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**26th International
Congress on
Occupational Health**

27th August - 1st September 2000

SINGAPORE

Scientific Programme and Abstracts

RELATIONSHIP BETWEEN BURNOUT AT WORK AND LEUKOCYTE SENSITIZATION/AGGREGATION

DD MPH,^{1,4} S. MELAMED PHD,^{1,4} Y. SHRAGIN MD,¹ T. KUSHNIR MD,^{1,4} A. SHIROM PHD,^{2,4} M. ARONSON, PHD^{3,4}
¹Health and Rehabilitation Institute, Ra'anana, ²Faculty of Management, ³Cell Biology and Histology, ⁴Tel-Aviv University, Tel-Aviv, Israel

Research examines whether burnout at work is associated with leukocyte sensitization/aggregate (LAA), a phenomenon known to be stress.

The LAA levels among 179 workers (88 men and 111 women) of Tel-Aviv University were determined when they underwent their annual health check-up. Blood pressure and toxic chemical exposure were recorded and background data were retrieved from medical records. Burnout and somatic complaints (known to be a general stressor) was collected through a self-report questionnaire.

Global burnout and each of its sub-components, emotional exhaustion, chronic fatigue and cognitive weariness, was significantly associated with LAA levels, even after controlling for age, sex and education level. Burnout and somatic complaints inter-correlated. Somatic complaints were not significantly associated with LAA levels after controlling for the above possible confounders.

Burnout was positively associated with LAA levels. This finding is consistent with the growing evidence of the negative impact of burnout on health. The lack of an association between somatic complaints and LAA reinforces the claim that burnout and stress are two different

EXPOSURE TO A MICROBIAL TOXIN, FUMONISIN B₁, INCREASES THE PRODUCTION OF REACTIVE OXYGEN SPECIES IN HUMAN NEUROBLASTOMA CELLS

Savolainen, K.M., Stockmann, H., Department of Industrial Hygiene and Toxicology, Finnish Institute of Occupational Health, Helsinki, Finland.

Background. Fungal growth often takes place in mold problem houses and may lead to exposure to high concentrations of microbes, bacteria or fungi, many of which produce fungi, and can also produce microbial toxins. Fungal growth typically takes place e.g. in work places in which moisture-induced damages in structures have not been repaired. The typical symptoms of exposure to indoor air bioaerosols including fungal spores include fatigue and respiratory tract disorders such as infections, irritation and of respiratory airways and the lungs, and febrile reactions. Recent observations also suggest that microbial toxins, e.g. Fumonisin B₁ (FB₁), produced by *Fusarium moniliforme*, frequently present in mold problem houses, may cause serious effects in the CNS of experimental animals and man.

Aim. The goal of the present studies was to explore the ability of FB₁ to increase the production of reactive oxygen species (ROS), and to induce cytotoxicity in human neuroblastoma cells exposed to graded doses of the toxin for increasing periods of time (0-36 h).

Methods. Human SH-SY5Y neuroblastoma cells were exposed to FB₁ at concentrations of 0.01, 0.1, 1, 10 and 100 µM up to 36 h in 48-well plates. Production of ROS, changes of intracellular glutathione (GSH), and cell viability were measured with fluorescent probes, dichlorofluorescein, monochlorobimane, and propidium iodide, respectively. The exposures were carried out for 0, 0.5, 1, 2, 3, 4, 5, 6, 12, 24, or 36 h in the presence or absence of diethylmaleate (DEM) that readily depletes the levels of intracellular GSH thereby rendering the cell more susceptible to ROS-induced oxidative stress.

Results. Exposure of the cells to FB₁ induced a transient and dose-dependent increase in ROS production from 0 to 5 h, both in the presence and absence of DEM, without any effect on the levels of intracellular GSH, or cell viability.

Conclusions. Several studies have shown that these cells are resistant to oxidative stress, and these results are consistent with this conclusion. It is, however, tempting to speculate that the initial increase in the ROS production may serve as a trigger that may lead to activation of redox-regulated transcription factors such as AP-1 and NFκB leading to subsequent alterations in gene expression that may render the cells more resistant to FB₁-induced production of ROS. Supported by the Academy of Finland.

HEPATIC LATERAL SCLEROSIS, DEMENTIA AND OTHER CENTRAL NERVOUS SYSTEM DISEASES FOLLOWING STYRENE EXPOSURE

A. J. Sanderkov, J. (1)
 Department of Occupational Medicine, Aarhus University Hospital, Aarhus.

Research examines if styrene exposure (an organic solvent) increases the risk of hepatic lateral sclerosis, dementia (including Alzheimer's disease), multiple sclerosis, Parkinson's disease and epilepsy.

A cohort of 42,000 potentially high level styrene exposed workers employed in reinforced plastics companies and 17,000 workers of 99 comparable companies with no styrene exposure were followed from 1978 to the end of 1997. A total of 1,000 person years were accumulated. Patients diagnosed with amyotrophic lateral sclerosis (n=23), dementia (n=362), multiple sclerosis (n=106), Parkinson's disease (n=66), and epilepsy (n=755) were identified in a national hospital discharge register which contains information on discharge diagnoses and date of diagnosis for all hospitalizations in Denmark during the follow-up period.

Exposure assessment was based on production data obtained for each company, measurements of styrene levels in the work places, and length of employment. Relative rates were estimated from the hospitalization data and rate ratios were calculated by internal comparisons in the cohort using Poisson regression models.

The risk of dementia more than doubled (but statistically insignificant) risk of amyotrophic lateral sclerosis was observed in the exposed workers (RR 2.6, 95% CI 0.9-9.0). The risk of epilepsy increased by increasing estimated styrene exposure level. No indications of occurrence of dementia (RR 0.9, 95% CI 0.8-1.2), multiple sclerosis (RR 0.7-1.8), Parkinson's disease (RR 0.7, 95% CI 0.4-1.1) or epilepsy (RR 0.8-1.1) were observed in the styrene exposed workers.

This study suggests that styrene exposure may increase the risk of hepatic lateral sclerosis. The finding is in accordance with earlier reports relating to organic solvent exposure. However, no support was provided for an association between hospitalization due to other degenerative disorders of the central nervous system and occupational styrene exposure.

BRAIN MRI IN MANGANESE EXPOSED WORKERS AND HEPATOPATIC PATIENTS

Lucchini R. (1), Gasparotti R. (2), Albini E. (1), Benedetti L. (1), Alessio L. (1)
 (1) Institute of Occupational Health, University of Brescia, Italy
 (2) Department of Neuroradiology, University of Brescia, Italy

Background: Manganese is a metal with paramagnetic properties that are useful for the magnetic resonance image (MRI) study of the deposition and accumulation in the brain. Brain MRI can show a T1-hyperintensity in globus pallidus among intoxicated workers following abnormal high exposure to manganese. The same image can be found in hepatopatic patients suffering from hepatic encephalopathy, due to a lack of manganese excretion through the biliary tract, and in subject with parenteral nutrition containing excessive amount of manganese in the parenteral solution

Aim: To verify the presence of hyperintensity images in asymptomatic workers exposed to "low" airborne manganese concentrations and in hepatopatic patients with no signs of encephalopathy, and to assess the relationship between manganese exposure dose and MRI intensity.

Method: A group of 7 male workers exposed to manganese in a ferro-alloy industry, 7 hepatopatic patients and a group of age matched control subjects were examined with brain MRI and blood manganese dosage. An attempt to assess the relationship between the exposure dose and the MRI hyperintensity was done by calculating the "pallidal index", which is defined as the ratio of globus pallidus to subcortical frontal white-matter signal intensity in sagittal T1-weighted MRI planes multiplied by 100. This index can be considered as a "semi-quantitative" estimate of the amount of manganese accumulated in the brain

Results: MRI hyperintensity was evident among the manganese workers and the hepatopatic patients, with identical pattern of bilateral and symmetric images, delimited within the globus pallidus and the pituitary gland. A significant correlation was observed between blood manganese and pallidal index

Conclusion: Regardless the underlying mechanism, a condition of manganese overload can determine a selective accumulation of this metal in the globus pallidus, where it can be visualized at the MRI. This situation can offer a valuable basis for the study of dose-effect relationship, in order to identify safe exposure levels