February 21, 2002 Meeting Abstracts

Following are the abstract presentations from the 13th Annual Meeting of the American Dermatitis Society, held on February 21, 2002 in New Orleans.

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RHO GTPase SIGNALLING IN SPONGIOTIC CHANGE

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Spongiosis is the characteristic histological manifestation of contact dermatitis. We investigated the role of Rho, a small GTPase that serves as an intracellular signal controlling cell adhesion, in mediating spongiotic change. We used a tissue culture model of spongiosis to investigate the role of Rho signaling in blister formation. Keratinocytes co-cultured for 24 hours with activated T lymphocytes developed intercellular gaps along with stretched bridges resembling in vivo spongiosis. This gap formation was associated with disassembly of adherens junctions as evidenced by disappearance of □ catenin at cell margins. Co-culture with activated T lymphocytes also decreased the level of Rho activation (GTP-Rho) in keratinocytes. To determine if Rho inactivation is sufficient to cause spongiotic change, we specifically inactivated keratinocyte Rho with C3 transferase. Rho inactivation caused loss of □ catenin at intercellular junctions as well as morphological changes resembling spongiosis. Our results suggest that inactivation of Rho may contribute to spongiotic change in contact dermatitis. This work was supported by the Dermatology Foundation and the UCLA Short Term Training Program.

THE GOLD STANDARD NICKEL REDUCTION DIET

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Nickel is the most widely tested contact allergen in the United States; approximately 14% of women in industrialized nations are sensitized. Although allergic contact dermatitis is the most common manifestation of nickel allergy, oral nickel challenge studies suggest some patients may suffer from endogenous systemic nickel dermatitis. These patients may benefit from reduced dietary exposure. Currently prescribed nickel-restriction diets offer lists of allowed and prohibited foods, not absolute amounts of nickel per food serving. In addition, the dietary role of nickel and the possibility of nickel deficiency have never been discussed. Using raw data presenting micrograms nickel/gram of food, and converting them to the absolute value of nickel found in a typical serving of food as defined by the USDA Food Guide Pyramid, we instruct patients to consume a level of nickel daily which fulfils a theoretical daily requirement of 50-100 micrograms and to restrict intake above that level to prevent flares. Compliance with such a diet allows for the consumption of a quality, relatively varied diet while allowing patients to consume their favorite nickel-dense foods in amounts compatible with a low total amount.

PREVALENCE AND METHODOLOGY OF PATCH TESTING AMONGST U.S. ALLERGISTS: RESULTS OF A CROSS-SECTIONAL SURVEY

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Objective: The objective of this study was to examine the prevalence of patch testing and associated methodologies used by U.S. allergists.

Methods: A cross-sectional survey of all U.S. Fellows of the American Academy of Allergy, Asthma and Immunology.

Results: Of 1239 questionnaires mailed, 519 (42%) were returned. Fifty-three percent of allergists reported performing patch testing. The majority (89%) patch tested five or fewer patients per month. The most common patch test reading schedule was at both 48 and 72 hours (48%). Thirty-three percent of respondents performed only a single patch test reading. The majority (72%) used TRUE Test. Only four percent reported patch testing for type IV allergy to dust mites.

Conclusion: Many more allergists patch test than we initially hypothesized. The patch testing methodologies used by allergists are similar to those of dermatologists.

Acknowledgements: This study was supported by the Minneapolis VA Medical Center.

THE SPECTRUM OF ALLERGIC REACTION TO THIOUREAS

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Thioureas and their derivatives are increasingly common causes of allergic contact dermatitis. They are widely used in the rubber industry as accelerators, and in photocopy paper, neoprene based medical devices, athletic-wear and computer accessories.

Objective: We present 18 cases of allergic reactions to mixed dialkyl thioureas.

Methods: We identified 33 cases with patch test reactions to dialkyl thioureas from the 1368 patients whom we patch tested between January 1999 and June 2001.

Results: Of the cases we reviewed, 18 were positive reactions, and 15 were positive and relevant. 78% had a prior history of dermatitis, and 28% had a prior history of atopy. There were equal numbers of males and females. Sources of exposure included photocopy paper, neoprene gloves and stockings, athletic shoes, diving gear, straps of CPAP mask, compression garments, and stomal appliance adhesive. The most common treatment modalities were topical corticosteroids and avoidance of offending allergen with improvement in the majority of individuals.

Conclusion: Although the incidence of allergic contact dermatitis to thioureas is low, individuals with dermatitis and exposure to neoprene components should be patch tested to mixed dialkyl thioureas

NECROTIZING CELLULITIS DUE TO APOPHYSOMYCES ELEGANS AT A PATCH TEST SITE

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Plant material is commonly used in patch testing for the diagnosis of contact dermatitis. Serious adverse reactions to this practice are extremely uncommon. We report a 68-year-old immunocompetent gentleman with hand dermatitis who developed severe necrotizing cellulitis due to Apophysomyces elegans at the site of a patch test to a snapdragon plant from his garden.

On day five of patch testing the patient developed a painful 3-cm red indurated rectilinear-shaped plaque on the left lower back which progressed over four days to a 10-cm full-thickness

necrotic plaque with induration extending to the entire left flank. The patient was hospitalized and underwent extensive surgical debridement. Biopsy of this tissue showed necrotizing fungal cellulitis involving the epidermis, dermis, and subcutaneous tissue with an associated acute and chronic inflammatory infiltrate. GMS stain confirmed the presence of weakly staining hyphae with morphology consistent with zygomyces infection. At six weeks, the original wound cultures identified A. elegans.

Zygomycotic skin infections are uncommon and typically occur in immuno-compromised hosts. A. elegans is a zygomycete, which has recently been reported to cause skin infection in immunocompetent individuals following local trauma with soil contamination. To our knowledge, this is the first such infection to develop as a complication of patch testing.

ALLERGIC CONTACT DERMATITIS TO LIDOCAINE

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We present two patients who, upon patch testing to the North American Contact Dermatitis Group Standard Tray, had positive reactions to lidocaine 15% pet. This sensitivity was confirmed by intradermal testing with 0.1 cc of 1% plain lidocaine from a glass vial. The positive patch and intradermal tests were relevant to their history of eruptions at the sites of local anesthetic injections.

Our lidocaine sensitive patients did not have positive patch test reactions to other amide anesthetics. This demonstrates the importance of patch testing to varied anesthetic agents in order to determine which agents the patient should avoid and which may be safe to utilize. Positive patch tests to an anesthetic agent should be confirmed with an intradermal challenge since two other patch test clinic patients with positive patch tests to lidocaine had negative intradermal tests and no history of lidocaine reactions. This presentation focuses on the basic groups of anesthetic agents, the frequency of patch test positivity to anesthetic agents, as well as how to best manage patients given anesthetic sensitivity.

HYPERSENSITIVITY REACTION TO SILICONE POLYMER

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Controversy remains regarding the ability of silicone polymers to initiate a local immune response. Silicone polymers are generally thought to be biologically inert and are frequently used to make medical prosthetic devices. Silastic tubing is commonly used medically to aid in many settings including the drainage of excessive cerebrospinal fluid. Suspected immune reactions to silastic tubing have been reported, but usually in children who have undergone multiple exposures for hydrocephalus.

We report the case of a forty four-year-old female patient who was referred to our clinic with a history of an inflammatory response along the path of a Lumboperitoneal shunt that was placed to alleviate cerebrospinal fluid accumulation. This patient had no history of prior exposure to silicone. The shunt was pulled because of suspected infection but the patient has had a subsequent shunt placed with bacterial cultures that revealed normal skin flora. Suspecting allergy, we first patch tested the patient to the shunt material with negative result.

Then, using sterile technique, a 1cm piece of the shunt from the same manufacturer originally placed in our patient was surgically implanted in the skin of the abdomen. A 1.5 cm incision to subcutaneous adipose tissue was made, the tubing was placed and the wound site closed with three 4.0 Nylon sutures. The patient was instructed to provide daily wound care with antibiotic ointment (Bacitracin) twice daily and return to clinic in two weeks. A cutaneous biopsy of the site

performed two weeks later revealed granulomatous inflammation with the presence of eosinophils around the embedded shunt. In addition, the patient's serum was obtained and tested for IgG binding levels to silicone elastomer extracts.
Our patient was also found to have elevated serum silicone extract IgG complexes as compared to normal subjects and similar to other shunt reaction patients.
A noteworthy aspect of this study is that most reported cases of immunologic reactions to shunts have been in children after longstanding presence of the shunt. Our patient surpasses the age most frequently reported in association with such a response to this type of shunt. Although the studies regarding immunologic reactions to silicone polymers are conflicting, this case indicates that silicone elastomers are capable of producing hypersensitivity reactions in some patients.

PREVALENCE OF CONTACT ALLERGY TO BOTANICAL EXTRACTS IN PATIENTS WITH COSMETIC DERMATITIS

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Plant extracts are used more frequently and are added to cosmetics in place of, or in addition to, more traditional fragrance ingredients. Data concerning the prevalence of contact allergy to specific plant extracts is sparse.
Objective: To determine the prevalence of positive patch test reactions to botanical extracts in users of botanical products with suspected cosmetic dermatitis.
Methods: With institutional review board approval, we patch tested 8 patients with suspected cosmetic dermatitis who had used a topical product containing botanical extracts. The study tray consisted of 50 botanical extracts and common extract additives. All study patients had been previously patch tested to the NACDG standard tray. The control group consisted of 33 new patients attending the Contact Dermatitis Clinic for patch testing.
Results: Seven of the eight patients in the study group were women. Five patients (63%) showed positive reactions to at least one botanical extract on the study tray. Three patients were allergic to botanical extracts in "fragrance-free" products with multiple botanical ingredients. Fragrance mix, balsam of Peru, and compositae mix did not accurately screen for botanical contact allergy.
Conclusion: Contact allergy to botanical extracts may be common in patients with cosmetic dermatitis who use botanical-containing products. "Fragrance-free" products may contain several relevant botanical allergens.

CONTACT SENSITIZATION TO DISPERSE DYES IN CHILDREN

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Objective: Our aim was to study disperse dye sensitization in children.
Methods: From January 1996 to December 2000, 1100 children undergoing routine patch testing for suspected allergic contact dermatitis were tested with 7 textile dyes: Disperse Blue 124, Disperse Blue 106, Disperse Red 1, Disperse Yellow 3, Disperse Orange 3, para-aminoazobenzene, and para-dimethylaminoazobenzene. Disperse Blue 106 and para-aminoazobenzene were not tested in children less than 10 years old.
Results: 51 children (mean age = 6.5 years), 34 female and 17 male, proved to be allergic to textile dyes. Out of these 30 subjects were affected by atopic dermatitis. Disperse Yellow 3, Disperse Orange 3, and Disperse Blue 124 gave the highest number of positive responses. About 12% of our paediatric population was sensitized to disperse dyes alone.
Conclusions: Our results demonstrated that sensitization to textile dyes is not unfrequent in children. Therefore disperse dyes should be included in paediatric patch test series .

THE HANDS: AN ATYPICAL LOCALIZATION OF TEXTILE DYE DERMATITIS?

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Objective: Our aim was to study disperse dye sensitization in patients with hand dermatitis.
Methods: From January 1996 to December 2000, 6478 consecutive patients with suspected allergic contact dermatitis were patch tested with 46 haptens including 7 textile dyes: Disperse Blue 124, Disperse Blue 106, Disperse Red 1, Disperse Yellow 3, Disperse Orange 3, para-aminoazobenzene, para-dimethylaminoazobenzene.
Results: Among the 437 patients sensitized to textile dyes, in 82 subjects the dermatitis was localized to the hands alone, whereas 48 patients had lesions both on the hands and on other skin sites. 7 patients (8.5%) had a history of atopic eczema, and 15 were hairdressers. Disperse Blue 106, Disperse Blue 124, and Disperse Orange 3 were the most common sensitizers. About 12% of our study population was allergic to disperse dyes alone.
Conclusions: Our findings proved that textile dyes should be taken into account in patients with hand eczema, even if the hands are not directly exposed.

MONOSENSITIZATION" TO DISPERSE DYES: DESCRIPTION OF 57 CASES

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Objective: Our purpose was to describe patients sensitized to disperse dyes alone.
Methods: 6478 consecutive patients with suspected allergic contact dermatitis who referred to our Department in Modena, in the 1996-2000, period were patch tested with 46 haptens, comprising 7 disperse dyes: Disperse Blue 124, Disperse Blue 106, Disperse Red 1, Disperse Yellow 3, Disperse Orange 3, para-aminoazobenzene, para-dimethylaminoazobenzene.
Results: Out of the 437 patients reacting to disperse dyes, 57 (13%) proved to be allergic to these dyes alone. 35 patients reacted to Disperse Blue 124, 26 to Disperse Blue 106, 22 to Disperse Orange 3, 17 to para-aminoazobenzene , 10 to Disperse Yellow 3, 10 to Disperse Red 1, and 8 to para-dimethylaminoazobenzene. 11 subjects were sensitized to one dye alone. The dermatitis was localized mainly to the face and the hands.
Conclusions: Our data underline the importance of adding disperse dyes to the standard series. Without a routine test of these dyes, 57 subjects belonging to our study population would not have been identified as contact allergic patients.

CELLULAR CHARACTERIZATION OF OCCUPATIONAL CONTACT DERMATITIS

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BACKGROUND: Previous studies suggested that the temporal changes in the expression and degradation of matrix components in allergic contact dermatitis (ACD) are associated with activation of immune cells. Fibroblasts are the primary source for matrix metalloproteinases (MMPs) in normal skin milieu.
AIM: This study was conducted to characterize hyper-sensitization of wound bed fibroblasts in chronic nickel-workers contact dermatitis.
METHOD: We established a survey based on fibroblasts explanted from 3 skin biopsies of nickel workers with clinically confirmed chronic ACD wounds and 3 normal tissue biopsies as controls. We employed simultaneous assessments of proliferation patterns using MTT test and gelatinase (MMP-2) zymography in synchronized conditioned media.

RESULTS: Mean MTT and zymography results for ACD fibroblasts was significantly higher than normal cell strains as assessed by time-course and activity per cell fashions ($p<0.05$). MMP-2 over-expression in ACD fibroblasts was showed to be independent of cell number. CONCLUSIONS: Our results suggest that the occupational nickel sensitization might be characterized by higher fibroblast proliferation capacity and over-expression of MMP-2. The selective induction of mitogenic or antifibrogenic signals might contribute to the development of chronic inflammatory dermatitis in contact hypersensitivity. However, more studies are required to examine MMPs inhibition and expression of cytokines in ACD wound beds.

EVALUATION OF ALLERGIC TESTS USING FLATBED SCANNERS

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To diagnose occupational allergic dermatitis and eczema, allergic patch test evaluation is needed. First in Russia experience of using store-and-forward teledermatology in the clinic of occupational dermatology demonstrated the need for technology of distant evaluation of patch tests, basing on still images, transferred via email. The prototype of such technology was developed.

Patch tests with occupational allergens were performed on the forearms of 15 patients, totally 144 allergens were applied using FinnChambers by Epitest Oy, Finland. The digital images of patch tests were captured using flatbed scanners and then evaluated, to determine the skin erythema levels for different test results.

The H parameter (Hue) in HSV color system (Hue, Saturation, Value) was measured using Adobe PhotoShop software. The differences between H for clear skin (17.1 ± 3.4) and all positive tests (from 5.8 ± 2.3 for slightly positive to 0.3 ± 2.3 for highly positive tests) were statistically significant ($p<0.001$).

Conclusions: 1) office flatbed scanner and proper software can be used to measure erythema level of skin patch tests on forearms, that is important not only for occupational dermatology, but also e.g. for tuberculin test evaluation 2) the images can be evaluated not only locally, but also by distant consultant in telemedical systems.

COMPARISON BETWEEN TWO DIFFERENT SKIN IRRITATION MODELS

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Aims: the purpose of the study was to compare two different tests, which represent compromised skin models, for the evaluation of chronic skin irritation.

Methods: an arm immersion model, consisting of a 30 min immersion of forearm skin in an aqueous solution of sodium lauryl sulphate (SLS) 0.5%, and a short term (30 min) application of patch test with SLS 5% on the controlateral forearm, were repeated once a day for 5 consecutive days on 11 subjects. Instruments: EP-1 evaporimeter, a CM-820 corneometer, a Minolta CR-200 colorimeter and a 20 MHz B-scanner (Dermascan C) equipped with a programme for image analysis (Dermavision 2D).

Results: The immersion model produced a slight chronic irritation, inducing a visible increase in hydration, whereas the occlusion model caused a stronger chronic irritation inducing dehydration and dermal edema.

Conclusion: occlusive and repeated applications of patch tests with 5% SLS appear to be the simpler and better model both for assessing skin irritation.

EVALUATION OF THE EFFECTS OF A MOISTURIZER ON CHRONICALLY IRRITATED SKIN

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Aims: the purpose of the study was to evaluate the efficacy of a skin care product in protecting the skin from chronic irritation.

Methods: the repeated arm immersion test with an aqueous solution of sodium lauryl sulphate (SLS) 0.5%, which reproduce a slight chronic irritation, and the repeated occlusion test with SLS 5%, which induces a strong chronic irritation, were performed on the volar forearms of 11 subjects for 5 days consecutively. Three different areas on each forearm were identified representing the “control site", the "pre-treated site", where a 30 min occlusion with the tested skin care product preceded the exposure to SLS, and the "post-treated site", where the skin care product application followed the irritation tests. Instruments: EP-1 evaporimeter, CM-820 corneometer, Minolta CR-200 colorimeter and 20 MHz B-scanner (Dermascan C) equipped with a programme for image analysis (Dermavision 2D).

Results: The effects of the application of skin care products in reducing the irritation-induced skin damage were observable only when a stronger irritation, by patch test application, was caused.

OCCUPATIONAL ALLERGIC CONTACT DERMATITIS FROM NITROMETHANE

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The chemical nitromethane, CH3NO2, has wide industrial and commercial application as a polar solvent for adhesives and acrylics as well as explosive fuel. Among other products, it is the primary ingredient of a commercially available solvent used by an automobile parts manufacturer. Allergic contact dermatitis (ACD) to this chemical has not been previously described. We report four cases of allergic contact hand dermatitis in female co-workers at this automobile parts manufacturer who similarly handled the adhesive solvent containing nitromethane while performing their factory line duties. All four cases were confirmed by patch testing and resolved after allergen avoidance. Control patch tests were negative. Our report emphasizes the need for protective measures, especially gloves, among employees in the industrial workplace and others who are exposed to nitromethane.

CUTANEOUS COMPLAINTS & EXPOSURE FACTORS IN DENTAL STUDENTS

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Dental workers have exposure to many irritants and allergens including latex. Following an initial study of latex sensitivity and skin complaints in 3rd and 4th year dental students using powdered latex gloves, a change to non powdered low latex gloves was made. A second study was conducted to determine the impact of the glove changes.

In the 1995 study, 75 3rd and 4th year students were seen with a prevalence of latex sensitivity of 9%. In the 2000 study, 57 were seen and none demonstrated latex sensitivity. There was a significant reduction in complaints of pruritis between the two studies (21% vs 4%), however, there was no significant change in complaints of rash with 20% in 1995 compared with 12% in 2000. Aside from change in glove provided, there was little significant change in other skin exposure characteristics.

Logistic regression analysis was performed to examine risk factors for the occurrence of hand dermatitis. The key factors associated with present skin rash were a past history of eczema and sweating when wearing gloves. Other factors identified were glutaraldehyde exposure, positive prick test to common allergens and the use of glove liners.

While a reduction in latex sensitization was achieved with the introduction of non powdered low latex gloves, little else in dermal exposures or skin care changed resulting in continuing dermatitis complaints in dental students.

FREQUENCY AND ETIOLOGY OF HAND AND FOREARM DERMATOSES AMONG VETERINARIANS

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Background: Veterinarians are exposed to a range of skin irritants and allergens yet few studies have addressed the occurrence of dermatoses among veterinarians.
Objectives: The goals of this study were to determine the frequency of non-infectious hand and forearm dermatoses among Kansas veterinarians; to estimate the role of occupational exposures in the aggravation of such dermatoses; to determine the frequency and nature of infectious dermatoses among veterinarians; and to investigate patterns of glove use.
Methods: A questionnaire was mailed to all members of the Kansas Veterinary Medical Association.
Results: The response rate was 60%. 24% of respondents reported non-infectious, recurrent/persistent hand or forearm dermatoses; 66% were work-related. Large animal veterinarians (p=0.026) and atopics (p=0.009) were more likely than their counterparts to attribute their dermatoses to work-related factors. 38% of respondents had contracted at least one infectious skin disease from an animal. Veterinarians who never or rarely use gloves during obstetric procedures were more likely to report work-related dermatoses (odds ratio= 4.25, 1.78<OR<10.07; p<0.001) than those who use gloves.
Conclusion: Veterinarians are frequently affected by infectious and non-infectious dermatoses. Improvement of barrier protection habits during obstetric procedures would likely reduce the frequency of occupational dermatoses among veterinarians.

ACD TO GLUTARALDEHYDE AND FORMALDEHYDE IN DENTAL PERSONNEL

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We previously reported an increased incidence of ACD to glutaraldehyde (GL) among health-care workers (HCW: 17.6%) compared to non-health care workers (NHCW: 1.9%) over a recent 5-year period. GL reactive HCW were more likely allergic to formaldehyde (FO; p<0.001), suggesting co-reactivity. All dental personnel evaluated were GL reactive. The current study evaluated a cohort of dental hygienists/assistants (DH/DA) compared to health non-dental professionals, with or without skin disease, to determine: 1) The incidence of ACD to GL and FO in the two groups; 2) Co-reactivity between GL and FO; and 3) The instructions given dental personnel in the proper handling of sterilizing solutions.

101 dental health care workers and 51 non-health-care workers have been enrolled. All except one volunteer are women, with a mean of 34 (±11)years of age in the dental population and 34(±11) years of age of those in the non-dental population. A mean employment of 11(±9) years was found in the dental population. 48 (47%) dental professionals had a known exposure to cold sterilizing solutions, while the remainder were unable to provide a known exposure history. 9 (8.9%) dental professionals were clearly GL reactive, while 0 were reactive to FO. 1 (2%) non-dental professional was GL reactive, and 1 (2%) was reactive to FO.

The results of our data suggest a statistically significant disparity in the likelihood of GL sensitivity between dental and non-dental professionals (8.9% vs. 2%, respectively; p<.001) We found no significant evidence of cross-reactivity between GL and FO, with the number of patients reacting to both allergens insufficient for statistical analysis. Finally, the preponderance of

reactions among the DH/DA suggests their present safety practices are an ineffective method of protection against sterilizing solution exposures.

HAND DERMATITIS IN A TERTIARY CARE CENTER

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Hand dermatitis is a very challenging problem that has tremendous psychosocial and economic impact.

Objective: To assess trends in hand dermatitis at our institution.

Methods: We reviewed 134 case histories of hand dermatitis among our 691 patients who were patch tested between April 2000 and May 2001.

Results: Of these cases, 54.5 % were female, 45.5 % male. Average age was 49. 39 % were affected for 1 year or less. Predominant occupations were those in healthcare, followed by laborers, service workers, and machinists/mechanics. Most common final diagnoses were nonspecific hand dermatitis, allergic contact dermatitis, irritant contact dermatitis, and atopic dermatitis. The most commonly positive patch tests were in the following groups: formaldehyde & releasers, other preservatives, fragrance, rubber, nickel, and neomycin/bacitracin. Foot examination was only noted in 48.5 % of the patients. Presence or absence of atopic disease was noted only 51.5 % of the time.

Conclusion: Our clinical data offers interesting information that compares & contrasts with existing literature. It also helps us to identify areas of information deficit, such as foot exam and atopic history, both essential to the evaluation of hand dermatitis.

WORKPLACE AND HEALTH CARE CHARACTERISTICS OF WORKERS WITH POSSIBLE CONTACT DERMATITIS

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Contact dermatitis is a common occupational disease. While there is much known about causative agents and diagnostic methods, there is less information on outcomes, prevention practices in the workplace and health care utilization. To address these gaps, a descriptive study of workers with possible contact dermatitis presenting for patch testing was undertaken. Information was collected at the time of diagnosis, and at 3 and 6 months following the initial assessment.

103 workers (mean age 40, 57% male) were seen at the initial assessment. One third worked in small workplaces. Two thirds reported some health and safety training but less than 1/3 received training regarding skin care. One quarter reported an on-site nurse or physician, and, if present, the majority sought attention for their skin problem from them.

94% of workers saw their family physician and 80% saw a dermatologist. 70% of family physicians and 85% of dermatologists asked about the patient's work but less than 10% asked for detailed exposure information. In addition, 15% of the workers utilized emergency services and 28% walk-in clinics.

Information from the 3 and 6 month visits will further describe the experience of a worker with possible contact dermatitis in the workplace and health care system.

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DERMATITIS IN NURSES AT A MAJOR PUBLIC HOSPITAL IN MELBOURNE

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Over the last 5 years, over 70 nurses attended Dermatology Outpatients at Monash Medical Centre with skin problems. 56 had hand dermatitis and were assessed by the same dermatologist (RN). They were referred by the staff health nurse and only 54.2% had seen a doctor for their skin complaint. 54 were female and 48.5% were atopic.
When clinically indicated, the nurses were extensively patch tested, to the standard series, cosmetic ingredients, antiseptics, rubber series and their own samples appropriately diluted. They were also tested for latex allergy with a screening RAST test. Those with negative RAST tests but with a history suggestive of latex allergy were referred for prick testing.
The primary diagnoses of the 56 were: irritant contact dermatitis 22, latex allergy 15, allergic contact dermatitis 6, endogenous hand eczema 10, other 3. Relevant allergens included rubber accelerators, formalin releasers, lanolin, and surfactants including coconut diethanolamide, which is present in some of the Microshield cleansers which were commonly used.
Nurses working in NICU (Neonatal Intensive Care Unit) were 4 times more likely to be referred with hand dermatitis, although had lower rates of latex allergy and allergic contact dermatitis.
Overall 89.3% had work related hand dermatitis (either significantly or partially aggravated).
There were no cases of ACD not related to work exposures.
The incidence of hand dermatitis over 5 years was calculated to be 43/1000 nurses employed at MMC but 159/1000 for NICU nurses.
Recently Strauss and Gawkrodger (Contact Dermatitis 44:293-6, 2001) reported a similar study of 44 nurses, but found a lower rate of latex allergy and only 18% of cases of ACD to be occupational.

COMBINED EFFECTS OF IRRITANTS AND ALLERGENS

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Effects of combined exposures to irritants and allergens have only been sparsely studied. In the present study the combined effect of an irritant and an allergen was evaluated in a dose-response designed experimental study.
Material and methods: 20 nickel-sensitized subjects were exposed to patch testing with varying concentrations of $NiCl_2$ and SLS alone and in combination. Evaluation of skin reactions was performed by colorimetry, measurement of transepidermal water loss and clinical evaluation.
Results: A synergistic effect of combined exposure to $NiCl_2$ and SLS as compared to each of the substances applied separately as evaluated by colorimetry and clinical scoring was found.
Conclusion: The effect produced by the combined exposure was substantially greater than the effect produced by either of the substances alone. The present results clearly illustrate that elicitation thresholds and concentration limits may be influenced considerably by combined exposure to allergens and irritants.

Abbreviations: NiCl2: nickel chloride, SLS: sodium lauryl sulphate

INTERACTIONS OF IRRITANTS - A NEW APPROACH TO IRRITANT CONTACT DERMATITIS

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In the workplace, the cutaneous exposure to a variety of irritants such as surfactants and solvents is frequent. Although the induction of irritant dermatitis by single irritants has been extensively studied in recent years, our knowledge about the complex mechanisms of a tandem application of different irritants is limited. Using the non-invasive bioengineering methods of measurements of

transepidermal water loss (TEWL) and skin color reflectance, we quantified the irritant effects of single and tandem application of 0.5% sodium lauryl sulfate (SLS) and undiluted toluene (TOL) in vivo. The irritants were applied twice daily for 30 minutes to the volar forearms of 20 volunteers.

Repeated application of SLS and TOL induced an irritant reaction, as indicated by an increase of the TEWL and skin redness. In contrast to SLS/SLS the application of TOL/TOL provided only a moderate increase of the TEWL confirming previous results. Tandem application of SLS/TOL and TOL/SLS induced significantly stronger reactions than those caused by twice daily application of the single irritants.

In a second study, tandem application of sodium lauryl sulfate (SLS) and n-propanol was investigated in 20 human volunteers using non-invasive bioengineering methods such as measurement of transepidermal water loss (TEWL) and chromametry. N-Propanol did not enhance cumulative skin irritation by SLS unlike reported for toluene. As n-propanol is the active ingredient in many desinfectants, this is of particular interest regarding occupational skin irritation in health care workers.

Our results demonstrate that a mixed application of an anionic detergent and an organic solvent has a hyper-additive effect of skin irritation. This interaction is not present for all irritants as shown for SLS and n-propanol. Further results indicate that the TRIT has great potential for the evaluation of skin care products to prevent irritant contact dermatitis.

SKIN SUSCEPTIBILITY TO $NiCl_2$ AFTER MOISTURIZER APPLICATION

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Employees working in wet conditions commonly use moisturizers as protective measures, and the positive effects of moisturizers in this situations is well documented. The aim of the present study was to evaluate whether use of a moisturizer on normal skin can increase skin response to allergens.
Material and methods: Twelve nickel-allergic volunteers applied a lipid-rich moisturizer on the upper arm 3 times daily for 7 days, while the other upper arm served as a control. Following this treatment, patch tests with 1% $NiCl_2$ aqueous solution were applied on each upper arm. After 24 and 72 hours the skin reactions were evaluated blinded by clinical scoring, and by bioengineering methods.
Results: Patch test reactions were increased on the moisturizer-treated arm as evaluated by clinical scoring after 24 hours ($p=0.01$), and by measurement of TEWL ($p=0.04$) and skin thickness ($p=0.006$) after 72 hours. Skin color showed a similar tendency after 72 hours, although not statistically significant ($p=0.06$).
Conclusion: Increased reaction in nickel-allergic subjects to patch testing with $NiCl_2$ on normal skin was found after treatment with a lipid-rich moisturizer, as compared to non-treated skin. The finding implicates that threshold values for elicitation of allergic reactions in already sensitized individuals may be changed by use of moisturizers.

APPLICATION OF IN VITRO TEST METHODS USING MONOLAYER AND THREE DIMENSIONAL CULTURE SYSTEMS TO EVALUATE THE IRRITANCY OF COSMETICS CONSTITUENTS

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Aims : We performed this study to compare several in vitro alternative methods in evaluating the irritancy of cosmetics constituents.

Methods : As a first step, we used monolayer cultures to compare human foreskin kerationcyte with HaCaT cell line. Secondly, we studied the irritancy using two non-commercial three dimensional culture systems, de-epidermized dermis (DED) and living skin equivalent (LSE). MTT assay was used to measure the cytotoxicity after treatment of each substance. Comparison of the results between monolayer and three dimensional cultures were also investigated.
Results :
1. In monolayer cultures, there are relatively good correlation between foreskin keratinocytes and HaCaT cells in irritancy ranking of strong irritants.
2. Much difference were noticed in three dimensional culture systems (DED and LSE), especially in strong irritants.(Concentration : DED ↑>LSE)
3. In irritancy ranking, the correlations between monolayer and three dimensional cultures were relatively good, The concentrations of irritants needed to get ED50 were much higher in three dimensional culture system than in momolayer culture system.
Conclusions : It is suggested that we should be cautious in the expectation of results about the irritancy of cosmetics constituents because the results may be different according to culture models.

WATER SORPTION-DESORPTION TEST AND MOISTURE ACCUMULATION TEST FOR THE FUNCTIONAL ASSESSMENT OF ATOPIC SKIN IN CHILDREN

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Aims: Sorption-desorption (SDT) and moisture accumulation tests (MAT) are simple and quick methods giving information about hydration kinetics of the stratum corneum. The aim of this study was to evaluate the stratum corneum hydration kinetics in the uninvolved and affected skin of children with atopic dermatitis and to compare them to the skin of healthy children.

Methods: 45 children were studied. The dynamic tests were performed employing the corneometer CM820. Numerical parameters were calculated.

Results: With the SDT, a lower water accumulation during the sorption phase and a slower water release during the desorption one was observed for eczematous skin. Whereas, the MAT evidenced an increase in the water accumulation velocity and in the water accumulation in atopic children.

Conclusions: In spite of a lower absorption capability, eczematous skin showed a greater avidity to retain water. New functional parameters (water sorption capacity and accumulated water decay) are proposed to more precisely describe the hydration kinetics of eczematous skin.

THE OPTIMAL POTASSIUM DICHROMATE PATCH.

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Background: A potassium dichromate (PD) patch that detects weak contact allergy is irritant. Standard petrolatum test material includes 0.5% PD and the TRUE Test® (TT) patch 0.025 mg PD/ cm^2. Multicenter investigations indicate equal sensitivity for the tests, questioned in recent studies.

Method: Six TT-strips with eight PD-patches between 0.069 - 0.000032 mg / cm^2 and one Finn Chamber® (FC) patch strip with 0.5% PD were applied on the upper back of 12 individuals, who had earlier tested + - +++ positive to PD. All strips included 2 placebo patches. The test strips were removed at 6, 24, 48, 72 and 96 h.
The sites of the patches were evaluated visually and with Laser Doppler Perfusion Imaging (LDPI) technique 24, 48, 72, 96, 168, 216 and 264 h after the application. The LDPI evaluation of the PD patch test fields was subtracted by the mean reading of two placebo patches.

Results: Nine out of the twelve patients tested positive with TT; four dilution steps in three patients, three steps in two, two steps in one and one in two.

The FC tests were positive in seven, questionable in one and negative in one of the TT positive patients. One patient tested negative with TT and questionable with FC. The two negative patients had weak irritant reactions to the highest TT dose.

Conclusion: The study demonstrates the value of LDPI in patch test standardization, the optimal application and evaluation time. An increased PD patch test dose is proposed for TT and FC.

DISPERSE DYES SENSITIZATION IN A PATCH TEST POPULATION OVER A 5-YEAR PERIOD

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Objective: Our purpose was to evaluate the prevalence of disperse dye sensitization, to further investigate the issue of cross-reactivity, and to characterize azo dye-positive patients.
Methods: From January 1996 to December 2000, 6478 patients undergoing routine patch testing for suspected allergic contact dermatitis were tested with 7 textile dyes: Disperse Blue 124, Disperse Blue 106, Disperse Red 1, Disperse Yellow 3, Disperse Orange 3, para-aminoazobenzene, para-dimethylaminoazobenzene.
Results: 437 patients (6.7%), 278 females and 159 males, proved to be allergic to textile dyes. 37 subjects (8.5%) had a history of atopic eczema. 196 patients reacted to Disperse Blue 106, 193 to Disperse Blue 124, 143 to Disperse Orange 3, 109 to para-aminoazobenzene , 95 to Disperse Yellow 3 , 92 to Disperse Red 1, and 60 to para-dimethylaminoazobenzene.
Conclusions: In our population the most frequent allergens were Disperse Blue 106 and 124. Our results showed an increase in prevalence of disperse dye allergy in Italy.

AISI 316L STAINLESS STEEL EAR PIERCING POST ASSEMBLY DOES NOT CAUSE DERMATITIS IN NICKEL SENSITIVE SUBJECTS.

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Twenty-three female and two male subjects determined to be nickel sensitive by history and diagnostic patch testing, were pierced by AISI 316L stainless steel ear piercing post assemblies (The Ear Piercing Manufacturers of Europe, UK). These ear piercing post assemblies contain nickel between the range of 10% and 14% not released by the material. After being pierced, the subjects were examined on day 7, 14, 30, 42. Seven of the ear piercing post assemblies, at random, collected from the subjects, at the end point of the study, were analyzed for nickel content and release. None of the nickel sensitive patients showed nickel dermatitis during the study. The nickel content of the studs tested were between 11.5%- 12.9% and the nickel release was <0.005 $\mu g/cm^2$/week below detection limit. We concluded that AISI 316L stainless steel ear piercing post assembly does not release sufficient quantities of nickel to cause reactions in subjects already sensitized to nickel.

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CONTACT ALLERGIC LICHENOID ERUPTION TO PALLADIUM AND GOLD

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Lichenoid eruptions to metals manifesting as oral lichen planus have been previously described. We present a case of oral and generalized erosive lichen planus eruption due to palladium.

A 43-year-old white male, foundry metal worker, developed a widespread eruption three weeks after the insertion of a metal prosthesis in his hand for a fusion procedure of his fifth metacarpal joint. The eruption started on the left wrist then spread to involve the torso, extremities and mucous membranes. On exam, he was noted to have generalized lesions of lichen planus, violaceous plaques with ulceration on the arch of the heels, patches and erosions on the penis and perianal area. The buccal mucosa showed white lichenoid plaques adjacent to his amalgams. Patch testing to the standard and metal series read at 96 hours and at 15 days, showed 3+ reaction to palladium, a 2+ reaction to potassium dicyanoaurate and a 2+ reaction to gold sodium thiosulfate. Biopsies of a skin lesion, and the palladium and gold sites showed lichenoid dermatitis. Palladium, but not gold, was found to be a constituent of his dental amalgam.

In conclusion, generalized and erosive lichen planus-like eruptions can be a manifestation of palladium contact allergy. These reactions are delayed and reading of the patch testing should be performed up to 15 day.

PILOT EVALUATION OF A CONVENIENT PATCH TEST PROCEDURE

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Objective: The primary objective of the double blind, randomized, pilot study was to evaluate whether previously-prepared, stored patches are as effective as freshly-prepared patches for detecting contact allergy.

Methods: Two sets of 63 allergens were applied to participants' upper backs. One set was freshly-prepared and the second set was previously-prepared and stored for an average of 6 weeks. Right or left back location for each set was random. Primary outcome measure was concordance, defined as a 1+, 2+, or 3+ reaction on both sides.

Results: In the 71 patients enrolled, there were 170 positive reactions. Concordance was found in 63% of pairs. Of the 25 pairs with complete discordance (negative on one side and 1+, 2+, or 3+ on the other side), there was no statistical difference between the rate of positive reactions for fresh and stored patches.

Conclusions: These results suggest that stored patches may be effective in detecting the majority of allergic contact reactions.

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THE ETIOLOGY OF FOOT DERMATITIS: A FIVE YEAR RETROSPECTIVE STUDY

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The objectives of this retrospective investigation were three-fold: 1) Among patients with dermatitis of the feet, what were the final diagnoses of those with dermatitis only on the feet and those whose foot dermatitis was accompanied by other cutaneous involvement?; 2) Among those determined to have ACD, what were the relevant allergens?; and, 3) Have the allergens in shoes changed in the United States? Of 704 patients patch tested at the University of Kansas Medical Center from 1 July 1996 through 30 June 2001, 70 patients presented with a clinical pattern suspicious for ACD of the foot. Compared to those without foot dermatitis, these patients were more likely to be atopic and male with a bimodal age distribution: <19 and 41 – 60 years. Despite clinical evidence suggesting allergy, only 23 (32.9%) patients had ACD to components of

shoes, while 30 (42.9%) had psoriasis. Among the remaining patients, 4 (5.7%) had a non-shoe allergy, 3 (4.3%) had dyshidrosis, 2 (2.9%) had nummular dermatitis, 2 (2.9%) had tinea pedis, and 1 (1.4%) each had PRP, JPD, atopy, id reaction, and traumatic/frictional dermatitis as their primary diagnosis. One remained undiagnosed. When evaluated by sites of involvement, psoriasis was diagnosed as often as ACD to shoes when the dermatitis was confined to the foot, but was more frequent than ACD when both the hands and feet were involved. With respect to shoe dermatitis, rubber components were the principal allergens, followed by chromated leather and p-tert butylphenol formaldehyde resin. Among the rubber allergens, dithiodimorpholine, 2-mercaptobenthiazole, thiurams and isocyanates were, in descending order, most frequently implicated. Iatrogenic ACD was also common and, among all allergens, bacitracin was the most frequently observed relevant reaction.

THE EFFECT OF RACE AND ETHNICITY ON PATCH TEST RESULTS FROM THE NORTH AMERICAN CONTACT DERMATITIS GROUP 1992-1998.

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Allergic contact dermatitis could be affected by differences in genetic and environmental factors which are informed by race and ethnicity. This study examined the differences in patch test results between white and black individuals tested by the members of the North American Contact Dermatitis Group from July 1, 1992 to June 30, 1998. Of 9,624 patients tested 8610 or 89.5% were white and 1014 or 10.5% were black. The gender distribution of the two sub-populations were similar. Allergic contact dermatitis and irritant contact dermatitis were the final diagnosis assigned by the investigators in similar percentages of the individuals of the two races: 49% and 16%, respectively, for the whites and 46% and 15% for the blacks. In at least one of the three two-year periods testing in whites revealed higher rates of sensitization to formaldehyde, glutaraldehyde and a number of the formaldehyde-releasing preservatives, lanolin, epoxy resin, thioureas, and balsam of Peru. Blacks exhibited higher rates of sensitization to para-phenylene diamine, cobalt chloride, thioureas and p-tert phenol formaldehyde resin in at least one of the two-year period. These differences, while possibly related to genetic factors based on race are more likely related to differences in allergen exposure determined by ethnicity

HISTOPATHOLOGIC FINDINGS ARE NOT GOOD PREDICTORS OF PATCH TEST RESULTS IN REFERRED ECZEMA PATIENTS.

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Objective: Describe histologic features useful in defining allergic contact dermatitis as experienced in daily clinical practice and to determine if these features can serve to predict which patients might benefit from patch testing.

Methods: A retrospective chart review of patients whose referral for treatment resistant eczema included a biopsy of their eruption. Skin biopsies were reviewed in a blind manner by a single dermatopathological utilizing a quantitative histologic grading system according to an IRB approved protocol. Analysis of these results was performed comparing two subgroups: "gold standard" ACD cases and control cases of eczematous dermatitis with negative patch test results.

Results: Thirty-nine cases fulfilled the inclusion criteria of either "gold standard" ACD or eczematic dermatitis with a negative patch test result. Both groups were found to have similar findings with the exception that the "gold standard" ACD cases had increased hyperkeratosis, eosinophils, and eosinophilic spongiosis, as well as notably decreased exocytosis and RBC extraversion.

Conclusions: Although the combination of certain characteristics may be useful in the diagnosis of ACD, such findings are not reliable in predicting patch test results.