on the hands of glove-wearing beryllium ceramics workers. Subsequent evaluations of work practices, both programmatic and individual, are being used to refine and improve personal protection practices.

332.

MOLECULAR BASIS OF GENETIC RISK ASSESSMENT IN CHRONIC BERYLLIUM DISEASE. J. Snyder, A. Weston, E. Demchuk, NIOSH, Morgantown, WV.

Chronic beryllium disease (CBD) represents a possible threat to approximately 800,000 workers and other individuals potentially exposed to beryllium. The pathobiology of chronic beryllium disease involves the major histocompatibility complex class II human leukocyte antigen (HLA). Molecular epidemiological studies suggest that inheritance of specific *HLA-DPB1* alleles may be a factor contributing to disease susceptibility. We have studied three-dimensional structural models of HLA-DP proteins encoded by these genes. The extracellular domains of proteins encoded by *HLA-DPA1*01031/B1*1701, *1901, *02012,* and **0401,* and *HLA-DPA1*02011/B1*1701, *1901, *02012, *0401* were modeled from the X-ray coordinates of an HLA-DR template. Using these models the electrostatic potentials at the molecular surface of HLA-DP were calculated and compared. These comparisons show specific characteristics in the vicinity of the antigen-binding pocket that distinguish the different *HLA-DP* allotypes. The differences in electrostatics originate from the shape, specific disposition, and variation in the negatively charged groups around the pocket. The more negative the pocket potential, the greater the odds of CBD estimated from reported molecular epidemiologic studies. The impact is caused by substitutions in the beta-chain at positions B55, B56, B69, B84, and B85. Interestingly, these are the same loci that have been identified as genetic markers conferring susceptibility to CBD and other hard metal lung disease through epidemiological studies. These findings suggest that these substitutions may eventually promote an involuntary cation-binding site within the otherwise metal-free peptide-binding pocket, consequently demoting the innate function of HLA by changing the specificity of antigen recognition. Occupational risk assessment pertaining to beryllium exposures may benefit from consideration of the electrostatic characteristics of HLA-DP isotypes.

International Occupational Hygiene Issues

Papers 333–337

333.

MAXIMUM ADMISSIBLE CONCENTRATIONS FOR HARMFUL AGENTS IN THE WORKING ENVIRONMENT IN POLAND ESTABLISHED IN 2003. S. Czerczak, M. Kupczewska-Dobecka, Nofer Institute of Occupational Medicine, Lodz, Poland.

Interdepartmental Commission for Maximum Admissible Concentrations and Intensities for Agents Harmful to Health in the Working Environment includes representatives of health and labour administration, various sectors of industry, trade unions, and research institutes in the fields of occupational medicine and work safety. The Commission has appointed the Group of Experts for Chemical and Dust Agents and the Group for Physical Factors, consisting of independent experts in the fields of toxicology, occupational medicine, and occupational hygiene. The experts prepare health-based documentation for recommended exposure limits along with analytical procedures, recommendations with respect to pre-employment and periodical medical examinations, and contraindications to exposure. The proposed MAC and MAI values are then the subject for evaluation by the Interdepartmental Commission and acceptance by the Minister of Labour and Social Policy. The MAC's lists are published in the Law Gazette. These are hygienic standards valid for all branches of the national economy.To 2002 there are 441 MAC values for chemical substances (The Ordinance of the Minister of Labour and Social Policy on the maximum admissible concentrations and intensities of harmful to health agents in the working environment, J. of Law 217, item 1833). In 2003, the Expert Group of Chemical Agents proposed 36 MAC values for chemical substances. According to the type of biological effects, the following categories of MAC values are used: NDS-MAC(TWA): maximum admissible concentration; NDSCh-MAC(STEL): maximum admissible short-term concentration; NDS-MAC(C): maximum admissible ceiling concentration. In the Polish system, the MAC and MAI values documentation are published quarterly in the publication of the Interdepartmental Commission "Principles and Methods of Assessing the Working Environment," which makes it possible for occupational physicians and sanitary inspectors to become acquainted with the problem.

334.

OCCUPATIONAL EXPOSURE TO SULFUR AND NITROGEN ORGANIC COMPOUNDS IN POLISH RUBBER INDUSTRY. E. Koziel, W. Domanski, M. Posniak, Central Institute for Labour Protection-National Research Institute, Warsaw, Poland.

Rubber industry is a very important branch of the national economy. The products of this industry are widely used in many production sectors. Production of rubber products is characterized by the emission of pollutants which are hazardous and harmful for health. The aim of the studies was to identify nitrogen and sulfur organic compounds that are found in workplace air during production and processing of rubber and assessment of workers' exposure. The studies were carried out in three rubber industry factories that produce rubber plates and forwarding tape. In order to identify pollutants, samples were taken in places where the highest concentrations of air pollutants was expected. Charcoal, silica gel, silica gel coated ascorbic acid, and a glass fibre filter with amberlite XAD-2 resin (flowrate 20–120 L/min) were used to sample sulphur and nitrogen compounds. Prior to sampling, the sorbents were extracted in carbon disulphide, methanol, acetonitrile, and dichloromethane. Samples were analysed with gas and liquid chromatography. The GC/MSD tests made it possible to identify over 15 compounds containing sulphur and nitrogen in the mixtures emitted at workstations with mixers, roll mills, calenders, and vulcanizing presses.

Six of the identified chemical compounds of sulphur and nitrogen were identified at all workstations. These substances were determined during a typical production cycle of rubber plates and forwarding tapes. The results of the measurements indicated that the concentration of benzothiazole ranged from 1.42 mgm-3 to 23.50 mgm-3, 2-ditio(bis)benzothiazole from 2.01mgm-3 to 26.11 mgm-3, carbon disulphide from 274.02 mgm-3 to 6519.50 mgm-3, cyclohexyl isotiocyanate from 1.81 mgm-3 to 70.5mgm-3, 2-imidazolidinethione from 0.013 mgm-3 to 1.22 mgm-3, and N-nitrosodimethylamine from 0.02 mgm-3 to 0.58 mgm-3. Assessment of occupational exposure to these compounds is very difficult because there are no maximum admissible concentration values for several compounds either in Poland or abroad.

335.

CHEMICAL HAZARDS IN POLISH IRON FOUNDRIES. I. Makhniashvili, M. Posniak, M. Szewczynska, Central Institute for Labour Protection-National Research Institute, Warsaw, Poland.

Metal founding, especially iron founding, is a branch of industry in which working conditions are very bad. During the whole process in casting production workers are exposed to dangerous, harmful, and strenuous factors that can cause occupational diseases, occupational accidents, and also fatal accidents. Chemical substances are emitted to the air at every stage of castings production, which create different degrees of hazards for human health. Identification studies of harmful chemical substances and metals were carried out at worksta-

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