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## **Doctoral theses within the realm of contact allergy/contact dermatitis in Sweden**

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During the 20<sup>th</sup> century a doctoral thesis in medicine has undergone a development from a comprehensive monograph, the result of many years of lonely work by an individual scientist, to a collection of papers within a common theme authored by a young research associate, his supervisor, and other co-workers. The time period allowed for this work in Sweden (optimally about 4 years) to the MD PhD exam is nowadays considered, not research, but training in research. As in the old days, the academic title is rewarded after a "disputation" at which the author's work is criticized in public.

Within the speciality of dermatology and venereology research in the area of contact dermatitis started rather late, encouraged by, among other things, the progress in clinical immunology and the development of special units for occupational dermatology. The formation of national research groups for contact dermatitis has further boosted the scientific activity, not the least in the Northern countries. In the following are listed the authors and their theses in the form of ultra-short summaries or after 2008 a link to the pdf-file of the thesis, purely or partly in the area of contact allergy or contact dermatitis, published in Sweden from 1951 and onwards. Thus, the aims embrace aspects of medical history as well as current research. New theses will continuously be added.

### **2017:**

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**Björk, Ann-Kristin (2017): Patch testing with metals with focus on gold**  
[http://portal.research.lu.se/ws/files/21080493/Ann\\_Kristin\\_Bj\\_rk\\_009\\_.pdf](http://portal.research.lu.se/ws/files/21080493/Ann_Kristin_Bj_rk_009_.pdf)

**Antelmi, Annarita (2017): Permanent hair dyes. Exposure, diagnostics, and prevention of contact allergy.**  
[http://portal.research.lu.se/ws/files/21393336/2017.02.02\\_Thesis\\_AA.pdf](http://portal.research.lu.se/ws/files/21393336/2017.02.02_Thesis_AA.pdf)

### **2015:**

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**Yazar, Kerem (2015): Consumers, cosmetics and skin sensitizers**  
[https://publications.ki.se/xmlui/bitstream/handle/10616/42304/Thesis\\_Kerem\\_Yazar.pdf?sequence=3](https://publications.ki.se/xmlui/bitstream/handle/10616/42304/Thesis_Kerem_Yazar.pdf?sequence=3)

### **2014:**

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**Hauksson, Inese (2014): Contact allergy to formaldehyde. Diagnosis and clinical relevance**  
<http://www.lu.se/lup/publication/4436848>

**Mowitz, Martin (2014): Contact allergy to fragrances with a focus on oak moss absolute**

<http://www.lu.se/lup/publication/4646137>

**2013:**

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**Rudbäck, Johanna (2013): Allergenic Oxidation Products from Fragrance Terpenes. Chemical Analysis and Determination of Sensitizing Potency**

[https://gupea.ub.gu.se/bitstream/2077/32865/1/gupea\\_2077\\_32865\\_1.pdf](https://gupea.ub.gu.se/bitstream/2077/32865/1/gupea_2077_32865_1.pdf)

**2012:**

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**Malinauskiene, Laura (2012): Contact allergy to textile dyes – Clinical and experimental studies on disperse azo dyes.**

<http://www.lu.se/lup/publication/3172617>

**2011:**

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**Andersson, Sofia (2011): Contact Sensitizers Induce Keratinocytes to Release Epitopes - Tools for In Vitro Tests and Implications for Autoimmunity**

<http://hdl.handle.net/2077/27868>

**Karlsson, Isabella (2011): Chemical and Dermatological Aspects of UV-absorbing Compounds.**

<http://hdl.handle.net/2077/26665>

**Simonsson, Carl (2011): New insights in contact allergy and drug delivery. A study of formulation effects and hapten targets in skin using two-photon fluorescence microscopy.**

<http://hdl.handle.net/2077/27832>

**2010:**

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**Glas, Bo (2010): Methodological aspects of unspecific building related symptoms research.**

<http://urn.kb.se/resolve?urn=urn:nbn:se:umu:diva-30640>

**Goon, Anthony (2010): Contact allergy to acrylates.** In retrospective studies, the commonest acrylate / methacrylate allergens causing contact allergy in dental personnel & patients, nail acylic users and industrial workers were determined. Screening for 5 selected acrylate / methacrylate allergens in the baseline series revealed 1.4% and 1.0% positive patch test rates in Malmö and Singapore respectively. High-performance liquid chromatography analysis of acrylate / methacrylate patch test preparations from different centres showed that the more volatile allergens, methyl methacrylate and 2-hydroxypropyl acrylate, were below the acceptable range of 80% or more of the stated concentrations. In another study, the concentration of such allergens in IQ chambers decreased much more rapidly than in polypropylene syringes and the decrease in allergen concentration was most rapid in room temperature, followed by refrigerator and freezer.

<http://www.dissertations.se/dissertation/5dfab9e5a9>

**Josefson, Anna (2010): Nickel allergy and hand eczema – epidemiological aspects.**

<http://urn.kb.se/resolve?urn=urn:nbn:se:oru:diva-11855>

**Netterlid, Eva (2010): Adverse Reactions after Vaccination and Allergen-Specific Immunotherapy: Contact Allergy to Aluminium and Itching Nodules.**

<http://www.dissertations.se/dissertation/661c6833c5>

**Samuelsson, Kristin (2010): Isothiocyanates as Skin Sensitizers - Bioactivation and Distribution in Skin and Draining Lymph Nodes**  
<http://hdl.handle.net/2077/23775>

**2009:**

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**Ahlgren, Camilla (2009): Dental gold and contact allergy.**  
<http://dspace.mah.se/handle/2043/8745>

**Allmyr, Mats (2009): On the fate of triclosan in humans.**  
<http://diss.kib.ki.se/2009/978-91-7409-510-4/thesis.pdf>

**Bråred Christensson, Johanna (2009): Clinical and experimental studies on oxidized fragrance terpenes as contact allergens**  
[gupea\\_2077\\_19052\\_1.pdf](http://gupea.ub.gu.se/handle/2077/19052/1)

**Hagvall, Lina (2009): Formation of skin sensitizers from fragrance terpenes via oxidative activation routes.**  
[gupea\\_2077\\_18951\\_1.pdf](http://gupea.ub.gu.se/handle/2077/18951/1)

**Johansson, Staffan (2009): Limonene Hydroperoxides in Allergic Contact Dermatitis. Radical formation, sensitizing capacity and immunogenic complex formation.**  
[https://gupea.ub.gu.se/dspace/bitstream/2077/19693/5/gupea\\_2077\\_19693\\_5.pdf](https://gupea.ub.gu.se/dspace/bitstream/2077/19693/5/gupea_2077_19693_5.pdf)

**Ryberg, Kristina (2009): Contact allergy to textile dyes: clinical and chemical studies on disperse dyes.**  
<http://www.lu.se/o.o.i.s?id=12588&postid=1370577>

**2008:**

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**Ahlfors, Stefan (2008): Molecular mechanisms and complete antigen formation in allergic contact dermatitis.**  
<http://www.lu.se/o.o.i.s?id=12588&postid=1261451>

**Anveden-Bergling, Ingegärd (2008): Exposure to skin irritants : Validation of questions and epidemiological aspects.**  
<http://diss.kib.ki.se/2008/978-91-7357-559-1/thesis.pdf>

**Blanco Romero, Luis E (2008): Dermal exposure determinants : A pesticide exposure assessment approach for developing countries.**  
<http://diss.kib.ki.se/2008/978-91-7409-270-7/thesis.pdf>

**Ekqvist, Susanne (2008): Clinical and experimental studies of contact allergy to stent metals with focus on gold.** A retrospective patch test study on 484 patients given a coronary stent showed a high frequency of contact allergy to gold, particularly in the patients having received a gold-plated stent compared to those with a pure

stainless steel stent. The risk of a coronary restenosis was also increased in patients with gold-plated stents. The B-Au was high in patients with a gold stent; the higher the B-Au, the stronger the patch test reaction. An experimental study on patients with a contact allergy to gold showed that an intentionally increased B-Au induced by topical provocation also increases the strength of the patch test reaction

**Moberg ,Cecilia (2008): Living with eczema : A multidisciplinary approach**  
<http://diss.kib.ki.se/2008/978-91-7409-264-6/thesis.pdf>

**Rauma, Matias (2008): A new technique to assess dermal absorption of chemical vapor in vitro by thermogravimetric analysis (TGA).**  
<http://diss.kib.ki.se/2008/978-91-7409-273-8/thesis.pdf>

**2007:**

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**Andresen Bergström, Moa (2007): Bioactivation of xenobiotics in the skin.**  
[https://gupea.ub.gu.se/dspace/bitstream/2077/17143/1/gupea\\_2077\\_17143\\_1.pdf](https://gupea.ub.gu.se/dspace/bitstream/2077/17143/1/gupea_2077_17143_1.pdf)

**Frick-Engfeldt, Malin (2007): Chemical and clinical studies of isocyanate contact allergy with focus on diphenylmethane diisocyanate.** Insufficient patch test methods to demonstrate contact allergy to isocyanates have led to underreporting and missed cases of occupational dermatoses. Primarily, patch tests with work place products are strongly recommended. In addition, selecting stable markers for test agents and extending the time period to read the test reactions have increased observations of contact allergy to isocyanates.

**2006:**

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**Bergfors, Elisabet (2006): Aspects of pertussis, pertussis vaccination and adverse events associated with aluminium adsorbed vaccines.** This thesis on the effectiveness of pertussis vaccines also describes the incidence, clinical course, and prognosis of persistent itching nodules as well as sensitization to aluminium, consequences of the adjuvant aluminium. In a mass vaccination of children nodules appeared in 1 % and with an average duration of 4 years. Contact allergy to aluminium was demonstrated in 77 % of the tested vaccinees with pruritic nodules.

**Gonzalez, Helena (2006): Studies of sunscreens: Percutaneous absorption of benzophenone-3 and photostability.** Percutaneous absorption and urinary excretion in man of benzophenone-3 (BZ-3) were assayed after topical application of the sunscreen. An average of 0.4 % of the applied amount was demonstrated in the urine, with higher amounts after repeated applications. Exposure to UVR did not influence the excretion. Also the metabolite dihydrobenzophenone could be assayed by the method. The photostability of different sunscreens showed various degrees of degradation and instability.

**Lind, Marie-Louise (2006): Hairdressers – hand eczema, hair dyes and hand protection.** The incidence of hand eczema in a nation-wide retrospective longitudinal cohort study comprising 7,203 female hairdressers was found to be 23.8 cases/1000

person years and 9.6 in a control group. Hand exposure to hair dyes was studied with a new rinse method. Four investigated types of gloves gave good protection to hair dyes.

**Lundgren, Lennart (2006): Large organic aerosols in a human exposure chamber. Applications in occupational dermatology and lung medicine.** A whole-body exposure chamber was constructed for challenges with large organic aerosols, e.g. wheat flour and pinewood dust. Heated mannequins could be used for preparatory tests. In humans, lung exposure to particles was registered by the cellular response in bronchoalveolar lavage fluid. By vacuum sampling the equivalent exposure of the skin to flour and starch particles could be assayed.

**2005:**

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**Aragón, Aurora (2005). Dermal exposure to pesticides in Nicaragua. A qualitative and quantitative approach.** In Nicaragua, contamination of the skin to insecticides occurs frequently in the occupational setting. Organophosphate compounds are responsible for acute pesticide poisonings. 29 subsistence farmers were interviewed. Field data for semiquantitative and quantitative exposure measurements of 31 farmers were collected during 33 pesticide applications. All farmers had quantifiable pesticide residues on their hands. Unsafe practices connected with poverty, inadequacy of personal protective equipment, climatic factors, and limited knowledge influenced by beliefs and traditions were responsible for the high exposure.

**EI-Nour, Husameldin (2005): Study of serotonin, innervation and sensory neuropeptides in allergic contact dermatitis.** Using a murine model for contact allergy (oxazolone) as well as positive patch tests in humans with contact allergy studies were carried out on the pathophysiology of allergic contact dermatitis (ACD). By immunohistochemistry, radioimmunoassay, and other methods the serotonergic system, the peripheral nerve supply, and sensory neuropeptides were found activated in eczematous skin compared to controls. They are thus probably involved in the pathogenesis of ACD of mice and men.

**Nilsson, Anna-Malin (2005): Mechanistic studies on the contact allergenic effect of terpenoid derivatives. Structure activity relationships, synthesis and predictive testing.** The electrophilic properties of organic compounds are considered good predictors for contact allergenic activity. The structure activity relationships and allergenic activity of carvone, an a,b- unsaturated ketone and related terpenoid derivatives were examined.

**Sköld, Maria (2005): Contact allergy to autoxidized terpenes. Chemical characterization, analysis and studies of the contact allergenic activity.** Autoxidation at room temperature of commonly used fragrance terpenes linalool, b - caryophyllene, b -myrcene, and linalyl acetate was investigated with main focus on contact allergenic activity of hydroperoxides. All terpenes studied autoxidized. Two strongly allergenic hydroperoxides formed from linalool, none was detected from b - caryophyllene. Linalyl acetate oxidized similarly to linalool. b -myrcene rapidly polymerized and the allergenic activity increased.

## 2004:

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**Kuzniza, Nathalia (2004): Biophysical aspects of contact dermatitis and its prevention.** Non-invasive methods such as transepidermal water loss and electrical impedance measurements were used to study irritant and allergic contact skin reactions and the effect on such reactions from pretreatment with moisturizing creams and sodium lauryl sulphate .

## 2003:

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**Pontén, Ann (2003): Contact allergy to epoxy resins of the bisphenol F-type.** Epoxy resins based on bisphenol A, in particular DGEBA, can cause occupational contact allergy. From bisphenol F resins different isomers were isolated by HPLC and TLC and positive patch test reactions were observed in epoxyallergic patients. The sensitizing capacity of bisphenol A and F isomers was determined in the guinea pig and in man, and cross-reaction patterns were established. An outbreak of allergic contact dermatitis among workers in a wind turbine rotor blade plant was traced to contact with epoxy resins.

## 2002:

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**Bodin, Anna (2002): Contact allergy and irritation from autooxidized ethoxylated non-ionic surfactants.** Ethoxylated non-ionic surfactants are ingredients in many cosmetics and major components of household and industrial cleaners. Primary and secondary oxidation products of ethoxylated surfactants were analysed and synthesised and their irritant and allergenic properties investigated. Previously unknown allergenic oxidation products were investigated and defined.

**Nyrén, Miruna (2002): Skin sensitivity testing: a biophysical approach.** Irritant skin reactions to sodium lauryl sulphate, allergic reactions to nickel, tuberculin reactions and prick test reactions to histamine and different allergens were evaluated visually and with the bioengineering techniques: electrical impedance, transepidermal water loss, electric capacitance and laser Doppler flowmetry.

## 2000:

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**Isaksson, Marlène (2000): Clinical and experimental studies in corticosteroid contact allergy.** Topical corticosteroids can be sensitizing but are also anti-inflammatory and anti-proliferative. Therefore, the dose-response relationship at patch testing in allergic patients was paradoxical with some agents, showing negative reactions to high concentrations but positive reactions to low. Positive patch test reactions are often late and therefore also require a late reading. Although corticosteroids in petrolatum and ethanol are stable, mixtures for patch testing often

do not work. Flare-up reactions to budesonide of a distant dermatitis occurred even after inhalation.

**Surakka, Jouni (2000): Dermal exposure to UV-radiation and UV-curable acrylate coatings in the wood working industry.** UV-radiation and UV curable acrylate coatings involve occupational hazards in wood working industry. UV radiation was measured and hazardous levels calculated. Skin exposure to acrylates was evaluated using tape stripping as a method to collect samples from skin and environment. The protection of working clothes to acrylates was estimated.

**Wahlkvist, Helen (2000): Predictive testing for contact allergy: comparison of some guinea pig and mouse protocols including dose-response designs.** The study evaluates methods used to predict potency of contact allergens. Three guinea pig test methods, a modified mouse ear-swelling test (MEST) and the murine local lymph node assay (LLNA) were investigated using multi dose response induction protocols. In conclusion MEST and LLNA have advantages of speed, labour intensity and cost compared to the guinea pig tests, but are not capable to replace them.

**Zimerson, Erik (2000): Contact allergens in p-tertbutylphenol- formaldehyde resin.** Chemical separation methods were used to isolate fractions and pure substances from PTBP-F-R which then were patch tested in patients with a contact allergy to PTBP-F-R. The sensitizing capacities and cross-reaction patterns of isolated substances were investigated using the guinea pig maximization test. Several new allergens were found among monomers, dimers and trimers.

**1999:**

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**Bjarnasson, Bolli (1999): Laser Doppler imaging of patch tests. A methodological and comparative study with visual assessments.** With serial dilutions of five different allergens patch test reactions were elicited in sensitive individuals. Laser Doppler perfusion imaging technique was used to quantify the test reactions. Dynamics of the reactions were followed for two weeks.

**Grängsjö, Anders (1999): Epidermal keratinocytes studied by X-ray microanalysis, with special reference to contact dermatitis: In vivo and in vitro studies of functional changes in human cells.** Intracellular elemental content of sodium, magnesium, phosphorus, sulphur, chloride, potassium and calcium was determined with X-ray microanalysis. Changes can be indicative of proliferation, cell membrane damage or cell death of human epidermal keratinocytes. Following the application of sodium lauryl sulphate and non-anoic acid, monoclonal antibody Ki67 and reverse transcriptase-polymerase chain reaction were used to determine the cytokine profile.

**1998:**

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**Bergh, Margareta (1998): Allergenic oxidation products in ethoxylated non-ionic surfactants.** Ethoxylated non-ionic surfactants are ingredients in many cosmetics and major components of household and industrial cleaners. They are

known to cause skin irritation and cases of allergic contact dermatitis have been reported. Oxidized compounds from ethoxylated non-ionic surfactants were identified and proved to be sensitizers.

**Hindsén, Monica (1998): Clinical and experimental studies in nickel allergy.**

Females with a contact allergy to nickel had a large variability over time, inter- and intraindividual, in clinical reactivity. Sites of a previous contact dermatitis showed an increased reactivity at patch testing with the allergen while this was decreased at the site of a previous irritant (SLS) dermatitis. Flare-up reactions after oral challenge with nickel were found to be correlated to nickel dose, intensity of a previous eczema, and time after the eczema.

**Lundeberg (Bondesson), Lena (1998): Interaction between the nervous and immune systems in allergic contact dermatitis. (A clinical and experimental study with emphasis on the role of VIP and serotonin).**

The interaction between the nervous and immune systems was investigated in allergic contact dermatitis (ACD) with emphasis on the role of vasoactive intestinal peptide (VIP) and serotonin (5-HT). Dose-dependent effects of VIP on the migration of mononuclear and polymorphonuclear leukocytes were found. Serotonin and the serotonin antagonists ketanserin, methiotepin and tropisteron had an inhibitory effect on the migration of mononuclear leukocytes. VIP and serotonin may play a pathophysiological role in ACD, and both VIP and ketanserin may have therapeutic potential.

**1997:**

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**Färm, Gunilla (1997): Contact allergy to colophony. Clinical and experimental studies with emphasis on clinical relevance.**

An investigation to elucidate the clinical relevance of contact allergy to colophony. Healthy subjects exposed to colophony and colophony-sensitized subjects were interviewed, clinically examined and patch tested. Repeated open application tests performed in colophony-allergic humans add valuable information to an ordinary patch test. Contact allergy to colophony is of clinical relevance when the skin is exposed to colophony under occlusion. Exposure to colophony is of minor significance for hand eczema in colophony-sensitive subjects.

**Gruvberger, Birgitta (1997): Methylisothiazolinones. Diagnosis and prevention of allergic contact dermatitis.**

Preservatives are widely used in water-based products and may be responsible for product hypersensitivity. By chemical analysis three sensitizers were isolated from the preservative Kathon CG. The sensitizing capacity was demonstrated by guinea pig maximization test and clinically by patch testing, particularly in a plant where workers had contact with these chemicals. Also prevention of chemical burns was introduced.

**1994:**

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**Gäfvert, Elisabeth (1994): Allergenic components in modified and unmodified rosin.**

A new major contact allergen, 13,14(b)-epoxyabietic acid, was identified in rosin. Rosin was modified with different methods and the major products of

modification were animal tested for sensitising capacity. Maleopimaric acid and glyceryl-l-monoabietate were found to be sensitizers.

**Mikulowska, Anna (1994): The human Langerhans cell in irritant contact dermatitis.** Skin biopsies from irritant contact dermatitis induced by SLS were studied by electron and fluorescence (after incubation with L-dopa) microscopy. The spectrum of reactive changes in the LC system is described including redistribution and decrease of the LC in epidermis and a concomitant increase in dermis. Subpopulations of LC of different functions may be observed in normal epidermis. Reactive changes in the LC system may actually be induced by occlusion with water.

**Nylander-French, Leena (1994): Identification of risk to workers in the ultraviolet radiation curing wood surface coating industry.** Occupational risks associated with UVcuring acrylates in wood surface coating industry were mapped. Irritant contact dermatitis was frequent whereas contact allergy to acrylates was rare.

**Stenberg, Berndt (1994): Office illness. The worker, the work and the workplace.** Workers complaining of the Sick building syndrome (SBS) may show signs of seborrhoeic dermatitis, erythematous facial skin conditions, and itching conditions on the trunk. Those working at visual display terminals often have similar complaints. Possible risk factors, such as females, lower age, and atopics, were elucidated. The association between air quality and the occurrence of SBS symptoms was demonstrated. As a consequence, "Indoor air syndrome" should replace the SBS denomination.

#### **1993:**

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**Wrangsjö, Karin (1993): IgE-mediated latex allergy and contact allergy to rubber are common in clinical occupational dermatology.** Glove-provoked contact urticaria is the dominating symptom in IgE-mediated latex allergy. RAST to latex antigens, skin prick test and patch tests to rubber chemicals were used in studies of health care personnel with skin problems. The findings gave a review of occupational patients with different types of rubber allergy. Severity of symptoms strongly indicates the need of preventive measures.

#### **1991:**

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**Mellström, Gunh (1991): Protective gloves of polymeric materials.** Protective gloves are used to diminish risks when handling hazardous chemicals and infective materials. Different in vivo and in vitro methods to evaluate permeation through glove material were compared. The destructive effects on glove materials from solvents and disinfectants and their influence on the resistance to chemicals were studied in vitro. Contact urticaria was verified in 40% of patients with rubber glove intolerance.

## 1990:

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**Meding, Birgitta (1990): Epidemiology of hand eczema in an industrial city.**

20000 randomly selected individuals, age 20-65, from Gothenburg were questioned about hand eczema. The 1-year period prevalence was estimated to be about 11% and point prevalence 5.4%. The most common type of hand eczema was the irritant followed by the atopic and the allergic ones. Service workers were the only occupational group with significantly increased prevalence of hand eczema.

**Warfvinge, Gunnar (1990): Experimental oral contact hypersensitivity.** Oral contact allergy was studied in a rat model by light microscopy, immunocytochemistry, electron microscopy, autoradiography, and an in vitro binding assay. The early infiltrate in allergic contact stomatitis consisted of memory T cells, mainly of the helper phenotype, and monocytes/dendritic cells. The contact allergen DNFB was demonstrated in dendritic cells 6-60 min after topical application. Most metal salts, with the exception of mercury, showed a low antigenic potential.

## 1989:

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**Berg, Mats (1989): Facial skin complaints and work at visual display units.** Skin disease reputedly caused by visual display units (VDUs), has been a considerable problem in Sweden. Complaining patients and controls were investigated by means of epidemiological, clinical and histopathological methods. Rosacea and migraine were common signs thought to be related to work at VDUs. No characteristic histologic finding was found in facial skin and the occurrence of skin symptoms was fortuitous from an epidemiological standpoint.

**Boman, Anders (1989): Factors influencing the percutaneous absorption of organic solvents. An experimental study in guinea pig.** The percutaneous absorption of butanol, toluene and 1,1,1-trichloroethane was studied in vivo in the guinea pig. Blood concentrations were determined after acute and subacute mechanical and chemical injuries. The effect of barrier creams against solvents was poor whereas gloves made from polymeric materials gave acceptable protection.

**Svensson, Åke (1989): Diagnosis of atopic skin disease based on clinical criteria.** A selection of laboratory and clinical signs and symptoms in patients with atopic dermatitis were evaluated and used to create a diagnostic score system. This was found useful in patients with suspected atopic skin disease but lacking a classical picture. The role of an atopic background and a contact allergy was evaluated in patients with metal sensitivity, eyelid dermatitis, gluteofemoral eczema and juvenile plantar dermatosis. With this diagnostic method, half of the patients with long-standing hand dermatitis were found to be atopic.

## 1988:

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**Edman, Björn (1988): Computerized patch test data in contact allergy.** A data base (DALUK) was built with the purpose of collecting results from a skin test laboratory, viz. clinical data in a patient file, sensitizers in a product file, and positive

patch tests. The product file was used as an information source in the secondary prophylaxis of the allergic patients. Statistical calculations of the data from 3500 patients showed trends in the development of contact allergy over time but also correlations between contact allergens and skin areas involved as well as between contact allergens and demographic factors.

**Emtestam, Lennart (1988): Studies on epidermal Langerhans cells and on HLA factors in nickel sensitivity.** The number of Langerhans cells was investigated after provocation with SLS. Specificity of cellular immune reactions to nickel was analysed using monoclonal antibodies and nickel specific lymphocytes. Findings suggested an association between the HLA-DQ locus and nickel sensitivity.

**Karlberg, Ann-Therése (1988): Contact allergy to colophony.** Tall oil rosin and different types of gum rosin were tested in guinea pig and man. Test concentration of 10% in petrolatum was found adequate. Fractions of gum rosin were isolated and tested. Abietic acid was not an allergen whereas a number of oxidation products were. 15-hydroperoxyabietic acid was identified as one of the main allergens.

**Lidén, Carola (1988): Occupational dermatoses from photographic chemicals.** Investigation of the occurrence and causes of occupational dermatoses at film laboratories. Three film developers and one persulphate bleach accelerator were investigated and verified as allergens. The clinical picture with lichenoid reactions and the cause of occupational skin disease among the staff in two film laboratories were analysed in detail.

**Sjövall, Peter (1988): Ultraviolet radiation and allergic contact dermatitis. An experimental and clinical study.** An allergic contact dermatitis induced in mice with picryl chloride is attenuated by a previous UVB exposure if the animals are exposed to UVB before induction. This might be explained by the fact that the number of epidermal Langerhans cells is diminished by UVB. UVB also reduced nickel dermatitis in exposed as well as non-exposed human skin. UVA exposure did not affect the allergic reaction in spite of a reduced number of LC in irradiated skin. Local treatment of hand dermatitis with UVB was beneficial and this effect was strengthened by additional whole-body exposure.

## **1986:**

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**Bjellerup, Mats (1986): Tetracycline phototoxicity. An experimental and clinical study.** Tetracycline phototoxicity was investigated with two in vitro systems (photohemolysis, fibroblast inhibition) and experimentally in man (systemic provocation and UVA exposure). Clear differences in phototoxic capacity between the tetracyclines were observed as well as a good correlation between the in vitro and in vivo models. By a mouse in vivo technique, a UVB photoaugmentation of the tetracycline reaction was studied and verified.

**Nilsson, Eskil (1986): Individual and environmental risk factors for hand eczema in hospital workers.** The risk of developing hand eczema was prospectively studied in hospital workers. Wet work was more harmful than dry office work; other

risk factors were nursing small children, the lack of a dish-washing machine, a history of metal dermatitis, and – to a high degree – a history of atopic dermatitis. A combination of risk factors further increased the poor prognosis. Colonization of eczematous lesions with *S. aureus* was frequent but also reduced by a successful treatment with a potent corticosteroid.

## 1985:

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**Anderson, Christopher (1985): The effect of selected immunomodulating agents on experimental contact reactions.** An experimental guinea pig study on the morphological effect of cyclophosphamide, methotrexate, azathioprine, and cyclosporin A on allergic and irritant contact dermatitis. These latter were induced with oxazolone and croton oil, respectively. In principal, the immunomodulating agents increased the macro- and microscopic reactions if given before sensitization but decreased the responses if given before elicitation.

**Bruze, Magnus (1985): Contact sensitizers in resins based on phenol and formaldehyde.** Occupational and nonoccupational dermatitis have been reported due to contact with resins based on phenol and formaldehyde. Patch testing with traditional paratertiary butyl phenol was supplemented with a resol resin, P-F-R-2. Hereby, new sensitizers were discovered and established and further investigated by guinea pig maximization test. The latter was modified in order to increase standardization, enable a blind evaluation, and also statistical comparisons between test animals and appropriate controls.

**Rystedt, Ingela (1985): Hand eczema and long-term prognosis in atopic dermatitis.** A 24-year follow up study on 955 individuals treated as in-patients or out-patients for atopic eczema, respiratory allergy or without atopic manifestations, a control group. Current severity and localisation of dermatitis, present work. The role of contact allergy, present activity, occupational and personal exposure to skin damage as background of eczema were calculated.

## 1984:

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**Björkner, Bert (1984): Sensitizing capacity of ultraviolet curable acrylic compounds.** The occurrence of contact dermatitis among workers in printing plants initiated a study on the chemical composition and allergenic potential of UV-curable acrylic compounds. These contain a reactive base prepolymer, a diluent system of multifunctional acrylic esters and a photoinitiator system. Compounds were analyzed by HPLC and potential allergens studied by GPMT. Specific allergens in the workplaces were demonstrated by patch testing.

**Sjöborg, Steinar (1984): New aspects on epidermal cells with special reference to Langerhans cells in contact dermatitis.** Human epidermis was studied by the electron and the fluorescence microscope with novel findings of Langerhans cell morphology. These cells showed several signs of an augmented activity in allergic contact dermatitis. This was also evident in healed positive patch tests after oral

provocation with the allergen. In irritant contact dermatitis on the other hand, the cellular activity of the LC system was depressed.

**1982:**

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**Lindberg, Magnus (1982): Studies on the cellular and subcellular reactions in epidermis at irritant and allergic dermatitis.** Transmission electron microscopy in combination with energy dispersive X-ray microanalysis was used to determine cellular and subcellular reactions of keratinisation at allergic and irritant contact dermatitis. Cellular content of phosphorous, potassium, magnesium, calcium, sodium chloride and sulphur was more or less changed.

**1981:**

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**Christensen, Ole B. (1981): Nickel allergy and hand eczema in females.** A clinical and pathogenetic study with special reference to the importance of ingested nickel. The most frequent contact allergen in females is nickel and the allergy is often correlated to a chronic hand eczema. The clinical type is mainly a symmetric, vesicular eruption in the palms (pompholyx) and the prognosis poor. Ingested nickel activates the hand eczema and therefore, high nickel contents in the food may be responsible for flares of hand eczema and other secondary eruptions.

**Skoog, Marja-Leena (1981): The cellular infiltrate in experimental contact dermatitis.** The inflammatory infiltrate in upper corium of guinea pigs was studied by light microscopy in allergic and irritant contact dermatitis. An increase of mononuclear and basophil polymorphonuclear cells was found after elicitation of contact allergy to DNCB, comparing it to the morphology of an irritant dermatitis induced with the same chemical. The modifying effects of cyclophosphamide and prednisolone on the cellular infiltrate in allergic and irritant contact dermatitis were recorded.

**1978:**

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**Ljunggren, Bo (1978): Drug phototoxicity. An experimental study on phototoxic inflammation with special reference to phenothiazines.** A quantitative in vivo method based on the increased water content of the mouse tail was developed and found effective for the study of systemic phototoxicity of several drugs. The molecular requirement for phototoxic activity of chlorpromazine and related drugs was elucidated as well as the potency of metabolites and the pathogenetic importance of photoproducts.

**1977:**

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**Thorgeirsson, Arnar (1977): Sensitization capacity of epoxy resin compounds.** Epoxy compounds were studied by the guinea pig maximization technique. Pure oligomers, obtained by gel permeation chromatography, showed a sensitization potential decreasing with the increase of molecular weight. Strong sensitizers were

also found among hardeners and reactive diluents. Humans with a contact allergy to epoxy resins reacted at patch testing only to the oligomer of lowest molecular weight (MW 340) which therefore should be eliminated from industrial environments.

#### **1974:**

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**Mobacken, Håkan (1974): Irritant cutaneous effects of "gentian violet".** Gentian violet and other triphenylmethane dyes are traditional topical remedies because of their antibacterial and antifungal effects in spite of infrequent irritant reactions. Necrotic reactions could be reproduced by painting crystal violet on stripped but not unstripped skin in the guinea pig as well as in man. In the rat, healing of incisional wounds was retarded because of a delayed onset of fibroplasia. The trimethylmethane dyes were cytotoxic in tissue culture.

#### **1969:**

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**Agrup, Gun (1969): Hand eczema and other hand dermatoses in south Sweden.** An epidemiological and clinical study on patients with hand eczema. In particular, the following aspects were dealt with: prevalence, occupation, clinical pattern and contact allergy as well as consequences on work capability and influence of different therapeutic interventions.

#### **1968:**

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**Björnberg, Alf (1968): Skin reactions to primary irritants in patients with hand eczema.** An investigation with matched controls. An experimental study on the sensitivity to primary irritants in non-atopic patients with hand eczema. Patients and controls were exposed by patch testing to known irritants. No constitutional increased sensitivity in eczema patients was observed and preemployment tests were not found to be advisable. A general, increased sensitivity to irritants was, however, demonstrated in patients with an active hand eczema, not though after healing.

#### **1967:**

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**Lidén, Sture (1967): The mononuclear infiltrate in allergic contact dermatitis.** The mononuclear cell infiltrate of contact dermatitis was investigated in guinea pigs sensitised to 2,4-dinitrochlorobenzene. Cells were labelled with tritiated thymidine and traced to the skin and lymph nodes. The thesis describes the pattern of cell accumulation at different periods of time after sensitisation.

#### **1966:**

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**Wahlberg, Jan E (1966): Percutaneous absorption of metal compounds.** Solutions of different metal salts were applied to guinea pig skin. Percutaneous toxicity was evaluated counting the number of dead animals after three weeks

exposure. Intraperitoneal injection of the same salts served as control and caused death within minutes from mercury and chromium salts (exception chromium trichloride) whereas cadmium, cobalt, zinc and mercury were less toxic. These results parallel the percutaneous toxicity results.

**1964:**

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**Groth, Ove (1964): Lymphoid cells in allergic contact dermatitis in guinea-pigs.** Contact dermatitis was induced in guinea pigs by DNCB for allergic and by croton oil for irritant reactions. A vigorous epidermal response with lymphoid cells was recorded in contact allergy reactions while it was weak in irritant reactions even if a macroscopic dermatitis was evident. Light microscopy and tritiated thymidin labelling were used when following the lymphoid invasion in epidermis during passive sensitization through intraperitoneal injection.

**1962:**

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**Fernström, Åke (1962): Procaine allergy with reference to urticaria following procaine penicillin therapy.** Patients with urticaria following treatment with penicillin, mostly as procaine penicillin G, underwent an allergologic study with the two components including a pressure patch test, a scratch test, and an intracutaneous test as well as a systemic provocation with penicillin G followed by thrombocyte counting. There was a high frequency of delayed type test reactions, the majority reasonably due to the procaine penicillin G therapy; a previous sensitization to procaine or related chemicals could, however, not be excluded.

**Wikström, Kjell (1962): Epidermal treatment of guinea pigs with potassium bichromate.** Potassium bichromate (PB) had no primary irritant effect on guinea pig skin, nor had a non-ionic surface-active agent, La8Et. A local dermatitis was, however, induced by repeated exposure to PB, and it appeared earlier if PB was mixed with La8Et. After such dermatitis an increased skin reactivity to chromium was observed. The increased sensitivity to chromium with a shortened latency time is actually an expression of hypersensitivity.

**1956:**

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**Skog, Erik (1956): Experimental studies on hypersensitivity to 2,4-dinitrochlorobenzene and tuberculin in animals.** Passive transfer of hypersensitivity to DNCB and tuberculin in guinea pigs was successfully conducted by intraperitoneal injection of cells from spleen, thymus, intraperitoneal exudate and lymph. With tuberculin allergy, the transfer also worked by intracutaneous injection. Persistence of hypersensitivity was usually shortlived. Hemolyzed cells had lost their capacity of passive transfer.

1951:

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**Holmqvist, Ivar (1951): Occupational arsenical dermatitis. A study among employees at a copper ore smelting work including investigations of skin reactions to contact with arsenic compounds.** Different clinical types of arsenical dermatitis were described; they were mainly acute and localized to the most exposed areas. Patch testing disclosed arsenic trioxide to be the principal sensitizer in crude arsenic. Contact sensitization by patch testing was demonstrated as well as cross sensitization between chemicals of different valency. Avoidance of exposure was more important than topical remedies but also hardening contributed to healing.