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Human nails as a biomarker of arsenic exposure from well water in Inner Mongolia: comparing atomic fluorescence spectrometry and neutron activation analysis
2005-10-19
As is found naturally in the geological strata within the Ba Men Region of Inner Mongolia, China. A study was conducted to compare the total As measurements from 2 analysis techniques: instrumental neutron activation analysis (INAA) and atomic fluorescence spectrometry (AFS), and to verify nails as an exposure biomarker in this population. Based on the results, INAA was significantly correlated with AFS and proved to be a reliable measure of nail As levels. In this population, toenail samples are a useful internal As exposure biomarker from drinking water sources.
Authors: Schmitt, M. T.; Schreinemachers, D.; Wu, K.; Ning, Z.; Zhao, B.; Le, X. C.; Mumford, J. L.
Full source: Biomarkers 2005, 10(2-3), 95-104 (Eng)

Detecting DNA repair capacity of peripheral lymphocytes from cancer patients with UVC challenge test and bleomycin challenge test
2005-10-19
The objective of this study was to evaluate DNA repair capacity of cancer patients with the bleomycin (BLM) challenge test and the UVC challenge test. The DNA repair capacity measured with the BLM and UVC challenge tests in 33 cancer patients was significantly lower than that in controls.
Authors: Zheng, Wei; Jin, Lifen; He, Jiliang; Lou, Jianlin; Wang, Baohong; Deng, Hongping
Full source: Mutagenesis 2005, 20(4), 271-277 (Eng)

Change of blood cell count and blood biochemistry in the patients with Kanemi Yusho
2005-10-19
The correlation between blood polychlorinated biphenyls (PCBs), polychlorinated quaterphenyls (PCQ), polychlorinated dibenzo-p-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs) and clinical examination values were examined in 374 Yusho patients and 151 healthy subjects. Blood levels of PCBs, PCQs, PCDDs, PCDFs and toxic equivalent quantitative (TEQ) were significantly higher in patients than those of healthy subjects. Blood half-life of PCBs was 19.5 years, but that of PCQ was 57.9 years by linear regression analysis. Slight negative correlation was observed between PCBs and red blood cell and Hb in male and female, and between PCB and white blood cell in male. With respect to PCQs, counts of red blood cell, Hb, hematocrit and platelet showed negative correlation in male patients. Correlation between PCQs and Na and creatinine was positive in male patients, and that between PCQs and P, albumin and total protein was positive in female patients. Total protein, blood urea nitrogen (BUN) and creatine kinase (CK) showed positive correlation with PCBs in male patients, and correlation between PCBs and total protein and BUN was positive in male and female patients. The CK value and ratio of incidence of abnormal CK was significantly high in patients. The correlation between blood PCBs and CK was positive in male patients. By multiple regression analysis, blood PCBs, total protein, albumin and BUN affected CK level, and blood PCBs concentration, total protein, PCDDs and CK affected urine pH.
Authors: Yoshimura, Toshiro; Nakano, Jiro; Okita, Minoru; Kikuchi, Yasuki;
Differential effects of ammonia on the benzodiazepine modulatory site on the GABA-A receptor complex of human brain

2005-10-19

Ammonia is a key factor in the pathogenesis of encephalopathies associated with liver failure. A direct effect of ammonia on GABAergic neurotransmission was proposed as a mechanism that may explain its neurotoxic effect on the basis of electrophysiology and biochemistry studies performed in animal models of liver failure. In the present study, the authors investigated using a radiometric assay the effect of ammonia on the binding of GABA-A receptor ligands to membranes from normal human brains. Ammonium tartrate significantly decreased the maximal binding of [3H]flunitrazepam to well-washed frontal cortical membranes. The efficacy of the effects of ammonia was within the millimolar range (IC50 = 4.8 mM). This effect was not seen in cerebellum or hippocampus. Ammonia exposure decreased the maximal binding of [3H]flumazenil. This effect was seen with a greater potency (Imax = 32.4%) and a lower IC50 (0.1 mM). Inhibition of [3H]flumazenil binding was significant in all brain regions. The apparent ammonia-induced decrease of [3H]flunitrazepam and [3H]flumazenil binding was due to a decrease in the binding affinities of these ligands for the benzodiazepine site. In contrast, ammonium tartrate exposure did not cause significant changes to the binding of [3H]muscimol in any brain region. These findings demonstrate that ammonia interacts negatively with components of the benzodiazepine-associated site at the GABA-A receptor complex in human brain in contrast to previous reports in the rat, and thus, does not support the notion that ammonia directly activates the GABA-A receptor complex resulting in increased GABAergic neurotransmission in human hepatic encephalopathy.

Authors: Ahboucha, Samir; Araqi, Fadwa; Layrargues, Gilles Pomier; Butterworth, Roger F.

Decrease of CD4+ T-lymphocytes in children exposed to environmental lead

2005-10-19

The effects of environmental Pb on the immune system of young children were assessed by determining the peripheral blood lymphocytes CD3+, CD4+, CD8+, B(CD19+) counts, and natural killer (CD16+CD56+) cells in 35 perschool children whose mean blood Pb level was 140.6 mug/L. The results were compared to an age- and sex-matched control group with a mean blood Pb level of 64.3 mug/L. Compared to the controls, a significant reduction in the percentage of CD4+ cells and a significant increase of CD8+ cells were seen in the high-Pb group. The negative correlation between the percentage of CD4+ cells and blood Pb levels was found to be significant. These results suggest that exposure to environmental Pb might result in alterations in the immune function of young children.

Authors: Sun, Li; Zhao, Zhengyan; Li, Rong; Cheng, Hanyun

Ammonia is a key factor in the pathogenesis of encephalopathies associated with liver failure.
Cardiac, pulmonary and renal function in Yusho patients
2005-10-19
Thirty-five years after the Yusho incident, some symptoms, signs, and laboratory abnormalities are still found in Yusho patients. The objective was to describe the cardiovascular, respiratory, and renal abnormalities caused by Yusho, especially in relation to blood polychlorinated dibenzofuran concentration. A total of 358 officially registered patients with Yusho participated in this study. Airway symptoms such as cough and sputum were frequently seen in Yusho patients, whereas other symptoms, signs, and laboratory abnormalities were not remarkable. There were marginal relationships between cough and blood concentration of PCBs, and between sputum and 2,3,4,7,8-PeCDF. Apparently, organs of the respiratory system remain affected by Yusho 35 years after the incident, whereas little effect on cardiac and renal systems is observed.
Authors: Nakanishi, Yoichi; Tokunaga, Shoji; Takayama, Koichi; Kuwano, Kazuyoshi; The Study Group for Yusho
Full source: Journal of Dermatological Science, Supplement 2005, 1(1), S33-S38 (Eng)

A 90-day toxicological evaluation of 1,5-anhydro-D-fructose in Sprague-Dawley rats
2005-10-19
1,5-Anhydro-D-fructose (1,5-AF) is a novel monosaccharide produced by the action of alpha-1,4-glucan lyase (EC 4.2.2.13) on glycogen, starch, or related substrates such as maltose and maltosaccharides. 1,5-AF is of interest as a compound to be used as a food supplement because of its antioxidant, antimicrobial, and antidiabetic properties. This enforces the safety of 1,5-AF and therefore, in the current study, 4 groups of male and female Sprague-Dawley rats were provided with 1,5-AF in the drinking water (at 0 or 1.0 g/kg body weight daily) for 90 days. All the animals survived, and no clinical signs of toxicity or alterations in hematology or clinical chemical parameters were observed. Furthermore, organ weight and histopathological examination of brain, heart, urinary bladder, gastrointestinal tract, and pancreas were normal after 1,5-AF treatment. Moreover, there was no change in food consumption, water intake, or body weight gain in rats receiving 1,5-AF. Thus, the administration of 1,5-AF did not induce any significant toxicological effects and, therefore, 1,5-AF seems safe to administer in vivo over a long period of time.
Authors: Mei, Jie; Yu, Shukun; Ahren, Bo
Full source: Drug and Chemical Toxicology (1977) 2005, 28(3), 263-272 (Eng)

Organ specificity of DNA adduct formation by tamoxifen and alpha-hydroxytamoxifen in the rat: implications for understanding the mechanism(s) of tamoxifen carcinogenicity and for human risk assessment
2005-10-19
Tamoxifen is an anti-estrogen widely used in the adjuvant therapy of breast cancer and is also used as a prophylactic to prevent the disease in high-risk women. An increased risk of endometrial cancer has been observed in both settings. In rats, tamoxifen potently induces liver carcinomas and also induces uterine tumors when given neonatally. It forms DNA adducts in rat liver via the formation of alpha-hydroxytamoxifen, the ultimately reactive form being generated by sulfotransferase. In order to investigate the formation of...
tamoxifen-derived DNA adducts in other rat tissues, female Fischer F344 or Sprague-Dawley rats were treated with tamoxifen or alpha-hydroxytamoxifen by gavage or by i.p. injection, daily for 1, 4 or 7 days, and DNA adducts were detected by 32P-postlabelling analysis. Tamoxifen formed DNA adducts in the liver but not in other tissues (uterus, stomach, kidney, spleen and colon). Alpha-hydroxytamoxifen also formed adducts at high levels in liver, but with the exception of single animals (1/8) in which a low level of adducts was detected in the stomach in one case, and in the kidney in the other; it also did not give rise to adducts in other tissues. The results suggest that tamoxifen is a genotoxic carcinogen in rat liver, but a non-genotoxic carcinogen in rat uterus, making it, uniquely, a carcinogen with more than one mechanism of action. Mutagenicity experiments conducted in Salmonella typhimurium strains expressing bacterial or human N,O-acetyltransferase did not provide evidence that either alpha-hydroxytamoxifen or alpha-hydroxy-N-desmethyltamoxifen undergoes metabolic activation by acetylation. The confinement of ST2A2, the isoenzyme of hydroxysteroid sulfotransferase that can activate the compounds, mainly to rat liver is the possible reason for the formation of ducts in the liver but not in other organs of the rat.

Authors: Phillips, David H.; Hewer, Alan; Osborne, Martin R.; Cole, Kathleen J.; Churchill, Cyd; Arlt, Volker M.

Full source: Mutagenesis 2005, 20(4), 297-303 (Eng)

Cytogenetic and clinicopathologic changes associated with exposure of male baladi goat to low dose of organophosphorus pesticide Selecron

2005-10-19

The present work was conducted to evaluate the possible mutagenic effect of the organophosphorus pesticide Selecron as well as its effect on blood picture, serum biochemical parameters, reproductive efficiency, and histopathological alterations of parenchymatous organs in male Baladi goats. Bucks were divided into 2 groups: Group A (5 bucks) served as control and Group B (6 bucks) were daily drenched with 0.20 mL of the pesticide for 3 successive months. Selecron induced significant increase in the structural chromosomal aberrations, micronucleus formation, and induced a significant reduction in the mitotic index of goat lymphocytes. It induced hematological changes as anemia and leukopenia. In addition, it increased the activities of serum enzymes (ALT and AST), BUN, and creatinine concentration while it induced a significant reduction in the total protein concentration and serum testosterone level. Selecron induced a significant reduction in reproductive indexes and a significant increase in the percentage of sperm cell abnormalities. Histopathological alterations in the tested parenchymatous organs were observed.

Authors: Nashwa, A. Abu-Aita; Kamel, H. H.; Karima, F. Mahrous

Full source: Veterinary Medical Journal Giza 2005, 53(2, Pt. 2), 713-729 (Eng)

Ushering in the new toxicology: toxicogenomics and the public interest

2005-10-19

New scientific tools spawned by the genomics revolution promise to improve the ability to identify causative factors in human diseases. But as these new tools elucidate the complex interactions between chemical toxins and biological systems, the strain on traditional ways of understanding toxic effects grows. Despite major advances in the science and technology of these new toxicogenomics tools, scientific and political complexities
threaten to delay the use of toxicogenomics to further the public interest or - worse - to advance its use initially to weaken the regulation and safety of widely used chemicals. To gain further insight into the scientific and political landscape of the new toxicology, the authors interviewed 27 experts from a variety of disciplines and sectors. Interviewees expressed widespread agreement that the new toxicology promises a significant increase in the amount of information available on the toxic effects of chemicals. But the interviews show that the promise of the new toxicology will be realized only if technical and political obstacles can be overcome. Although scientific rigor is necessary for the new toxicology to move forward, the scientific and public-interest communities must ensure that inappropriate definitions of rigor, as well as proprietary interests, do not create unnecessary barriers to more effective public health protection.

Authors: Balbus, John M.
Full source: Environmental Health Perspectives 2005, 113(7), 818-822 (Eng)

Safety studies of a new wound dressing materials SG-01 for several experimental injury in rabbits and guinea pigs
2005-10-19
SG-01 is newly developed hydrophilic wound dressing material consisting of a cross-linked hydrogel base containing water spread onto the backing non-woven cloth and plastic release film. The absence of topical irritative reactions to SG-01 was examined by conducting a primary skin irritation test, a cumulative skin irritation test, an intracutaneous reactivity test, and a skin sensitization test. A pyrogen test was also carried out to further confirm the safety of this material. These tests were performed in experimental injury in rabbits and guinea pigs. The results of these tests are presented, ensuring the safety of SG-01.

Authors: Kaneko, Tetsuo; Hashimoto, Atsushi; Hayashi, Tetsuo; Umehara, Norimitsu; Tezuka, Masakatsu