1484 TYPE I HYPERSENSITIVITY TO LATEX AMONG GLOVE MANUFACTURING WORKERS IN MALAYSIA.

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Previous studies indicate individuals in certain groups may have an increased risk for developing a latex allergy. This includes healthcare workers, rubber workers, atopic individuals, spina bifida patients and others who have undergone multiple surgical procedures. The study objective was to determine the extent of latex allergy in a Malaysian glove manufacturing facility where potential exposure to latex may be greater. Employee interviews and skin prick tests (SPT) were conducted. At least 16 allergens were used in the SPT including dust mites, grasses and latex. Sera was collected for measurement of latex-specific IgE antibodies. Airborne allergen concentrations, total proteins and antigenic proteins from the gloves in the production facility were determined. Results from 323 predominantly Banglideshi workers indicate a 2% incidence of latex sensitivity as determined by SPT. The mean age was 29.7 years and mean duration of exposure to rubber gloves was 5 years. The study has been expanded to include all nationalities employed at the manufacturing plant. Of those employees testing positive to latex, 80% were also positive to at least one other allergen, most typically dust mites, cockroach or watermelon. Airborne allergen concentrations ranged from 8–30,000 ng/m^3 which correlated with antigenic protein and total protein content of gloves sampled from different sites within the facility. The development of latex hypersensitivity does not appear to be increased in this population. These findings are comparable or lower than those reported in earlier studies conducted with glove factory workers.

1485 THE ROLE OF ENDOTOXIN IN THE DEVELOPMENT OF LATEX ALLERGY.

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Several investigators have hypothesized that endotoxin may act as an adjuvant, enhancing the development of an IgE response to natural rubber latex proteins following respiratory exposure. These studies were conducted to evaluate the role of endotoxin in the development of latex sensitization following two other relevant routes of exposure, topical and subcutaneous (sc). Groups of female BALB/c mice were exposed to 0, 5, 10 or 25µg of lipopolysaccharide (LPS) alone or in conjunction with 25µg of non-ammoniated latex (NAL). For topical studies mice were dosed 5 days a week to the shaven, derm-abraded, dorsal thorax. For sc studies animals were exposed once weekly by injection between the scapulae. Total IgE levels were monitored weekly and at the termination of the study; splenocyte proliferation assays were preformed and cytokine levels were quantified on *in vitro* splenocyte cultures. Following topical administration, animals simultaneously exposed to NAL and LPS (all doses) showed approximate 50% decreases in total IgE production as compared to animals exposed to NAL alone. Animals exposed sc to NAL and LPS demonstrated more dramatic decreases in IgE levels with values reaching less than 10% of the levels in mice exposed to NAL alone. A similar decrease in *in vitro* splenocyte proliferation was seen. A minimal effect on proliferation was seen following *in vitro* stimulation with NAL in splenocytes from animals topically sensitized to NAL in the presence of LPS. However, in animals sc sensitized to NAL in the presence of LPS an approximate 50% reduction in proliferation occurred. An increase in IL-2 levels were seen in splenocyte culture supernatants from these animals, which may hinder the class switch to IgE. Data from these studies suggest that the route of exposure to endotoxin may play a role in modulation of the IgE response to latex allergens. (These studies were supported in part by NIOSH/NIEHS interagency agreement Y02ES10189.)

1486 REDUCED PROINFLAMMATORY CYTOKINES IN FEED-RESTRICTED RATS EXPOSED TO HOUSE DUST MITE ANTIGEN.

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Feed restriction (FR) has been shown to reduce allergic responses to house dust mite (HDM) antigen in rats, which include less pulmonary inflammation, lower antigen-specific IgE in serum, and reduced antigen-specific lymphocyte proliferation in pulmonary lymph nodes. To understand the underlying mechanisms, both Th1/Th2 and proinflammatory cytokine expression was assessed in female Brown Norway rats fed either *ad libitum* (AL) or at feed intakes equal to 75% that of AL intake. Through an intratracheal instillation of HDM, rats were sensitized after 3 weeks of feed restriction then challenged 2 weeks later. Rats were euthanized and pulmonary lymph nodes collected 7 and 14 days after sensitization as well as 2 and 7 days after challenge. Although expression patterns of Th1/Th2 and proinflammatory cytokines were demonstrated in AL and FR rats exposured to HDM, no FR-related change was observed in IL-1β , IL-2, and IL-4 mRNA expression in pulmonary lymph nodes. However, IFN-γ expression level in FR rats was similar to that in AL rats prior to challenge and 2 days post challenge, it was higher in FR rats than that in AL rats 7 days after HDM challenge. While the expression of IL-6 and TNF-α was lower in FR rats than in AL rats 7 days after HDM sensitization, it elevated to the same levels as AL rats after HDM challenge. These data revealed Th1/Th2 and proinflammatory cytokine profiles in rats exposed to HDM antigen and indicated that dietary restriction reduced proinflammatory cytokine expression after sensitization. (This abstract does not necessarily reflect the views and policies of US EPA.)

1487 COMPARISON OF ALLERGIC RESPONSES TO HOUSE DUST MITE (HDM) AMONG LOCALLY AND SYSTEMICALLY SENSITIZED SUCKLING, WEANLING, AND ADULT BROWN NORWAY RATS.

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The model of HDM allergy in adult Brown Norway (BN) rats has been a useful tool for exploring the mechanisms of allergic disease and the impact of environmental pollutants on the development and expression of disease. Because the incidence of childhood asthma is increasing, it is necessary to adapt the HDM model to younger animals. In this study, allergic responses to Derf1, a purified HDM antigen, were compared among systemically and locally immunized 8-week-old adult, 3-week-old weanling, and 10-day-old suckling BN rats. Systemically immunized animals received subcutaneous injection of saline or 10µ g Derf1. Locally immunized animals received saline or a total of 10µ g Derf1 in 2 intratracheal (IT) instillations 48 hours apart. Twelve days after sensitization, rats were IT challenged with 10µ g Derf1. At 2,4, and 9 days post challenge, total IgE, antigen specific proliferation of lymph node and spleen cells, and pulmonary inflammation were measured. These data show that while local and systemic administration of antigen, without the use of adjuvant, caused allergic sensitization in adult and weanling animals, serum IgE levels were substantially higher in systemically immunized animals. Maximal pulmonary inflammation occurred at 2 days in adult rats, but was delayed until 4 days in weanlings. This immunization protocol was not sufficient to induce allergic sensitization in suckling rats. Future studies will investigate alternative immunization protocols, including multiple Derf1 instillations. (Funded by the NCSU/EPA Cooperative Training Program in Environmental Science Research, Training Agreement CT826512010 with North Carolina State University. This abstract does not reflect EPA policy.)

1488 A FLOW CYTOMETRIC METHOD TO SCREEN FOR BERYLLIUM SENSITIZATION.

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Human exposure to beryllium can result in chronic beryllium disease (CBD), an immune system-mediated disease resulting in loss of lung function, formation of granulomas, and fibrotic scarring. Medical monitoring relies on an assessment of beryllium sensitization based on the lymphocyte proliferation test (LPT), which currently measures ^{3}H-thymidine incorporation into DNA of beryllium-stimulated and -unstimulated peripheral blood lymphocytes (PBL). We present a flow cytometric assay that uses the quenching effect of bromodeoxyuridine on Hoechst 33258 DNA fluorescence to study the proliferative activity of PBL. This method allows the enumeration of cells in each G_1, S, and G_2/M phases of up to three successive cell cycles. PBLs were isolated from known CBD patients and normal controls and tested in culture for their response to either phytohemagglutinin P (PHA), tetanus, or berylli-

An Official Journal of the
Society of Toxicology
Supplement

38th ANNUAL MEETING

TOXICOLOGICAL SCIENCES

Formerly Fundamental and Applied Toxicology

The Toxicologist

Oxford University Press

Volume 48, Number 1-S, March 1999

The Toxicologist

An Official Publication of the Society of Toxicology

and

Abstract Issues of

TOXICOLOGICAL SCIENCES

An Official Journal of the Society of Toxicology

Published by Oxford University Press, Inc.

Abstracts of the 38th Annual Meeting

Volume 48, Number 1-S

March 1999