case an impinger/filter system. The penetration of particles through the denuder at 300 mL min⁻¹ was nearly 100% in the particle size range 25 to 700 nm, which fits well with the Gormley-Kennedy equation. Denuder/filter sampling of the 4,4’-MDI aerosol at 500 mL min⁻¹ yielded a phase distribution that was in accordance with the results from the reference method. The method limit of detection was 6 ng m⁻³ and 4 ng m⁻³ for the denuder and filter, respectively, when using an air sampling flow rate of 300 mL min⁻¹ and a sampling period of 15 minutes. This is well below the Swedish occupational exposure limit (OEL) of 50 and 100 μg m⁻³ for an 8-h working day and a 5-min period, respectively.

A method for measuring the potential dermal exposure to methyl methacrylate during two different dental technical work tasks

2005-11-02

Dental technicians are exposed on a daily basis to undiluted Me methacrylate (MMA) when performing various routine tasks. Although the clinical effects of this chemical have been known for decades, no previous studies have been performed to estimate the potential dermal exposure to it. In this study authors describe a patch-sampling technique to intercept the MMA that would otherwise have contaminated the skin on different parts of the hand and lower arm. The results indicate that the exposure patterns associated with producing an orthodontic splint and denture preparation differed. Authors found work task-dependent differences in the amounts of MMA collected at the different parts of each hand, and differences between the right and left hands. There was also an interaction between hand and work task, especially for the right hand. The air measurements were positively correlated with the dermal exposure. This study highlights the importance of using a measurement strategy that takes the variability within the hand/arm body parts into account when measuring potential exposure during these kinds of work tasks.

Dental technicians are exposed on a daily basis to undiluted Me methacrylate (MMA) when performing various routine tasks.
Assessment of workers’ exposure to palladium in a catalyst production plant

2005-11-02

Airborne particulate matter was collected and biomonitoring of workers was performed by sampling blood, urine and hair of 84 exposed subjects, 17 occasionally exposed employees, 21 controls from administrative offices and 25 unexposed people (external controls). The Production of Catalysts Department and the Refining Service presented the highest levels of Pd in airborne matter collected by means of an area sampler. Hair showed a clear distribution pattern among departments, with values ranging from 0.60 to 5.54 mg g⁻¹. Administrative workers presented blood levels of Pd between 2 and 500 times higher than external controls. Only urine levels correlated with the measurements of airborne Pd collected with personal devices. A very strong association between airborne Pd collected by personal devices and Pd levels in hair and urine was found. On the basis of these findings: (i) blood results appear to be an unsuitable biological marker for occupational exposure to Pd; (ii) urine could be considered as a satisfactorily responsive bio-marker for occupational monitoring; and (iii) hair cannot be considered a good index of time-related exposure.

Authors: Violante, N.; Petrucci, F.; Senofonte, O.; Cristaudo, A.; Di Gregorio, M.; Forte, G.; Alimonti, A.

Full source: Journal of Environmental Monitoring 2005, 7(5), 463-468 (Eng)

Polymorphisms in glutathione S-transferases in French vinyl chloride workers

2005-11-02

The authors have recently demonstrated a significant gene-environment interaction between vinyl chloride exposure and polymorphisms in the DNA repair protein XRCC1 on the occurrence of mutant p53 biomarkers of vinyl chloride-induced genetic damage. The aim of this study was to examine the polymorphisms in the glutathione S-transferases (GSTs) as potential modifiers of this relationship, since these enzymes may be involved in the phase II metabolism of the reactive intermediates of vinyl chloride. A cohort of 211 French vinyl chloride workers was genotyped for common polymorphisms in GSTM1, GSTT1 and GSTP1. Although no independent, statistically significant effect of these polymorphisms on the occurrence of the mutant p53 biomarker was found, the null GSTM1 and null GSTT1 polymorphisms were found to interact with the XRCC1 polymorphism to increase the occurrence of the biomarker such that, for example, workers with at least one variant XRCC1 allele who were null for both GSTM1 and GSTT1 had a significant odds ratio for the biomarker compared with workers who were wild-type for all alleles, controlling for potential confounders including cumulative vinyl chloride exposure.

Authors: Li, Y.; Zhou, M.; Marion, M.-J.; Lee, S.; Brandt-Rauf, P. W.

Full source: Biomarkers 2005, 10(1), 72-79 (Eng)

Urinary metabolites of workers exposed to nitrotoluenes

2005-11-02

Nitrotoluenes are important intermediates in the chemical industry. 2,6-Dinitrotoluene (26DNT), 2,4-dinitrotoluene (24DNT) and 2-nitrotoluene (2NT) are carcinogenic in animals and possibly carcinogenic in humans. Thus, it is important to develop methods to biomonitor workers exposed to such chemicals. The authors have monitored the air and urine metabolite levels for a group of workers in China exposed to 24DNT, 26DNT, 2NT and 4-nitrotoluene (4NT). The metabolites 2,4-dinitrobenzylalcohol (24DNBAlc), 2-
amino-4-nitrobenzoic acid (2A4NBA), 4-amino-2-nitrobenzoic acid (4A2NBA) and 2,4-dinitrobenzoic acid (24DNBA) resulting from exposure to 24DNT were found in 89, 88, 91 and 78% of the exposed workers, respectively. The metabolites 2,6-dinitrobenzylalcohol (26DNBAlc) and 2,6-dinitrobenzoic acid resulting from 26DNT exposure were found in 99 and 86% of the exposed workers, respectively. Quantitative, 2A4NBA, 4A2NBA and 26DNBAlc were the major metabolites. The nitrobenzoic acids were the major metabolites resulting from exposure to 2NT and 4NT and were present in 96 and 73% of the exposed workers, respectively. Air concentrations of DNT and 2NT did not correlate with the levels of metabolites in the urine. In conclusion, the dinitrobenzyl alcohols and aminonitrobenzoic acids determined in the urine provided a good marker for recently absorbed dose and were intrinsically related to the bioactivation and detoxification pathways of DNT. Air measurements were not a good measure to predict internal exposure.

Authors: Jones, C. R.; Sepai, O.; Liu, Y.-Y.; Yan, H.; Sabbioni, G.
Full source: Biomarkers 2005, 10(1), 10-28 (Eng)

Prognosis of contact dermatitis in epoxy resin workers
2005-11-02
Between January 1993 and February 2002, 40 of 1354 (3%) workers who attended a tertiary referral occupational dermatology clinic were diagnosed with allergic contact dermatitis (ACD) from epoxy resin systems (ER). 20 Of these patients were followed up at least 2 years post-diagnosis to establish prognosis. Characteristics collected at diagnosis, including age, atopic status and severity, were compared between the follow-up and not followed-up groups. No significant differences were observed. A clinician contacted patients and administered a telephone questionnaire based on variables identified from the literature, which were considered of importance for prognosis. All patients reported improvement of their skin condition since diagnosis. 12 Of the 20 patients had applied for workers’ compensation; all of these claims were successful. 16 Had ceased working with ER. Of these, 9 reported complete healing and 7 reported ongoing dermatitis. Although no conclusions could be drawn because of the small sample size, factors that may be associated with a poor prognosis were age, atopy, duration of symptoms and severity at diagnosis. The prognosis of ACD from ER is not always favorable, even if a worker ceases exposure.

Authors: Cahill, Jennifer; Keegel, Tessa; Dharmage, Shyamali; Nugriaty, Dhini; Nixon, Rosemary
Full source: Contact Dermatitis 2005, 52(3), 147-153 (Eng)

Blood lead and erythrocyte protoporphyrin levels in association with smoking and personal hygienic behavior among lead exposed workers
2005-11-02
This study investigates the effects of smoking and personal hygienic behavior on blood lead (BPb) and free erythrocyte protoporphyrin levels (FEP) in lead exposed workers. Statistically significant decreases in mean BPb and FEP occurred during the three years. The proportion of BPb reduction in the non-smoking workers was significantly higher (mean 24.3%) than in the smoking workers (15.3%). When the workers were classified into three groups (excellent, good, and poor) based on the four personal hygienic behavioral indicators, the greatest decreases of BPb and FEP were observed in the non-smoking workers of the excellent group. The consistent use of protection devices and cleanliness at work appeared to contribute to the lowering of BPb and FEP. Cessation of smoking in the workplace was also of importance.
Lead in finger bone, whole blood, plasma and urine in lead-smelter workers: extended exposure range
2005-11-02
The objectives were to assess the historical exposure and to study the relationships between Pb concentrations in whole blood (B-Pb), plasma (P-Pb), urine (U-Pb), finger bone (Bone-Pb) and duration of employment in workers at a secondary Pb smelter and to compare the relationships between B-Pb and P-Pb with results from previous studies of populations with a wide range of Pb exposure. The high Bone-Pb values recorded for the German smelters implied a historical Pb exposure of considerable magnitude. The long-term high Pb exposure also showed up in the B-Pb levels for both active and retired workers, leading to the implementation of necessary industrial safety measures to respond to biological threshold limits. The suggested equation describing the relationship between B-Pb and P-Pb in the combined group of subjects with a wide range of Pb exposure can be useful in future cross-sectional and longitudinal studies of Pb-exposed populations, relating, e.g., Pb exposure to adverse health outcomes.

Authors: Schuetz, Andrejs; Olsson, Martin; Jensen, Anker; Gerhardsson, Lars; Boerjesson, Jimmy; Mattsson, Soeren; Skerfving, Staffan
Full source: International Archives of Occupational and Environmental Health 2005, 78(1), 35-43 (Eng)

Trinitrotoluene (TNT)-induced cataract in Danish arms factory workers
2005-11-02
The prevalence of cataract in workers exposed to trinitrotoluene (TNT) to the prevalence in a group of un-exposed workers was compared, matched on age and sex, using Tiukina's description and grading of TNT-induced cataract. Four cases of TNT-induced cataract were identified among the 23 TNT-exposed workers and none in the un-exposed group. Exposure to TNT may cause a unique type of cataract, which a general ophthalmologist, using Tiukina's description and grading scale, will be able to distinguish from other cataracts.

Authors: Kruse, Anders; Hertel, Mette; Hindsholm, Marianne; Viskum, Sven
Full source: Acta Ophthalmologica Scandinavica 2005, 83(1), 26-30 (Eng)

Markers of cadmium exposure in workers in a cadmium pigment factory after changes in the exposure conditions
2005-11-02
Changes in concentrations of Cd in the blood (Cd-B), Cd in the urine (Cd-U), beta2-microglobulin in the serum (beta2-mG-S) and beta2-microglobulin in the urine (beta2-mG-U) of workers at a Cd pigment factory in Japan in which exposure conditions improved were assessed. Authors evaluated reversibility of these markers in continuously employed workers in relation to changes in exposure levels resulting from improvements in the workplace and the reduced production of Cd. Exposure levels were high in all work areas, according to the criteria set by the American Conference of Governmental Industrial Hygienists (ACGIH). Workers’ Cd-B and Cd-U concentrations reflected high levels of exposure. Correlation was found between these direct

The high Bone-Pb values recorded for the German smelters implied a historical Pb exposure of considerable magnitude.
indexes and beta2-mG-S concentrations. Since the 2nd year, ambient Cd concentrations decreased and reacted markers were improved. Cd-B, Cd-U, beta2-mG-S, and beta2-mG-U are appropriate markers for monitoring both the level of Cd exposure and the tubular function of workers. Reversibility of urinary low molecular weight protein was observed in the workers over the 4 years.

Authors: Kawasaki, Takashi; Kono, Koichi; Dote, Tomotaro; Usuda, Kan; Shimizu, Hiroyasu; Dote, Emi

Full source: Toxicology and Industrial Health 2004, 20(1-5), 51-56 (Eng)