347 OCCUPATIONAL CONTACT DERMATITIS FROM PROTEIN IN SEA PRODUCTS: DIFFERENCES BETWEEN 2 POPULATIONS

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Background Protein contact dermatitis has frequently been reported in case studies (usually in cases involving contact with seafood products), but there are very few descriptive series.

Objectives First, to determine the incidence of protein contact dermatitis among fishermen in France and compare it with data from onshore work involving seafood exposure. Second, to discover what factors could explain any differences.

Methods/materials/patients We analysed data from the French national occupational disease surveillance and prevention network (RNV3P) and occupational diseases declared to the French National Network for Monitoring and Prevention of Occupational Disease. This retrospective study was done for a 13 year period.

Results Between 2000 and 2012, we only found eight cases of protein contact dermatitis in the French network. There were no cases of protein contact dermatitis in the seafaring population. The eight cases from the French network are essentially allergies to different fish and chefs are the professionals most affected. Atopy is present in half of these cases.

In the seafaring population we found several cases of eczema due to bryozoans and to gloves but no protein contact dermatitis.

Conclusions Chefs who have to cook seafood are more at risk of occupational protein contact dermatitis than fishermen. We think that skin protection (that is to say glove wearing) is better implemented in the fishing sector than in the catering profession on shore in France.

384 THE RISK BUSINESS OF BEING AN ENTOMOLOGIST: A SYSTEMATIC REVIEW

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Introduction Adverse work-related health outcomes are a significant problem worldwide. Entomologists, including arthropod breeders, are a unique occupational group exposed to potentially harmful arthropods, pesticides, and other more generic hazards. These exposures may place entomologists at risk of a range of adverse work-related health outcomes.¹

We sought to determine which adverse work-related health outcomes entomologists have experienced, the incidence and prevalence of these outcomes, and what occupational management strategies have been employed by entomologists, and their effectiveness.

Methods A systematic search of eight databases was undertaken to identify studies informing the review objectives. Data pertaining to country, year, design, work-exposure, adverse work-related health outcomes, incidence or prevalence of these outcomes, and occupational management strategies were extracted, and reported descriptively.

Result Results showed entomologists experienced work-related allergies, venom reactions, infections, infestations and

delusional parasitosis. These related to exposure to insects, arachnids, chilopods and entognathans, and non-arthropod exposures, e.g. arthropod feed. Few studies reported the incidence or prevalence of such conditions, or work-related management strategies utilised by entomologists. There were no studies that specifically investigated the effectiveness of potential management strategies for entomologists as a population. Critical appraisal indicated poor research quality in this area.

Discussion Entomologists are a diverse, unique occupational group, at risk of a range of adverse work-related health outcomes. This study represents the first systematic review of their work-related health risks. Future studies investigating the prevalence of adverse work-related health outcomes for entomologists, and the effectiveness of management strategies are warranted to decrease the disease burden of this otherwise understudied group.

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414 INDUCTION OF IL-17 PRODUCTION FROM HUMAN PERIPHERAL BLOOD CD4+ CELLS BY ASBESTOS EXPOSURE

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From our previously reports, chronic, recurrent and low-dose exposure to asbestos fibres causes a reduction in antitumor immunity. In addition with natural killer (NK) cells and cytotoxic T lymphocytes (CTL), the analysis of T helper cells showed that surface CXCR3, chemokine receptor, and the productive potential of interferon (IFN) γ were reduced following asbestos exposure in an *in vitro* cell line model and in peripheral CD4 +cells of asbestos-exposed patients. Moreover, experiments revealed that asbestos exposure enhanced regulatory T cell (Treg) function. This study also focused on CXCR3 expression and the Th-17 cell fraction. Following activation with T-cell receptor and co-culture with various concentrations of chrysotile fibres using freshly isolated CD4 +surface CXCR3 positive and negative fractions, the intracellular expression of CXCR3, IFN γ and IL-17 remained unchanged when co-cultured with chrysotile. However, subsequent re-stimulation with phorbol 12-myristate 13-acetate (PMA) and ionomycin resulted in enhanced IL-17 production and expression, particularly in CD4 +surface CXCR3 positive cells. These results indicated that the balance and polarisation between Treg and Th-17 fractions play an important role with respect to the immunological effects of asbestos and the associated reduction in antitumor immunity.

416 SEARCH FOR BIOMARKERS OF ASBESTOS EXPOSURE AND ASBESTOS-INDUCED CANCERS IN INVESTIGATIONS OF THE IMMUNOLOGICAL EFFECTS OF ASBESTOS

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The immunological effects of asbestos exposure on various lymphocytes such as the regulatory T cell (Treg), responder CD4⁺T helper cell (Tresp), CD8⁺ cytotoxic T lymphocytes (CTL) and natural killer (NK) cells were investigated. Results show that asbestos exposure impairs anti-tumour immunity through enhancement of regulatory T cell function and volume, reduction of CXCR3 chemokine receptor in responder CD4⁺T helper cells, and impairment of the killing activities of CD8⁺ cytotoxic T lymphocytes (CTL) and NK cells. These findings were used to explore biological markers associated with asbestos exposure and asbestos-induced cancers, and suggested the usefulness of serum/plasma IL-10 and TGF- β , surface CXCR3 expression in Tresp, the secreting potential of IFN- γ in Tresp, intracellular perforin level in CTL, and surface expression NKp46 in NK cells. Although other unexplored cytokines in serum/plasma and molecules in these immunological cells, including Th17, should be investigated by experimental procedures in addition to a comprehensive analysis of screening methods, biomarkers based on immunological alterations may be helpful in clinical situations to screen the high-risk population exposed to asbestos and susceptible to asbestos-related cancers such as mesothelioma

557 CONTACT DERMATITIS AMONG WORKERS OCCUPATIONALLY EXPOSED TO FERRONICKEL ALLOYS

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Introduction Many studies have shown that nickel and its alloys can be potential irritants and sensitizers among workers engaged in ferronickel alloy production, and provoke occupational contact dermatitis.

Objective To assess the prevalence of contact dermatitis focusing on allergic contact dermatitis in workers exposed to nickel while producing ferronickel alloys.

Methods A cross-sectional study included 103 male workers (mean age=49.1 $\pm$ 10.1) employed as ferronickel smelters (duration of exposure 18.2 $\pm$ 11.9) with direct contact to nickel. Their findings were compared with a control group of 37 male office workers (mean age=46.7 $\pm$ 10.6), employed in the same facility, without direct nickel contact, matched for age, smoking habits and socioeconomic status. Evaluation of examined subjects included Nordic Questionnaire on Occupational Skin Diseases (NOSQ-2002/long), physical examination of the skin changes on hands, wrists and forearms, and patch test with NiSO₄ (5%).

Results and discussion Skin rash during six months was registered in 21 (20.4%) exposed worker, and in 4 (10.8%) controls. The prevalence of skin changes, chronic rhinitis, conjunctivitis, and asthma was higher in exposed workers, but without statistical significance. Hand skin efflorescence due to non-occupational substances were present in 10 (9.8%) of exposed workers, and among 2 (5.5%) of controls. There was no significant difference concerning urticaria between two groups, and non-occupational nickel sensitisation (metal buttons, jewellery, etc.). Positive patch test by 5% NiSO₄ was registered in 20 (19.5%) exposed workers and in 2 (5.4%) controls (p<0.05). Significant difference was found between the two groups concerning improvement of skin lesions after

temporary elimination of workplace exposure. Positive elimination test was registered among 5 (4.9%) exposed workers with hand contact dermatitis.

Conclusion Our data confirmed that workplace nickel exposure can cause occupational allergic contact dermatitis among workers producing ferronickel alloys, and determined the need of preventive activities in order to decrease the pathogenic dermal effect of nickel.

638 EFFECTS OF IL-15 ADDITION ON THE SUPPRESSED INDUCTION OF CTL UPON EXPOSURE TO ASBESTOS

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Introduction Asbestos exposure can cause malignant mesothelioma and lung cancer. However, in contrast, its effect on anti-tumour immunity remains unclear. Our previous study reported that asbestos exposure suppressed the induction of CTL during mixed lymphocyte reactions (MLR), accompanied by the decrease in proliferation of CD8⁺T cells. Recently, we reported that IL-2 showed a tendency to increase% granzyme B⁺ cells in the CFSE-positive CD8⁺ lymphocytes without proliferation upon exposure to asbestos. Therefore, we investigated whether IL-15 addition might improve the suppressed induction of CTL upon exposure to asbestos.

Methods For MLR, human PBMCs were cultured with irradiated allogenic PBMCs upon exposure to chrysotile B asbestos at 5 μ g/ml for 7 days. After 2 days of culture, IL-15 was added at 1 ng/ml. After 7 days of MLR, PBMCs were collected and analysed for phenotypic and functional markers of CD8⁺ T cells with fluorescence-labelled anti-CD3, anti-CD8, anti-CD45RA, anti-CD45RO, and anti-granzyme B Abs using flow cytometry.

Result IL-15 didn't recover the asbestos-caused decreases in% CD25⁺ and% CD45RO⁺ cells and increase in% CD45RA⁺ cells, but recovered the decrease in cell numbers of CD3⁺CD8⁺ cells and% granzyme B⁺ cells, in contrast to IL-2.

Discussion These results indicate that IL-15 is more effective on recovery from asbestos-caused suppressed induction of CTL than IL-2, although the interfered expressions of cell surface markers were not recovered even by addition of IL-15. Further study about the characteristics of CD3⁺CD8⁺granzyme B⁺ cells induced by addition of IL-15 will contribute to clarification for the mechanism of asbestos-caused suppression in CTL induction and to finding out a clue to restore it.

640 EFFECT OF LONG-TERM EXPOSURE TO ASBESTOS ON FUNCTIONAL PROPERTIES OF HUMAN CD8⁺T CELL LINE

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Introduction The tumorigenicity of asbestos, which is thought to cause mesothelioma, has been clarified, whereas its effect on anti-tumour immunity remains unclear. In ICOH Congress 2015, we have reported the enhanced decrease in% perforin⁺ cells of stimulated CD8⁺ cells of the patients with malignant