the Patch Tester

Contact Dermatitis | Haptens | Patch Testing

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THE GOLD ISSUE

"The Patch Tester" is a quarterly e-magazine from Chemotechnique to the Patch Testers of the world.

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PURPOSE

The Patch Tester is an e-mag developed by Chemotechnique to serve as an information resource for all Patch Testers and other Dermatologists around the world; not just in Sweden, or Europe, or America, but wherever the English language can be read and understood. This twentyfirst issue comprises 46 pages with various different topics and features. Ultimately, we plan for The Patch Tester to become the forum for all of us to communicate and cooperate, in all directions.

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Pre and Post-Implant Patch Testing

*Based on the article "*Acrylates and Methacrylates Sensitisation in Patients with Orthopaedic and Dental Prostheses: Asymptomatic Pre-Implant and Symptomatic Post-Implant Testing"
***by* Francesca Vallon, et al.,**
In DERMATITIS, Volume 35, No. 5, Sept/Oct 2024, pp 476-482
https://doi.org/10.10189/derm.2023.0363

Acrylates and methacrylates are well-known to be strong sensitisers, but are nonetheless used widely in dental and orthopaedic prostheses, false nails, household and industrial adhesives, glues and paints. This group of substances includes most usually the following individual acrylates and methacrylates:

Substance	Abbreviation	Art. No	Concentration
Methyl methacrylate	MMA	M-013	2.0% pet
Ethyl methacrylate	EMA	E-012	2.0% pet
Ethyl acrylate	EA	E-004	0.1% pet
Butyl acrylate	BA	B-018	0.1% pet
2-Hydroxyethyl methacrylate	HEMA	H-010	2.0% pet
Ethylene glycol dimethacrylate	EGDMA	E-007	2.0% pet
Tetraethylene glycol dimethacrylate	TEGDMA	T-029	2.0% pet
Dimethyl aminoethyl methacrylate	DAEMA	D-045	0.2% pet
Methyl acrylate	MA	no longer available	

However there are numerous other related acrylate and methacrylate substances in:
Chemotechnique (Meth) Acrylate Series – Dental, Printing, and Other – MA-1000
Chemotechnique (Meth) Acrylate Series – Nails – MN-1000.

Acrylic and methacrylic monomers belong to a large family of chemical compounds, and occur as esters, salts, or conjugated bases of acrylic acid. These substances are flammable, volatile, toxic, and colourless compounds in the liquid state.
They are widely used in their monomeric form in everyday household products, such as adhesives, glues, paints, textiles, and non-textile coatings; as well as in the hospital sector where they are used as cements for both dental and orthopaedic prostheses. These substances are also used in their polymerised form as plastics.

Acrylic acid appears as a transparent, colourless, that is liquid at room temperature. It is a moderately toxic but very corrosive molecule that can cause serious gastrointestinal lesions, whereas its vapours are irritating to the eyes and mucous membranes. Due to its corrosive properties, it must be handled with appropriate protective equipment (PPE), such as rubber gloves, goggles, and masks.

Occupational groups affected by contact dermatitis caused by acrylates and methacrylates include:

- Beauticians (nail technicians),
- Health care workers (dentists, dental technicians, dental hygienists, nurses, and orthopaedists),
- Printers and ink handling workers,
- Metal industry workers
- Glass industry workers
- Construction industry workers.

Exposure to (meth)acrylates is also increasing in non-occupational settings due to exposure to glues, cements, application of acrylic nails, and dental and orthopaedic prostheses.

Although there have been many studies over the years on acrylates and methacrylates exposure to various occupational groups and patients, only a few studies have evaluated (meth)acrylate sensitisation in patients without contact dermatitis who have undergone patch testing prior to prosthesis implantation, and those studies have focussed primarily on metal allergy rather than the adhesives that are most usually an integral part of such surgical implantation procedures.

There is significant current debate on the value of pre-implant testing for metal allergy amongst patients with scheduled prosthesis implantation, with the consensus being that it is not clinically necessary or economically worthwhile. Nevertheless, there are isolated locations and situations where such pre-implant patch testing is done, such as testing for nickel sensitisation amongst patient groups of highest incidences.

This study was designed to assess the prevalence of sensitisation in patients before the application of dental or orthopaedic prostheses or after the application in patients who developed potentially related ACD. There were 675 patients in the former group (without ACD before prosthesis placement) and 217 patients in the latter group (subsequent ACD potentially due to the placement of the prosthesis).
The study was based on all patients who were patch tested at the allergy clinic of the Occupational Medicine Clinical Unit in the University of Trieste Italy, from 1998 to 2022, of pre-implantation of dental or orthopaedic prostheses or after implantation in the case of suspected allergic contact dermatitis subsequent to the implantation. During the long period of the study different haptens were tested during the years, so that for example 881 patients were tested for MA and MMA, but only 18 patients were tested for BA.

The study authors noted that all haptens were purchased from Chemotechnique MB Diagnostics (Sweden).

In the test population of pre-implantation patch testing, the majority of patients (98.4%) were patch tested before orthopaedic implantations and just 5.2% before implantation of dental prostheses.
The study showed that of the 882 patients who were patch tested, there were 37 cases of patch test positivity to at least one acrylate (4.2%), of which 9 were male (4%) and 29 were female (4.4%).

In this study, the patch test positivity rates for individual haptens amongst the two test populations were found to be as follows:

Hapten	Pre-Implant Asymptomatic Population	Post-implant Symptomatic Population
EGDMA	5.3% of 57 patients tested	0% of 30 patients tested
EA	2.8% of 409 patients tested	2.4% of 210 patients tested
2-HEMA	1.2% of 84 patients tested	1.7% of 220 patients tested
MA	1.4% of 664 patients tested	1.4% of 217 patients tested
MMA	1.7% of 664 patients tested	0.5% of 217 patients tested
DAEMA	2.1% of 48 patients tested	0% of 30 patients tested
EMA	0.6% of 664 patients tested	0.5% of 216 patients tested
TEGDMA	0% of 57 patients tested	0% of 30 patients tested
BA	0% of 2 patients tested.	0% of 16 patients tested

The majority of patients testing positive were positive to only 1 (meth)acrylate, however there were 13 (35.1%) patients positive to 2 or more haptens tested.

Some other interesting observations were revealed in this study:

- The pre-implant population was composed primarily of women (80%), probably because they tend to be more commonly affected by degenerative bone and joint diseases and are, therefore, more commonly subjected to hip and knee replacement than men.

- A higher number of positive cases for acrylates were found in the older age groups, particularly in the 62- to 70-year age group and in the 71-year age group and above, which composed up to 77% of allergic contact dermatitis with acrylates.

- Previous dermatitis and atopic dermatitis in childhood increased the risk of having a patch test positive for acrylates, which is consistent with previous studies, as atopic dermatitis in childhood is an established major risk factor for the onset of skin allergies in adulthood.

- The correlation between allergic dermatitis and respiratory atopy was statistically significant. In fact, 12 acrylate-positive patients were also positive for respiratory atopy; the percentage was twice as high as that in the acrylate-negative population. In addition, all acrylate-positive patients were found to have a family history of allergic skin and respiratory diseases. This underlines other reports that postulate an important genetic component in the development of various skin allergies.

- EA is the only (meth)acrylate to cause a highly positive +++ reaction at both 48 and 72 hours).

- During the 26-year period of the study, the incidence of sensitisation to the (meth)acrylates has increased considerably, from 2-3% during 1998-2001 to 5% during 2018-2022. This increase is particularly evident for male patients.

In total, it seems that pre-implant and post-implant testing for meth(acrylates) might in due course be able to piggyback onto the patch testing for metals, but there ae several steps along the way, including the need for more studies to identify the most at-risk patients for (meth)acrylate sensitisation. There is much additional information and data to be found in the original article by Vallon et al, particularly regarding the prevalence rates for the different (meth)acrylate haptens as reported in various other studies. So for further information, the reader is referred to the original article in DERMATITIS.

Gold - relevant for baseline tesing?

based on the article *"Prevalence of Contact Allergy to Gold in Dermatitis Patients from 2010 to 2024: A systematic review and meta-analysis"*
by Mikkel Bak Jensen et al.,
in CONTACT DERMATITIS, Volume 91, Issue 6, December 2024, pp 451-458

Contact allergy to gold is confirmed through standardised patch tests using as the test hapten either:

- Gold sodium thiosulphate (GST) $AuNa_3(S_2O_3)_2x_2H_2O$
- Gold chloride (GC) Au_2Cl_6
- Gold thiomalate $C_4H_3AuO_4S$-$_2$

Allergic contact dermatitis (ACD) is diagnosed when these tests are not only positive but also clinically relevant, as defined by the European Society of Contact Dermatitis (ESCD).

However, patch tests for gold are frequently positive, indicating sensitisation to the gold, but no clinically relevance can be established; i.e. patch test positive, clinical signs & symptoms negative.

This high rate of apparent false positive patch test results for gold may explain why gold is included in so very few national baseline series, and other screening series, and that also may explain why so many clinics do not routinely screen for gold contact allergy. However, it is included in TRUE Test®

Although most Contact Dermatitis Societies (including the ESCD and the NACDG) do not recommend gold for routine patch testing, there are some physicians that continue to include gold in baseline testing, most notably the ASCD in their Core Allergen Panel III.

Another issue is that there is no consensus on the optimal formulation, concentration and excipient for patch testing with gold compounds. GST is often used, but the concentration and excipient can significantly affect test results. GST at 0.5% in petrolatum seems to be the accepted standard for individual commercially available haptens, but the TRUE Test® system includes GST in its 35-hapten panel at a concentration of 75 ug/cm^2 which corresponds to 0.2% GST in petrolatum, less than half of the 0,5% concentration in the individual petrolatum-based hapten material.

There is also the somewhat alarming point that patch testing with gold has previously been reported to possibly induce prolonged reactions to the patch test hapten. Gold is known to often cause delayed reactions that can be missed with standard reading of 48 and 72 hours, as the reaction materialises later than other patch test reactions, and may persist longer. The cause of this phenomenon is not known.

This particular study was based around a PubMed literature search; which listed no less than 23,191 studies, which boiled down to 12,835 unique studies of which just 27 were selected for full-text evaluation, which were further whittled down to 16 studies post 2010, comprising 14,887 dermatitis patients which were included in the analysis. Note this is specifically dermatitis patients and not an assessment of the sensitisation rate amongst the general public. Studies were included that used all forms of gold salts and differing concentrations and vehicle.

Obviously, there is a tremendous volume of data involved in this study, and so this article in The Patch Tester e-mag can literally only scratch the surface. So the reader is strongly encouraged to read the original article in CONTACT DERMATITIS in order to obtain the full value of the study.

Of the 16 studies included in the review, 13 employed TRUE Test® which is Gold(I) sodium thiosulphate at a concentration of 75ug/cm^2 in hydrogel. The three other studies utilised GST at 0.5%, 2.0% and at both 0.5% and 2.0%. Note that 75 ug/cm^2 GST in hydrogel corresponds closely to 0.2% GST in petrolatum. However, that is not the concentration utilised in the various national and screening series, where the 0.5% concentration of GST in petrolatum is utilised.

This systematic review and meta-analysis provide a comprehensive overview of the prevalence of sensitisation to gold amongst patients undergoing patch testing for dermatitis between 2010 and 2024 at National Allergy Research Centre in Herlev, Denmark. The analysis of the 16 studies from several continents that have been included in the analysis encompasses 14,887 dermatitis patients which revealed a pooled prevalence of 14.1% of patients were sensitised to gold as indicated by a positive patch test result to gold in one salt or another, one excipient or another, and in one concentration or another. The authors remarked on the significant heterogeneity between the included studies.

Compared to data from other previous studies on sensitisation to other metals such as those that are included in the European Baseline Series (EBS), data from the European Surveillance System on Contact Allergies 2009–2018 (ESSCA) show sensitisation rates in dermatitis patients to nickel 20.7%, cobalt 7.39% and chromium 5.25%. Similarly, data from the North American Contact Dermatitis Group (NACDG) from 2019–2020 reveal patch test positive rates for nickel of 18.2%, cobalt 7.3% and chromium 1.5%. Therefore the 14.1% positivity rate for gold in the Danish review not only indicates a high prevalence of gold sensitisation but it is almost on a par with the rates of sensitisation to nickel.

But sensitisation as indicated by a positive patch test reaction (a true positive reaction, not an irritant or other type of reaction) does not necessarily indicate clinical allergy, as many previous studies have shown that positive patch test results do not necessarily indicate genuine allergic reactions to daily gold exposure.

Unfortunately, in this Danish review study, only two included papers published after 2010 presented data on clinical relevance of positive patch test reactions to gold, where they found the clinical relevance to be 21.3% and 34.6%. The clinical relevance is often not reported in the literature, which is a deficiency which should be addressed in future studies for publication.

There are apparently no meta-analyses on dermatitis patients that include information on clinical relevance for various metals involved in contact allergy. However, recent data from the NACDG, illustrating the clinical relevance in dermatitis patients for chromium, cobalt and nickel were 52.5%, 47.5% and 46.0%, respectively, which are all significantly higher than for the gold sensitisation reported in this Danish review. Nickel is perhaps the best comparator, as both nickel and gold primarily exert their adverse effect through exposure to jewellery.

The use of gold or gold-plated earrings and dental gold were significant sources of gold exposure leading to gold contact allergy. One study highlighted that 96% of females with gold contact allergy had ear piercings and 90% of those used gold or gold-plated earrings, but some of those positive cases also had gold fillings. Dental materials of gold may be the cause of gold allergy, which can appear clinically as oral lichen planus or oral lichenoid lesions (OLR). Removing gold restorations has shown improvement in oral symptoms. Studies confirm that frequent exposure to dental gold, particularly when multiple gold surfaces are present, increases the risk of sensitisation and contact allergy, even though gold release from dental alloys within the oral cavity is said to be generally stable over time.

Additionally, gold may be released from implanted materials into the body via gold-coated stents. Several studies have indicated that gold-coated stents may be associated with an elevated risk of restenosis compared to uncoated stents. Consequently, this has resulted in a reduction in their usage. In-ear headphones have recently emerged as a source of gold exposure, particularly from charging contacts coated with gold-containing alloys.

Prolonged use and activities such as sports may promote ionisation of the gold, especially when charging contacts come into direct contact with the thin skin of the ear. Given the widespread use of in-ear headphones, the incidence of contact allergy may increase.

Occupational exposure to gold is the subject of a few studies which have examined how often occupational exposure is responsible for gold contact allergy. According to one study, occupational exposure was identified as the cause in 0.8% of cases of patients who tested positive for gold contact allergy.

There are several gaps in the understanding of gold contact allergy, particularly regarding its diagnosis, clinical relevance and the mechanisms of the positive (allergic) reactions. The underlying immunological mechanisms and pathways leading to gold contact allergy are not fully understood. This includes understanding why some patients develop allergies to gold while others do not, despite similar exposures. The role of genetic, environmental and immunological factors needs further exploration. The high heterogeneity among studies and the limited clinical relevance of positive tests indicates a need for more standardised research efforts including the use of standardised testing products and protocols, as part of a nuanced approach to manage gold contact allergies in clinical practice.

Patch Test Hapten from Chemotechnique

Art no	Name	Conc.	Veh.
G-0005A	Gold(I) sodium thiosulphate dihydrate	0,5%	pet
G-0005B	Gold(I) sodium thiosulphate dihydrate	2,0%	pet

Patch Tests for non-immediate cutaneous adverse drug reactions: Late readings on Day 4 is more sensitive than on Day 3

by Ilaria Matei, et al.,
CONTACT DERMATITIS, 2024; Volume 91, Issue 4, October 2024, pp 321-326.
https://doi.org/10.1111/cod.14654

Non-Immediate Cutaneous Adverse Drug Reactions (NICADRs) are a somewhat special situation in Patch testing, due to their proximity yet clear difference from Immediate Cutaneous Adverse Drug Reactions, as the latter are typically caused by IgE-mediated hypersensitivity - as opposed to the Type IV (Gell & Coombes – yes, it is still around) classification.

Patch Tests are the first step of discovering the culprit drug in NICADR. If the PT is negative, it is usually followed by Intra-Dermal Testing and eventually drug rechallenges, both of which are potentially hazardous for the patient. Hence, the increase of sensitivity of Patch Tests to detect such clinical sensitisations could avoid further clinical explorations and thereby save time, costs and morbidity in patients with a history of NICADR. Moreover, identifying other related contra-indicated drugs may be highly beneficial for such patients.

The authors of this study had previously reported that with NICADR patients, a reading of the PT reactions on Day 2 with an additional reading at Day 4 showed that almost half of the positive reactions would have been missed if only Day 2 readings had been used to identify the NICADR. Therefore, in this new study they compared the results of testing at Day 3 with Day 4 of 249 patients at a French reference centre for severe drug reactions, during July 2020 to June 2023.

They also tested for related drugs simultaneously, which they labelled “secondary outcome”.

The materials used in this study are worth noting as several of the tested drugs are not commercially available. The tested drugs were either diluted in petrolatum at 10% of the active ingredient, or at 30% of the finished drugs. Some drugs were available, in a ready to test form, supplied by Chemotechnique Diagnostics, whilst other drugs were prepared by the hospital pharmacy. The drugs available only in injectable forms, were tested “as is”. For example, bortezomib, vancomycin, iodinated and gadolinium contrast medias, heparins, piperacillin/tazobactam, daptomycin, and vaccines.

The test substances were applied on the patients’ upper back using IQ Ultra chambers supplied by Chemotechnique Diagnostics.

Patch tests are always performed with the suspected drugs and with their related molecules at the same time. This then illustrates any cross-reactivity and the identification of alternative drugs. For


2025
Reading?

example, if amoxicillin is suspected, then other penicillin dugs, cephalosporins, aztreonam and penems would also be tested simultaneously.
The primary outcome of this study was to compare the PT sensitivity between a reading on D3 or on D4 for the suspected drugs of interest. The secondary outcomes were to compare the PTs sensitivity between a reading on D3 or on D4 for all suspected drug and related molecules, as well as to compare the clinical characteristics of patients between the D3 and D4 positive groups.

The symptoms of the 249 NICADR patients (65% female, mean age 58 years) were:

- Macropapular exanthema = 64%
- Acute generalised exanthematous pustulosis (AGEP) = 15%
- Eosinophilia and Systemic Symptoms (DRESS) = 12%
- EN = 6%
- Fixed Drug Eruptions = 3%
- Lichenoid Reactions = 0.02%
- Overlap AGEP/EN = 0.02%.

The results of the study can be summarised as follows:

- Of the various types of drugs testing positive, the Iodinated Contrast Media (33.3%) and Beta-lactams (31.3%) dominated over Macrolides and related drugs at 13.7%.

- Among the 249 included patients, 24.9% had at least one positive PT (including four only positive for related drugs).

- Allopurinol, sulfamethoxazole and rifampicin PTs were always negative in 8, 16 and 5 cases respectively.

- Regarding the primary outcome, i.e., positivity for the suspected drug, 13.7% of the 249 patients were positive at the first reading on D3, but 24.9% were positive PT at the second reading on D4. Thus, 45% of patients were positive only at D4. All the positive PTs at D3 remained positive on D4.

- Regarding the secondary outcome, that is, positivity for the suspected and the chemically related drugs, 9.6% of the 249 patients showed positive tests on D3, compared with 24.9% at D4. Thus, 15.2% of patients had at least one positive PT only on D4. All the positive PTs detected at D3 remained positive on D4.

- Comparing drugs classes evaluated, overall no statistical difference was observed between testing on Day 3 or Day 4.

- For Beta-lactams and Iodinated Contrast Media, their tests could either be positive from D3 or only at D4. In contrast, although concerning a small sample, all the carbamazepine-positive PTs were observed on D3, but on the contrary, all the clindamycin-positive PTs were positive only at D4.

- The authors of this study made several recommendations based on the results of this study

and their previous study.

- In line with the data published regarding allergological exploration in contact dermatitis, our study confirms that a late D4 reading of PTs is essential to avoid false negatives in systemic drug testing. Our results argue against the alternative of a final reading at D3, as proposed by several references, including guidelines.

- Testing to both suspected and related drugs at the same time allowed a greater efficiency and ability to identify cross reactions, and the identity of non-reacting drugs.

- One more day of occlusion and/or for reading (D2 vs. D3 for first reading), does not enhance positivity as the authors measured comparable positivity rates of 13.9% on D2 in the previous study and 13.7% on D3 in the present study.

- Reading on D4 is, on the contrary, essential for maximum sensitivity of the Patch Test. In line with their first study, the authors recommend a single reading performed after 4 days of occlusion as it may also reduce the number of consultations.

- An occlusion time of 3 days does not cause Irritation reactions.

- Instructing patients to remove the PTs chamber strips themselves at home at D2 or D3 followed by a physician reading at D4 could be proposed to reduce the number of consultations, but it is not always easy to keep the marks where PTs were applied and especially when many PTs are performed.

- The study authors conclude that the last late reading should not be carried out on D3 because of an important loss of sensitivity of the Patch Test compared to D4, and they encourage the testing of related drugs together with the suspected drugs.

Ear Dermatitis after wearing earrings: Rhodium hypersensitivity

by Ignacio Garcia-Nunez et al
CONTACT DERMATITIS, 2024; Volume 91, Issue 4, October, pp 353-354.
https://doi.org/10.1111/cod.14614

Metal allergy is classically targeted at Nickel, with the other two usual main suspect metals such as Cobalt and Chromium following in its wake. Of the lesser-known metals perhaps Rhodium is most obscure.

Rhodium was first discovered in 1803 by William Hyde Wollaston. Its name is derived from the Greek “Rhodon” meaning rose-coloured.

Rhodium is the rarest of all non-radioactive metals. It occurs un-combined in nature, along with other platinum metals, in river sands in North and South America. It is also found in the copper-nickel sulphide ores of Ontario, Canada.

Rhodium is obtained commercially as a by-product of copper and nickel refining.

World production is about 30 tonnes per year.

The major use of rhodium is in catalytic converters for cars (80%), where it reduces nitrogen oxides in exhaust gases.

Rhodium is also used as catalysts in the chemical industry, for making nitric acid, acetic acid and hydrogenation reactions.

It is also used to coat optic fibres and optical mirrors, and for crucibles, thermocouple elements and headlight reflectors.

It is used as an electrical contact material as it has a low electrical resistance and is highly resistant to corrosion.

And it is nowadays increasingly used in jewellery and in dental prostheses, which in both cases means prolonged skin contact in persons.

Rhodium has no known biological role.

It is also a suspected carcinogen.

There are very few published cases of adverse reactions to Rhodium, though the majority of those

involve rhinitis and occupational asthma, in metal workers. Whilst Rhodium is wrongly classified as a non-allergenic metal, with its immuno-toxicity being shown to be less than that of platinum and palladium, it is clearly not insignificant as a cause of symptomatic allergy.

Another study has shown that Rhodium, alongside nickel and palladium, can induce increased levels of IL-10 and IFN-gamma in patients with contact dermatitis induced by these three metals.

It's prevalence and significance may be underestimated due to the lack of testing.

The authors of this case report received in their Spain-based clinic a 26-year-old female with earlobe eczema with pruritis after wearing a nickel-free Rhodium earring. This was shown to contain no other metals in its composition. Testing with a standard panel (TRUE Test®) was negative but testing with Rhodium (III) chloride hydrate 2% pet (Chemotechnique) was positive at both 48 and 96 hours, with ++ moderate papules, vesicles, erythema and pruritis. As Controls, ten healthy patients tested negative with this hapten.

The authors therefore wish to bring to the attention of their Dermatologist colleagues the existence of sensitivity to metal jewellery containing Rhodium, which may be present in an alloy and not stated.

Patch Test Hapten from Chemotechnique

Art no	Name	Conc.	Veh.
R-013	Rhodium (III) chloride hydrate	2,0%	pet

Allergic Contact Dermatitis from Titanium secondary to surgical brow lift: A case report with a 4-year follow-up

by Silje E. Mikalsen, et al.
CONTACT DERMATITIS, Volume 91, Issue 4, October 2024, pp 358-360.
https://doi.org/10.1111/cod.14620

Titanium was discovered in 1791 by William Gregor and the name is derived from the Titans, the sons of the Earth goddess of Greek mythology.

In appearance when pure it is a hard, shiny metal, with an atomic number of 22.
Titanium is the ninth most abundant element on Earth. It is almost always present in igneous rocks and the sediments derived from them. It occurs in the minerals ilmenite, rutile and sphene, and is present in titanates and many iron ores.

The two most useful properties of the metal are corrosion resistance and strength-to-density ratio, the highest of any metallic element. In its unalloyed condition, titanium is as strong as some steels, but less dense. There are two allotropic forms and five naturally occurring isotopes of this element, 46Ti through 50Ti, with 48Ti being the most abundant (73.8%).

Titanium is produced commercially by reducing titanium(IV) chloride with magnesium. Titanium(IV) oxide is produced commercially by either the ‘sulphate process’ or the ‘chloride process’, both of which use the mineral ilmenite as a starting material.

Titanium is as strong as steel but much less dense. It is therefore important as an alloying agent with many metals including aluminium, iron, vanadium, and molybdenum, among other elements. These alloys are mainly used in aircraft, spacecraft and missiles because of their low density and ability to withstand extremes of temperature. They are also used in golf clubs, laptops, bicycles and crutches.

Power plant condensers use titanium pipes because of their resistance to corrosion. Because titanium has excellent resistance to corrosion in seawater, it is used in desalination plants and to protect the hulls of ships, submarines and other structures exposed to seawater.

The largest use of titanium is in the form of titanium(IV) oxide. It is extensively used as a pigment in house paint, artists’ paint, plastics, enamels and paper. It is a bright white pigment with excellent covering power. It is also a good reflector of infrared radiation and so is used in solar observatories where heat causes poor visibility. It is a popular photocatalyst and is used in the manufacture of white pigments. Other compounds include titanium tetrachloride (TiCl4), a component of smoke screens and catalysts; and titanium trichloride (TiCl3), which is used as a catalyst in the production of polypropylene.

A cell phone with a titanium frame

Titanium(IV) oxide is also used in sunscreens because it prevents UV light from reaching the skin. Nanoparticles of titanium(IV) oxide appear invisible when applied to the skin.

Titanium metal connects well with bone, so it has found surgical applications such as in joint replacements (especially hip joints) and tooth implants, in both cases therefore in constant contact with the immune system of the host of these medical devices.

Titanium is considered an ideal material for surgical implants due to its high specific strength, biocompatibility, capacity for osseointegration, and lack of ferromagnetism. Ti (III) is used in surface coatings of hip, knee, and dental prostheses, stents, and pacemaker leads.

Titanium has no known biological role.

It is non-toxic, though fine titanium dioxide dust is a suspected carcinogen.

The Norway-based authors of this paper have written up a Case Report of a healthy female in her thirties who was non-atopic, with no rheumatic disease or contact allergy or history of dental, reconstructive treatments, who developed a recurrent intensely burning face and neck eczema 2 months after a surgical brow-lift utilising titanium screws. The screws also contained aluminium 6% and vanadium 4% in the alloy with titanium.

The eczema symptoms were preceded by prodromal fatigue lasting up to 5 days, causing much distress.

Treatment with Tacrolimus 0.1% ointment twice daily for 2 months led to partial improvement of the eczema only, but it swiftly returned on discontinuation of the treatment.

Other diagnostic tests such as complete blood count, C-reactive protein, ANA, anti-neutrophil antibodies and complement were normal.

After a comprehensive exposure assessment, patch testing was initiated, with photo-patch testing with UVA (Waldmann 802 L) 5 J/cm2 and the commercially available patch test haptens from Chemotechnique. Patch test substances were as follows:

- Chemotechnique Photopatch Baseline Series (EP-1000)
- Chemotechnique Sunscreen Series (SU-1000)
- Chemotechnique European Baseline Series (S-1000)
- Titanium (III) nitride (5.0% pet.) from the Chemotechnique Metal Series (MET-1000)
- Titanium(IV) oxalate hydrate (5.0% pet.) from the Chemotechnique Metal Series (MET-1000).

The haptens were applied to the upper back for 48 h in Finn Chambers® on Scanpor tape.

Just 24 h after the application of the titanium haptens, the patient developed pruritic nummular eczema peri-orbitally and on the neck.

Positive patch test reaction(+) to titanium (III) nitride (5.0% pet.) was observed on Day 3 and Day7.

All other patch tests were negative.

On the author's recommendation, the titanium screws were removed, which resulted in complete resolution of both eczema and prodromal symptoms by 3 weeks after removal.
The patient subsequently remained asymptomatic at 4-year follow-up, thereby supporting the clinical relevance of the positive reaction to titanium.

Contact allergy to titanium is rare, with most reports involving dental, orthopaedic and cardiovascular devices. According to a systematic literature search on 29/04/2024, this is the first reported case of allergic contact dermatitis from titanium after an aesthetic procedure.
However, pruritus, pain/burning sensation, and even fatigue, (as in this case report), and severe reactions such as generalised nummular dermatitis and drug rash with eosinophilia and systemic symptoms have previously been reported for titanium contact allergy.

One previous study reported improved pain in 6 of 7 cases after removal of craniofacial titanium implants for bone anchored hearing aids. Several previous studies have also reported improvement and resolution of symptoms after removal of titanium screws.

In this study, the patient was only tested for Ni, Co, Cr in addition to titanium amongst the metals, though ideally she should also have been tested for vanadium and aluminium, but these haptens were not readily available in the clinic. However, the patient has no history of reacting to other metallic objects containing aluminium and vanadium. Additionally, the complete resolution of the symptoms after removal supports the clinical relevance and the diagnosis of allergic contact dermatitis to only titanium.

The authors concluded that overall, this case illustrates the importance when assessing a patient with neck and face eczema of including questions on aesthetic procedures and exposure assessment of such procedures and implants.

Art no	Name	Conc.	Veh.
P-014A	Potassium dichromate	10%	pet
P-014B	Potassium dichromate	5%	pet
T-040	Titanium dioxide	10%	pet
T-041	Titanium(IV)oxalate hydrate	5%	pet
T-042	Titanium	10%	pet

Screening Series:

MET-1000	Metal Series
METE-1000	Metal Extended Series
IMP-1000	Implant Series

Results of Patch Testing Propolis in the European Baseline Series: A 4-year retrospective study

by Gizem Kocabas, et al.
CONTACT DERMATITIS, Volume 91, Issue 5, November 2024, pp 375-378
https://doi.org/10.1111/cod.14678

Propolis is a very interesting biological product that has recently gained considerable attention as a potential cause of ACD....but what is Propolis exactly??

Propolis, or bee glue, is a resinous mixture that honeybees produce by mixing saliva and beeswax with exudate gathered from tree buds, sap flows, or other botanical sources. It is used by the bees as a sealant for unwanted open spaces in the beehive. Propolis is used for small gaps (around 6 mm or less), while gaps larger than the bee space (around 9 mm) are usually filled with burr comb. Its colour varies depending on its botanical source, with dark brown as the most common. Propolis is sticky above 19 °C, while at lower temperatures, it becomes hard and brittle.
When foraging, worker bees primarily harvest pollen and nectar, while also collecting water and plant resin necessary for the production of propolis.
The chemical composition and nature of propolis depend on environmental conditions and harvested resources.

Propolis functions for bees may also include:
1. To protect the colony from the elements, such as rain and cold winter drafts.
2. Reinforcing the structural stability and reduce vibration.
3. Providing improved thermal insulation to the hive and reduce water loss.
4. Providing protection from pathogens, via antifungal and antibacterial properties.
5. Make the hive more defensible against parasites and predators by narrowing the existing entrance (in wild colonies) to a single ”choke point”.
6. Mitigate putrefaction within the hive - bees usually carry waste out of and away from the hive, but if a small lizard or mouse, for example, finds its way into the hive and dies there, bees may be unable to carry it out through the hive entrance. In that case, they would attempt instead to seal the carcass in propolis, essentially mummifying it and making it odourless and harmless.

Mixed types of propolis found in European countries with a moderate climate include two or more sources of plant resins (plant species) identified by composition, such as Aspen, Mediterranean, Poplar, Pacific, Brazilian green, Brazilian red, and Mangifera types of propolis.

The composition of propolis varies from hive to hive, from district to district, and from season to season, and of course, from country to country. This last point is important when considering the topic of this article.
Normally, propolis is dark brown in colour, but it can be found in green, red, black, and white hues, depending on the sources of resin found in the particular hive area. Detailed analyses show that the

chemical composition of propolis varies considerably from region to region, along with the vegetation. In northern temperate climates, for example, bees collect resins from trees, such as poplars and conifers. ”Typical” northern temperate propolis has roughly 50 constituents, primarily resins and vegetable balsams (50%), waxes (30%), essential oils (10%), and pollen (5%). In contrast, an analysis of propolis from Henan, China, found sinapinic acid, isoferulic acid, caffeic acid, and chrysin.
In neotropical regions, in addition to a large variety of trees, bees may also gather resin from flowers in the genera *Clusia* and *Dalechampia*, which are the only known plant genera that produce floral resins to attract pollinators. *Clusia* resin contains polyprenylated benzophenones. In some areas of Chile and Argentina Andean valleys, propolis contains viscidone, a terpene from Baccharis shrubs, and prenylated acids, such as 4-hydroxy-3,5-diprenyl cinnamic acid.
Overall, flavonoids, phenolic acids, and phenolic aldehydes are common constituents, while coumarins, stilbenes, and lignans are less common.

Propolis has been used in traditional medicine, with a claim that it is ”possibly effective” for treating mouth ulcers and improving blood sugar levels in people with diabetes.

Propolis is used by some string-instrument makers (violin, viola, cello, and bass) as a varnish ingredient. A tincture of propolis may be used to seal the surface of newly made violin family bridges and may be used in the maintenance of the bores of pan flute tubes.

Propolis has more recently become a constituent of cosmetics, pharmaceuticals and food supplements.

Propolis was added to the European Baseline Series in 2019 as a result of the ESSCA 2013-2014 patch test studies in seven European countries of which five showed high prevalence rates of 2.1% to 6.3%.

Propolis hapten is commercially available as a patch test hapten in a 10% concentration in petrolatum (Art no. P-022);

It is currently included in the following (Chemotechnique) National and Occupational Series:

- International Comprehensive Baseline Series ICB-1000
- European Baseline Series S-1000
- European Comprehensive Baseline Series ECB-1000
- American Core Series AC-1000
- North American Series NA-1000
- North American 80 Comprehensive Series NAC-80
- Chinese Baseline Series CB-1000
- Australian Baseline Series ABS-1000
- New Zealand Baseline Series NZBS-1000
- Polish Standard 1 Series PST-1000
- Hungarian Standard Series HU-1000
- Plant Series PL-1000
- Leg Ulcer Series LU-1000

At the Amsterdam University Hospital between June 2019 and November 2023, 3,134 consecutive patients were tested with propolis hapten/allergen manufactured by SmartPractice in their Allerg-

EAZE product range. The commercial source of the hapten/allergen preparation has a particular importance in this study.

Of the 3,134 consecutive patients 299 (9.5%) had a positive reaction to propolis 10% pet. The percentages of positive reactions by year showed a very strong trend of apparently increasing sensitisation, with a sudden jump between 2021 and 2022.

2019 (5 months) = 3.4%
2020 = 2.8%
2021 = 6.1%
2022 = 16.1%
2023 (11 months) = 16.4%.

This sudden increase was not mirrored in other similar studies from other countries, though there were differences in prevalence rates in different countries and different years, but not of the abruptness and magnitude shown in this single Amsterdam clinic.

The study authors state “We found a striking increase in the prevalence of positive reactions to propolis from 2020 to 2023: 2.8% in 2020, 6.1% in 2021, 16.1% in 2022 and 16.4% in 2023, which could not be explained by (apparent) increased exposure to propolis-containing products. Therefore, we looked at possible changes in the patch test material”.

So what else could possibly have been the cause of this apparent jump in sensitisation rates??
The study authors then looked at possible changes to the patch test materials used during the 5.5-year term of the study.

The manufacturer SmartPractice then confirmed that the source of the raw material propolis was a China-based supplier up to October 2019, after which a Brazil-based supplier of the propolis raw material had replaced the Chinese source.

The manufacturer claimed that it had informed its distributors globally of the change in the hapten/allergen, but neither the study authors nor any of their contacted European colleagues had received any such notification from their suppliers of the SmartPractice products.

Apparently, the increase in positivity rates using the new source of Brazilian propolis was known to the manufacturer.

Why the Brazilian propolis gave (or appears to have given) more positive reactions than Chinese poplar-type propolis is unknown. Brazilian propolis is known to be significantly different from propolis found in the temperate zones. The chemical composition of any propolis type is highly variable and only detailed knowledge of the ingredients in the Chinese propolis and the Brazilian propolis used for preparing the AllergEAZE test materials could possibly explain the observed increase in positive reactions. Unfortunately, the manufacturer SmartPractice could not provide this analytical information.

It is reasonably assumed that most propolis reactions are related to fragrance sensitisation. Therefore, a possible explanation of the differences between the Chinese and the Brazilian propolis is that the Brazilian propolis used for preparing propolis patch test hapten contains a larger number

of sensitising fragrance chemicals or in higher concentrations than the Chinese propolis used for the previously available patch test material. For Chinese propolis, bud exudate of poplars, mainly *Populus nigra* L. (Black Poplar) is the main source, and these are not known for their fragrance.

For Brazilian green propolis, *Baccharis* species, predominantly *Baccharis dracunculifolia* DC, is the main source. This is a renowned aromatic plant species, with the leaf essential oil being highly appreciated in the fragrance/perfumery industry by its woody, floral, and green notes. This is mainly attributed to (E)-nerolidol and other sesquiterpene alcohols. High concentrations of β-caryophyllene (up to 9.8%), β-pinene (up to 27%), limonene (up to 26%) and α-pinene (up to 11%) have also been observed in samples of this essential oil. Whether this will also be present in Brazilian propolis is unknown, but in general, propolis composition is directly related to that of the leaf bud exudates.

As a consequence of this change in product specifications greatly influencing the performance of the patch test hapten and thence its clinical utility, the authors of the study state that information on changes in patch test materials should be provided to all users to avoid misinterpretation of patch test results.

There were several other points of clinical interest that were highlighted in this research study; as follows:

- Of the 299 / 3,134 positive tests for propolis only 9 (3%) were judged to be clinically relevant

- There were significant co-reactivities to *Myroxylon pereirae* (Balsam of Peru), colophonium, Fragrance mix I and Fragrance mix II, as well as to limonene and linalool hydroperoxides.

- Of the 299 patients with positive reactions to propolis:
  - 8.4% had a single reaction to propolis.
  - 59.9% of individuals co-reacted to one or more fragrances in an extension of the EBS (linalool hydroperoxides, limonene hydroperoxides) or to one or more fragrance indicators in the EBS (*Myroxylon pereirae* resin, colophonium, fragrances mixes 1 and 2).

- In patients with positive patch tests to propolis, co-reactivity to individual haptens and mixes was as follows:
  - Balsam of Peru 20.7% (6.5% in propolis-negative individuals),
  - Colophonium 11.4% (2.1% in propolis-neg.),
  - Fragrance mix I 23.4% (vs. 8.3%),
  - Fragrance mix II 14.7% (vs. 4.9%),
  - Linalool hydroperoxides 32.4% (vs. 14.9%)
  - Limonene hydroperoxides 30.1% (vs. 10.4%).

  All differences were statistically significant.

- Of the 9 cases of past and present clinical relevance, causative products were 6 cosmetics, 2 food supplements and 1 topical biopharmaceutical.

- No positive propolis patch tests were from beekeepers.

In conclusion, the study authors claim that the addition of propolis to the EBS has, in their circumstances, not been very useful for the Netherlands.

Allergic Contact Dermatitis in Adults, with and without Atopic Dermatitis: valuation of the Spanish Contact Dermatitis Registry (REIDAC)

by P. Chicharro, et al.
CONTACT DERMATITIS, Volume 91, Issue 5, November 2024, pp 404-411
https://doi.org/10.1111/cod.14672

Atopic dermatitis (AD) is a chronic and relapsing inflammatory skin disorder characterised by an impaired skin barrier function and an immune dysregulation. This is classically a Type I hypersensitivity reaction, mediated by IgE, and therefore the causative antigens are typically biological in origin (though some are chemical, such as drugs) and are identified by Skin Prick Tests and in vitro s-IgE tests.

Allergic contact dermatitis (ACD), conversely, is a type IV hypersensitivity reaction developed as a result of cutaneous re-exposure to specific allergens in sensitised individuals. The causative antigens are therefore classically of chemical origin (though some are biological, such as plants) and are identified by Patch Tests.

The association between AD and ACD is controversial as studies have shown varying results and drawn varying conclusions. Two systematic reviews have indicated that atopic individuals, including both children and adults, who undergo patch testing, exhibit a lower prevalence of contact hypersensitivity compared to patients without AD.

A 2017 systematic review and meta-analysis, including 74 studies of which 5 involved the general population, concluded that in adults, a higher prevalence of contact sensitisation (ACD) was observed in patients with AD. However, there was an inverse association in patients referred for patch testing (with, presumably, suspected ACD).

In children, both prospective and retrospective studies showed that the prevalence of ACD was significantly higher among children without AD, but the rates of sensitisation varied considerably. Conversely, different studies have been published in recent decades, suggesting AD as an increasing risk factor for developing ACD, both in children and adults.

The Spain-based authors of this study reported that there was no research or data on the association between Spanish AD and ACD patients with suspected contact allergies.

The study was designed with two main purposes:

1. To identify differences in patch test results between patients with and without AD among those referred for patch testing.

2. To ascertain the prevalence of sensitisation to standard Spanish contact allergens in both AD and non-AD patients.
   Their analysis of data from REIDAC (the Spanish national registry of patch test results in dermatology clinics throughout Spain) from January 2018 to June 2020 covered a total of 5,055 patients. All patients were patch tested with the Spanish Baseline Series, that constitutes 29 haptens, using haptens acquired commercially from Chemotechnique, AllergEAZE and TRUE Test®.

The following points can be derived from the data:

- Of the total 5,055 patients, 23% had a history or final diagnosis of AD established by their attending dermatologist.

- Of the total 5,055 patients, 70% were women. Over 99% of patients were adults, with individuals aged over 40 years being more prevalent in the non-AD group compared to the AD group (78% vs. 46%).

- There were significant differences in clinical symptoms between the two groups:
  AD patients had a greater frequency of facial symptoms than non-AD patients (32% vs. 24%), and generalised involvement was also more common in AD patients (26% vs. 12%). These results were consistent with other international studies.

- At least one positive reaction was seen in 40% of AD patients and 48% of non-AD patients.

- For AD patients, the most prevalent positive reactions were to:
  - Nickel sulphate (20%)
  - MCI/MI (7%)
  - Cobalt chloride (5%)
  - Potassium dichromate (4%)
  - Fragrance mix I (3%).

- For non-AD patients, the most prevalent positive reactions were to:
  - Nickel sulphate (25%)
  - MCI/MI (7%)
  - Cobalt chloride (5%)
  - Fragrance mix I (5%)
  - Paraphenylenediamine (4%).

- Regarding clinical relevance of the positive patch test results, in AD patients, 17% of these reactions were considered clinically relevant (1 or more positive patch tests), while the non-AD group showed 22% of positive test results were considered to be clinically relevant.

- For AD patients, the most common relevant positive reactions were to:
  - MCI/MI (63%)
  - Fragrance mix I (56%)
  - Formaldehyde (56%)
  - Potassium dichromate (44%)
  - Nickel sulphate (12%).

- For non-AD patients, the most common relevant positive reactions were to:
  - MCI/MI (64%)
  - Paraphenylenediamine (63%)
  - Fragrance mix II (58%)
  - Fragrance mix I (45%)
  - Nickel sulphate (20%).

As can be seen from the above results, whilst there are some fairly significant differences between the Patch Test results of AD and non-AD patients, the differences are not at all dramatic.
The study authors conclude with the following points:

- The study does not support the greater presence of ACD in patient referred for patch testing in Spain.
- The study findings support the hypothesis that the selection criteria for patch testing in atopic individuals should not differ from those for non-atopic patients.
- Patch testing results in AD patients were similar to those in non-AD individuals, except for a negative association between AD and nickel sulphate sensitisation.
- AD patients suspected of having ACD should be patch tested considering exposure to potentially relevant allergens, including fragrances, preservatives, corticosteroids, as well as occupational and personal exposures. The selection of allergens for testing should be the same for patients with AD as for those patients without AD. There is a great deal of additional data in the original article, so interested viewers are encouraged to read the original article by Chicharro et al at https://doi.org/10.1111/cod.14672, in CONTACT DERMATITIS, volume 92, issue 5, pp 404-411.

Concordance of different sources for Nickel Sulphate Patch Testing

by Juan Sanz-Correa, et al.,
DERMATITIS, Volume 91, No. 5, November 2024, pp 441-442.
https://doi.org/10.1111/cod.14646

This interesting study from Madrid Spain is a rather rare comparison of the two commercially available manufacturers of patch test haptens/allergens; namely Chemotechnique and SmartPractice with their AllergEAZE product line of haptens/allergens. Both product lines have marketing authorisations in Spain, and both are used interchangeably in this single clinic.

Both test preparations are 10% concentration in petrolatum.

Unusually, the two participating clinics utilise patch test strips called Curatest®, that comprise 10 viscose discs set on a backing tape. They are therefore not exactly the 3-dimensional patch test chambers found in almost all other such patch test chamber strip products.

It is highly relevant that epicutaneous tests present false positives and false negatives in principle, so that the sensitivity is said to be 77% and the specificity of patch tests 71%.

The type of hapten/allergen tested also influences patch test concordance, with nickel being one of the haptens/allergens with the highest reproducibility.

The study authors reported that they observed that some patients with clinical signs suggestive of sensitisation to nickel gave negative patch tests and so they suspected that there may have been differences in the test materials (haptens/allergens) provided by the two manufacturers. So they decided to carry out a study to determine the degree of concordance between the two different hapten/allergen products.

Of the 505 patients tested with the Spanish Standard Series between November 2021 and February 2022, 23.56% had at least one positive reaction at 48 h and/or 96 h.

Among the positive reactions, 113 were related to allergy and 6 to irritation. A Vaseline® (petrolatum) control was included, as a positive Vaseline control could indicate that nickel-positive reaction is probably irritative.
However, in this study there is an apparent contradiction as the authors state that all nickel-positive patients were negative to Vaseline.

The study parameters tried to eliminate any differences due to materials, methods and evaluations, but the lack of blinding in the study was its greatest limitation, as the nurse who applied the tests and the dermatologist who evaluated the results both knew the research protocol.

Despite the attempts at standardisation, there are a few potential sources of error which may explain the discordant results between the two products. The applied dose of allergen onto the Curatest® filter-paper reaction site was not measured with any device, so there may be variations in the amount of hapten/allergen applied onto each test site. Other reasons for these discordances include unequal adherence of the Curatest® and supplemental Mefix® adhesive to the skin, and therefore differences in skin penetration of the hapten/allergen.

It should be noted that epicutaneous tests present false positives and false negatives and that the sensitivity and specificity of these tests are 77% and 71%, respectively. In addition, the type of allergen used also influences patch test concordance. Nickel is one of the allergens with the highest reproducibility, that is, the ability to obtain the same results in successive tests.

Chemotechnique at 96 h failed to detect 19 out of 113 (16.81%) allergic reactions and AllergEAZE at 96 h, failed to detect 14 out of 113 (12.39%).

Unfortunately, no data is provided regarding patch test results obtained at 48 hours.

The observed agreement was 0.93, whereas the kappa value was 0.79, which indicates statistically substantial agreement.

This study showed substantial agreement between Chemotechnique and AllergEAZE and that the use of one source or another does not systematically affect final outcomes. Nevertheless, both methods failed to detect some nickel-allergic reactions.

The use of two patches (i.e., both hapten/allergen products) instead of one could be beneficial for detection of allergic contact sensitisation for nickel sulphate in patients with suggestive symptoms, but this would not be practical for routine use, especially for more than just nickel tests. However, if patient's history and patch test results are not in concordance, retesting with a patch test hapten/allergen from another manufacturer may be practically feasible and provide better diagnostic information.

The Value of Patch Testing with Plants "as is" in diagnosing plant sensitisation

by Evy Paulsen, et al.
In CONTACT DERMATITIS, Volume 91, Issue 6, December 2024, pp 459-464.
https://doi.org/10.1111/cod.14680

Plants as a cause of contact allergic reactions is an often-neglected area of patch testing. This is at least in part due to the relative paucity of commercially available patch test haptens/allergens. The number of commercially available plant allergen/hapten/extracts is limited and therefore patch testing with fresh or even dried plant material may be a necessary supplement to testing with the commercially available patch test haptens/allergens.

Plants and plant-based substances are not well represented in patch test screening panels with the obvious exception of the perfumes, which originally will have been obtained from plant-based sources but are nowadays synthesised chemical compounds.

Being biological in origin, plant materials do not make good, stable, quantifiable test substances for patch testing, which is one contributing factor to the low number of commercially available plant substances for patch testing. Variability in composition and content, as well as lack of stability, both contribute greatly to the problems faced by patch test hapten/allergen manufacturers. With the ever-increasing regulatory demands on standardisation, then this issue is only exacerbating.

This study was therefore designed to evaluate the practicalities and the benefits of using raw plant material "as is", and to ascertain which are the most commonly occurring plant allergens/haptens.

A total of 1,839 consecutive patients were patch tested between January 2019 and December 2023.

Just 57 (3%) of these patients were shown to be sensitised to plants.

The most frequent sensitisers were:

1. Compositae
2. Tomato
3. Tulipalin A
4. Falcarinol
5. Philodendron plants
6. Hydrangea
7. Pelargonium zonale
8. Monstera

Occupational sensitisation was revealed for 32% of the 57 patients.

In 12 of the 57 patients (21%), the diagnosis was made only using fresh material, not commercially available patch test hapten/allergen preparations.

The study authors concluded that a large minority of plant-sensitised patients would have been undiagnosed without patch testing with raw materials obtained “as is” from plants. Most of the culprit plants were known sensitisers, but which are not commercially available. Therefore, patch testing with these known sensitisers as well as with other new species that may or may not be sensitisers makes patch testing with fresh plant materials unavoidable.

Photopatch testing: Clinical characteristics, test results, and final diagnoses from the North American Contact Dermatitis Group, 2009–2020

by Vincent A. DeLeo, et al.,
In CONTACT DERMATITIS, Volume 91, Issue 6, December 2024, p465-473.
https://doi.org/10.1111/cod.14677

The Photo-patch Test (PT) is used to identify contact allergens to which the individual has become sensitised, but which only cause clinical symptoms in the presence of UV radiation from sunlight. Without the sunlight the sensitisation has no clinical consequences, but in the presence of sunlight UV then the clinical symptoms appear.

Photoallergic Contact Dermatitis (PACD) is an uncommon form of ACD, whose diagnosis is confirmed by photo-patch testing.

Just because Photo-Patch testing is not a standard practice in many dermatology clinics, then readers may not be conversant with the technicalities and practicalities of the procedure. For the un-initiated, the paper reviewed here explains the procedure they used, essentially in accordance with the America-based NACDG guidelines; as follows:

> The procedure for photo-testing (minimal erythema dose [MED] determination) and PhotoPT in the NACDG is briefly described as follows:
>
> On Day 1, irradiations are performed to determine MED to UVA (320–400 nm) and, at the clinician's discretion, UVB (290–320 nm) radiation. On that Day 1, 32 photo-allergens from Chemotechnique and SmartPractice were in this study applied to the back in duplicate using Finn Chambers® on Scanpor® tape. The haptens/allergens provided by the two manufacturers varied over the 12 years of this study, and providers were chosen when necessary to maintain the series. At any time, the agents used were consistent at all sites of the study.
>
> On Day 2 or 3 (allergen contact time varied between 24 h and 48 h depending on scheduling needs at the testing sites), both sets of haptens/allergens were removed, and one set was irradiated with UVA. Standard protocol is for a dose of 10 J/cm^2, which was utilised in most cases (322/454, 71%). A modification of the dose was allowed at the discretion of the investigator; if the MED to UVA was less than 10 J/cm^2, a dose at least 1 J/cm^2 less than the MED was used. Alternate doses utilised included 5 J/cm2 (14%) and 1–20 J/cm^2 (14%). The other set of allergens was shielded and acted as the non-irradiated control. Both sets of allergens were then photo-protected.
>
> Readings of the test sites were performed on the day of removal of the patches, both before and immediately post-irradiation.
> Two delayed post-irradiation readings were done. The first reading occurred on Day 3 or Day 4 and

the second on Days 5–10.

Patch test reactions are graded according to NACDG protocol. In addition, after all readings have been completed, a final interpretation is to be determined. A positive reaction that is equal at both the non-irradiated and irradiated sites is defined as a positive allergic contact reaction, while a photoallergic contact reaction was defined as a positive reaction only at the irradiated site. When both sites were positive, but the irradiated site was more intensely positive, it is considered a photo-aggravated reaction.

Clinical relevance of an allergic/positive patch test reaction is determined using the patient's history, skin examination and exposure assessment.

Clinical relevance is defined as:

- Definite = positive patch test or use test with a skin contactant verified to contain the putative allergen
- Probable = the allergen identified by patch testing could be verified as present in known skin contactants and the clinical presentation was consistent
- Possible = a skin contactant likely contained the positive allergen.
- Past
- Unknown

Finally, each physician assigns a final diagnosis that takes into consideration the PhotoPT results as well as history and physical examination, as well as possibly other types of laboratory procedures, including additional patch test results, cutaneous biopsies and/or serologies.

Up to three diagnoses could be assigned to each patient.

- PACD
- ACD
- Chronic actinic dermatitis (CAD)
- Atopic dermatitis with photosensitivity
- Polymorphous light eruption (PMLE)
- Systemic drug photosensitivity
- Solar urticaria
- Actinic prurigo
- General photosensitivity undefined
- Non-photo-related condition.

Back to the review of this particular original research article...

The study period of 2009 to 2020 encompassed just 454 patients with suspected photosensitivity who were referred for Photopatch testing by members of the NACDG, with the 24 haptens/allergens of the NACDG Photopatch Test Series during 1999 to 2009 and the 32 haptens/allergens utilised in the NACDG Photopatch Series from 2009 to 2020. That leads to a total of approximately 14,500 photopatch tests in the second period that was the basis of the current study.

The changes to the NACDG Photopatch Series in 2009 included the removal of 4 haptens/allergens that had given plenty of positive results but of no clinical relevance, such as fenticlor, plus other anti-infective agents and a fragrance ingredient. There were 12 sunscreen agents added, making a total of 24 of the 32 of the post-2009 NACDG Photopatch Series.

Since 2021, based on the finding reported by this research study and other recent literature, the NACDG Photopatch Series presently in use by the NACDG group has been altered again.
See below for further information.

Seventy percent of the 454 photopatch tested individuals in this study were female, and 21-60 years old and White.

Associated clinical conditions included 19.8% with asthma, 31.5% with hay fever/rhinitis, and 26.7%

with atopic dermatitis. Note that these are also the three main clinical conditions associated with IgE-mediated Type I hypersensitisation.

A total of 119 positive photopatch tests were observed, so approximately 0.8% of all photopatch tests. 93 (0.6%) contact (non-photo) allergic, and 19 (0.12%) were classified as photo-aggravated allergic. That is together 231 of 454 (50.8%) of all patients photopatch tested and 1.6% of all photopatch tests performed.

Amongst the Photoallergic reactions, sunscreen agents produced the most positive photoallergic patch tests (88.2%). Benzophenones (BZP) for 57.1%, of these, (most commonly BZP-3 (oxybenzone; 26.7%). Other sunscreen agents accounted for 37.8% of the positive photopatch tests. The non-steroidal anti-inflammatory drug (NSAID) ketoprofen accounted for 5.0% of positive reactions. Additional reactions (6.7%) were allocated to fragrances, plant-derived chemicals and anti-infective agents.

Amongst the Allergic Contact (non-photo) reactions, 77.4% of the positive allergic contact (non-photo) reactions were to sunscreens with 46.2% due to benzophenones - most commonly BZP-3 (18.3%). Non-benzophenone sunscreens accounted for 31.2% of positive contact allergic reactions. There were 10.8% reactions to plant allergens (sesquiterpene lactone mix and lichen acid mix).

Amongst the photo-aggravated reactions, sunscreens once again pre-dominated, with 89.5% of the photo-aggravated reactions, most commonly by butyl methoxydibenzoylmethane (avobenzone); at 26.3%.

Clinical relevance of positive photopatch test reactions was uniformly high:

- Photo-allergic reactions = 84%
- Contact non-photo allergic reactions = 80.6%
- Photo-aggravated reactions = 77.8%.

The final diagnoses were many, with the most common as follows:

- ACD = 44.5%
- Polymorphous Light Eruption = 18.9%
- PACD = 17.2%
- Chronic Actinic Dermatitis = 9.0%
- Undefined photosensitivity = 9.0%
- Irritant Contact Dermatitis = 6.2%
- AD with photo-sensitivity = 5.3%
- Dermatitis (not photo) = 5.1%
- Dermatoses (not photo) = 4.2%
- Solar Urticaria = 2.9%

The true prevalence of PACD is unknown, and projections are based solely on reports from Photopatch Test Series. Low availability and the subsequent lack of access to Photopatch testing in USA likely leads to underdiagnosis of PACD.

Over the years, the haptens/allergens responsible for photoallergic contact dermatitis have varied based on historical population-specific exposure patterns. In the 1960s, the widespread marketing of popular bar soaps with anti-infectives containing halogenated salicylamides resulted in large numbers of cases of PACD in the United States, Western Europe and Australia. Recognition of the problem resulted in the removal of those agents from the market. The synthetic fragrance fixative musk ambrette in men's colognes and the fragrance 6-methylcoumarin used in sunscreens caused mini-epidemics of PACD in the 1970s. Recognition of the sensitisations caused by these substances led to their removal from the market as well. Several systemic medications, particularly the topical phenothiazines were frequently reported to produce PACD during that period and are still marketed in some areas of the world. In the 1970s and 1980s, as sunscreen ingredient composition changed and overall usage increased, photo-allergy to sunscreen agents has also increased. From the mid-1980s, topical NSAIDs, particularly ketoprofen, became prominent causative agents in many areas of the world. In the USA specifically, the demographics of the population that were patch tested has also evolved, as has membership of the NACDRG, with many more Black and Asian and Hispanic individuals having access to patch testing and offering patch testing.

The original article goes on to characterise the most important haptens/allergens causing positive results in photopatch testing; specifically:

1. Benzophenones
2. Ethylhexyl dimethyl PABA (Padimate O)
3. Butyl methoxydibenzoylmethane (Avobenzone)
4. Ocyocrylene

Note that some of the agents in the NACDG Photopatch Series are specific for USA and/or Canada, and may not be prevalent elsewhere in the world.

In Europe, early attempts to standardise the methodology and share results by multicentre groups in Scandinavia, Germany, Austria, Switzerland, and the UK led to the formation of the European Multicentre Photopatch Test Study (EMCPPTS) Taskforce. They issued two publications, "Photopatch Testing: a Consensus Methodology for Europe" and "Recommendations for a European Photopatch Test Baseline Series". A study published by the group in 2012 reported results in testing over 1,000 patients in a 1-year period.

It has been suggested that a collaborative process in North America, similar to that undertaken by the EMCPPTS in Europe, be developed in order to increase recognition of the necessity for access to Photopatch testing in the USA for the proper diagnosis of the photosensitive individual.

The EMCPPTS compiled their own Baseline Series and Extended Photopatch Series in 2013, which differ significantly from the NACDG Photopatch Series of 2021, for reasons of prevalence of the different native substances in Europe compared to USA.

In the table shown besides, the NACDG Photopatch Series 2021 is compared to the NACDG Photopatch Series used in this study, and compared to the Photopatch Series used by the European Multi-Centre Photopatch Test Study group (EMCPPTS), established in 2013 with both a Baseline Series and an Extended Series.

Photopatch Series:
NACDG 2021-2024, EMCPPTS 2013, Chemotechnique (bold = included in the Photopact Series)

Category	Hapten/Allergen	NACDG '21-'24	EMCPPTS '13	Chemotechnique
Sunscreen	Benzophenone-3, 10%	B	B	**H-014C**
SunScreen	Benzophenone-4, 10%	B, 2%	B, 2%	**H-023C (2%)**
SunScreen	Bisethylhexyloxyphenol methoxyphenol triazine, 10%	B	B	**B-037**
SunScreen	Butyl methoxydibenzoylmethane, 5%	B, 10%	B, 10%	**B-029C**
SunScreen	Diethylamino hydroxybenzoyl hexyl benzoate, 10%	B	B	**K-002B**
SunScreen	Diethylhexyl butamido triazone, 10%	B	B	**D-063**
SunScreen	Drometrizole trisiloxane, 10%	B	B	**D-055**
SunScreen	Ethylhexyl methoxycinnamate, 7.5%	B, 10%	B, 10%	**E-019C**
SunScreen	Ethylhexyl triazone, 10%	B	B	**O-010**
SunScreen	Isoamyl-p-methoxycinnamate, 10%	B	B	**I-009**
SunScreen	4-Methylbenzylidene camphor, 2%	B, 10%	B, 10%	**M-024B**
SunScreen	Methylene bis-benzotriazolyl tetramethylbutylphenol, 10%	B	B	**M-037**
SunScreen	Octocrylene, 1%/10%	B, 10%	B, 10%	**O-009**
SunScreen	PABA, 10%	B	B	**A-006C**
SunScreen	Benzophenone-10, 10%	B	EX	n/av
SunScreen	Disodium phenyl dibenzimidazole tetrasulfonate, 10%	B	EX	**D-064**
SunScreen	Ethylhexyl salicylate, 5%	B, 10%	EX, 10%	**O-007B**
SunScreen	Homosalate, 5%	B, 10%	EX, 10%	**H-024B**
SunScreen	Phenylbenzimidazole sulfonic acid, 10% B	B	EX	**P-024B**
SunScreen	Polysilicone-15, 10%	B	EX	**P-035**
SunScreen	Ethylhexyl dimethyl PABA, 10%	B		n/av
SunScreen	Menthyl anthranilate, 5%	B		n/av
SunScreen	Benzophenone-2, 1%	Deleted		n/av
SunScreen	Benzophenone-8, 2%	Deleted		n/av
SunScreen	TEA Salicylate, 5%	Deleted		n/av
SunScreen	Terephthalylidene dicamphor sulfonic acid, 10% AQ		B	n/av
Antiseptics	Triclosan, 2%	B	EX	**T-014**
Antiseptics	Chlorhexidine diacetate, 0.5% aqua	B		n/av
Antiseptics	Hexachlorophene, 1%	B		**H-001**
Antiseptics	Bithionol	Deleted		n/av
Antiseptics	Dichlorophene	Deleted		n/av
Antiseptics	Fentichlor B	Deleted		n/av
Antiseptics	Tribromosalicylanilide	Deleted		n/av
Antiseptics	Trichlorocarbanilide, 1%		EX	n/av
Fragrances	Musk ambrette, 1%	Deleted		Mx10B
Fragrances	Musk xylene, 1%	B		M-021
Plant Allergens	Lichen acid mix, 0.3%	B		Mx-15
Plant Allergens	Sesquiterpene lactone mix, 0.1%	B		Mx-18
Topical NSAIDs	Ketoprofen, 5%	B, 1%	B, 1%	n/av
Topical NSAIDs	Etofenamate, 2%	B	B	**E-025**
Topical NSAIDs	Piroxicam, 1%	B	B	**P-033**
Topical NSAIDs	Diclofenac, 5%	B	EX	**D-061B**
Topical NSAIDs	Benzydamine, 2%		B	n/av
Topical NSAIDs	Dexketoprofen, 1%		EX	n/av
Topical NSAIDs	Ibuprofen, 5%		EX	I-010A
Topical NSAIDs	Piketoprofen, 1%		EX	n/av
Medications	Promethazine, 0.1%		B	n/av
Medications	Fenofibrate, 10%		EX	n/av
Medications	Chlorpromazine, 0.1%		EX	n/av
Miscellaneous	Thiourea, 0.1%	B		**T-026**
Miscellaneous	Decyl glucoside, 5%	B		**D-065**
Miscellaneous	Methylisothiazolinone, 0.2% aqua	B		M-035B
Miscellaneous	Olaquindox, 1%		EX	n/av

Allergen vehicles are petrolatum unless stated otherwise.
B = Baseline Series
EX = Extended Series
NACDG = North American Contact Dermatitis Group
EMCPPTS = European Multicentre Photopatch Test Study
n/av. = not available

Characterisation of Paediatric Patch Testing: A Retrospective Review 2020-2023

by Caroline Brumley et al.,
in DERMATITIS, Volume 35, No. 6, Nov/Dec 2024, pp 618-624
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Acute ACD was once thought to be rare in children due to their developing immune systems and comparatively fewer exposures. However, data from recent decades have shown a similar prevalence of ACD in children, 16.5%, as in adults, 21.4%.

Patch testing is the most valuable diagnostic tool for ACD, but despite similarities in prevalence, children continue to account for less than 10% of patch testing subjects.

This study in a major patch testing centre is a retrospective review conducted on 135 patients ages 1–17 years who underwent patch testing from July 2020 from August 2023. This was from a total of 1,546 patients patch tested at the clinic during this period, so just 8.5% of patients tested were in the 1 to 17 age range.

Data were stratified by age; 1–5, 6–11, and 12–17 years.

Significance- Prevalence Index Numbers (SPIN) were calculated for each of the allergens.

The objectives of the study were as follows:

- To characterise the results of paediatric patch testing at one of the largest patch testing centres in the United States
- To understand patterns associated with paediatric ACD,
- To identify emerging allergens compared to other paediatric cohorts,
- To optimise paediatric patch testing protocols.
- To allow the data collected in this study from Minnesota and bordering states to serve as a starting point for establishing regional trends in paediatric contact allergens across the United States.

All 135 paediatric patients in the study were patch tested with the NACDG Series, and many were also tested with various other series as well as supplemental personal products “as-is” haptens/ allergens based on individual relevant exposures.
The many results of the study in some ways reinforced results from other studies but there were also some interesting new revelations from this study.

- 86% of patients had at least one positive reaction (PR) on patch testing, and 40% of patients had at least one positive relevant reaction (PRR).
- All reaction totals increased by age group, and patients had on average 5.2 PRs.
- Overall positivity rates and rates of PRR were 75% and 25% in ages 1–5, 83% and 32% in ages 6–11, and 89% and 49% in ages 12–17 years, respectively.
- Positivity rates were approximately equal in female compared to male patients (86% vs 85%, respectively).
- The rates of PRR were similarly equal in females compared to males (41% vs 40%, respectively).
- Equal numbers of males and females were patch tested in ages 1–5 and 6–11 years, but females outnumbered males 3.22:1 in ages 12–17.
- The rates of PRR and overall positivity were approximately equal between females and males in ages 12–17 years (47% vs. 56% for PRR and 90% vs. 89% for overall positivity, respectively).
- Compared to other recent paediatric cohorts, this study reported a higher rate of sensitisation (86%) with slightly lower rates of relevant reactions (40%); as well as an approximate 15% increase in overall positivity compared to data collected from 2001 to 2004.
- Rates of sensitisation are significantly higher in recent American studies than Europe-based studies (36.9% in a 2015 study) and Israel (43% in a 2023 study).
- In addition to overall increasing rates of ACD, this study reported positivity was similar between males and females in all age groups. This report differs from previous studies that report higher rates in females.
- The haptens/allergens reported to be of greatest significance in this report has also evolved somewhat compared to previous studies.
- Previous studies have found metals (nickel sulphate, cobalt sulphate, gold sodium thiosulphate), preservatives (methylisothiazolinone [MI], methylchloroisothiazolinone[MCI], formaldehyde), fragrances (hydroperoxides of linalool and limonene, fragrance mix, Balsam of Peru), and antibiotics (neomycin, bacitracin) to be the most common contact allergens in the paediatric population. In addition, propylene glycol and cocamidopropyl betaine have also been reported among the most common causes of ACD in children. Acrylates have also been reported from a recent Israeli study.
- This study reported the most relevant allergens by SPIN Factor were hydroperoxide of linalool (11.01), propylene glycol 100% (10.30), and hydroperoxide of limonene (10.27), followed by fragrance mix I (5.62), propylene glycol 30% (5.39), and lanolin 50% (4.90. Average SPIN scores for all allergens were not clinically significant between age groups.
- Comparing SPIN scores has an advantage over reporting positivity rates or relevant reactions alone, as these may not represent the true impact of a specific allergen within a population.

- There was no statistical difference between average SPIN scores of allergens between age groups, suggesting a comparable impact of ACD for children of all ages.

- SPIN scores were overall low compared to those calculated for recently published NACDG data from other studies.

- This ranking differed when rated by total PRs or clinical relevance alone, and by age groups.
    - In ages 1–5 years, neomycin, bacitracin, tixocortol-21-pivalate, and pramoxine were the most relevant reactions.
    - In ages 6–11 and 12–17 years, hydroperoxide of linalool, hydroperoxide of limonene, and propylene glycol (100% and 30%) represented the most relevant allergens.

The Top 30 allergens identified in this study are as follows:

Order of Relevance	Allergen	Total PR	% of PR Relevant	SPIN
1	Hydroperoxide of linalool 1.00% pet	38	29%	11.01
2	Propylene glycol 100.00% aq	32	47%	10.30
3	Hydroperoxide of limonene 0.30% pet	35	31%	10.27
4	Fragrance Mix I 8.00% pet	19	32%	5.62
5	Propylene glycol 30.00% aq	19	47%	5.39
6	Lanolin 50.00% pet	14	50%	4.90
7	Myroxylon Pereirae Resin 25.00% pet	17	29%	4.89
8	Lanolin 30.00%	12	42%	4.41
9	Neomycin 20.00% pet	14	43%	3.92
10	Fragrance Mix II 8.00% pet	11	27%	3.43
11	MCI/MI 0.02% aq	6	67%	2.95
12	Methylisothiazolinone 0.20% aq	8	50%	2.70
13	Sodium benzoate 5.00% pet	13	23%	2.70
14	Cetrimonium chloride 0.50% pet	32	6%	2.44
15	Carba Mix 3.00% pet	10	20%	2.21
16	Nickel sulfate hexahydrate 2.50% pet	13	8%	2.20
17	Bacitracin 20.00% pet	8	38%	1.96
18	2-Hydroxyethylmethacrylate2.00% pet	5	60%	1.96
19	Nickel sulfate hexahydrate 5.00% pet	13	0%	1.96
20	Carmine 2.50% pet	10	0%	1.96
21	Dimethylaminopropylamine 1.00% aq	4	50%	1.72
22	Pramoxine 2.00% pet	7	29%	1.47
23	Tixocortol-21-pivalate 1.00% pet	3	67%	1.47
24	Cobalt (III) chloride hexahydrate 1.00% pet	11	9%	1.47
25	Decyl glucoside 5.00% pet	7	14%	1.47
26	Benzoic acid 5.00% pet	5	40%	1.47
27	Ethylene glycol dimethacrylate 2.00% pet	3	67%	1.23
28	Carvone 5.00% pet	3	33%	1.23
29	Coco glucoside 5.00% pet	7	14%	1.22
30	Sorbitan sesquioleate 20.00% pet	4	25%	1.22

- Importantly, 8 allergens within the top 30 as defined by SPIN or total PR are not included in the NACDG Standard Series. Three of these have a different concentration or closely related allergen on the NACDG Standard Series (namely propylene glycol 30.00% aq, lanolin 30.00% pet, and benzoic acid 5.00% pet.).

- Cetrimonium chloride 0.50% pet, carmine 2.50% aq, and ethylene glycol dimethyl acrylate (EGDMA) are part of the 30 most relevant allergens by SPIN in addition to the three aforementioned allergens.

- Aluminium chloride hexahydrate 2.00% pet and phenylmercuric acetate 0.05% pet are part of the top 30 allergens as defined by number of PRs.

- Other baseline series, such as TRUE Test® do not include many more of the most common and relevant allergens. Such limited test series are likely not sufficient when ACD is strongly suspected, both in children as well as in adults. No less than half of the most relevant allergens in this study are not present in TRUE Test®, including hydroperoxides of linalool, limonene and propylene glycol.

- Emulsifiers represented the most relevant allergen category, followed by fragrance, preservatives, acrylates, antibiotics, and surfactants. Additional allergen categories such as hair, rubber, textiles, metals, plants/woods, and others were only infrequently relevant.

- Fragrance represented the most common allergy category among all age groups, whereas antibiotics, corticosteroids, and other medicaments were of high relevance in ages 1–5 years and of decreasing significance with older ages.

- The most relevant allergens seen in this paediatric cohort were fragrances (hydroperoxide of linalool, hydroperoxide of limonene, fragrance mix I) and emulsifiers (propylene glycol, lanolin).

- The predominance of fragrance allergy is consistent with other recently published data in other studies from the United States. This reinforces the idea that the pervasive inclusion of fragrance in products is problematic for not only adults but also for children.

- No preservatives were found within the top five most common or relevant reactions as they have in other recently published data, particularly methylisothiazolinone which stands out among other cohorts.

- In this study, reactions to metals were overall fewer and less commonly relevant compared to recently published data that has reported nickel and cobalt allergy within the top five most common and relevant allergens in paediatric ACD.

- The relevance of emulsifiers such as propylene glycol and lanolin as a cause of ACD in paediatric populations, potentially more important than fragrance, has not previously been reported. While propylene glycol is found in many cosmetics and foods, it is also used extensively in pharmaceuticals including topical anti-inflammatory preparations. These findings emphasise the importance of using topical steroids and other medicaments that do not contain propylene

glycol or other potentially allergenic ingredients such as lanolin or benzyl alcohol. Importantly, propylene glycol and lanolin alone made up most emulsifier reactions, with few reactions to other emulsifiers.

- Age-related differences were seen in this study. Neomycin, bacitracin, tixocortol, pramoxine, and lanolin were more relevant than fragrance in ages 1–5 years, possibly reflecting increased rates of AD and thus exposure to medicament ingredients in younger ages.

- Overall, supplemental allergen testing is important in the complete diagnostic evaluation of paediatric ACD. Expert clinical knowledge and thorough patient histories are required to properly select supplemental allergen panels. Another study has previously reported a 20% rate of positivity to supplemental allergens, though this included personal products tested “as-is” and did not specify the exact allergens. Another recent study emphasised the importance of testing supplemental allergens in paediatric cohorts to improve quality and efficiency of care. The authors of this study echo those recommendations.

Testing personal products “as-is” has value in determining the clinical relevance of positive reactions and subsequent management of ACD, particularly for children 6 years and older, as was demonstrated in this study by the frequency of relevant reactions to personal products. Reactions to products tested “as-is” can also lead to the discovery of unreported contact allergens based on the product’s ingredients, what the patient was tested to, and further patch testing with additional ingredients. Despite logistical limitations such as decreased body surface area for testing, personal product testing should be prioritised in paediatric populations as in adults.

There is so much clinically useful information presented in the original publication in DERMATITIS that the reader of The Patch Tester is encouraged to read the original article in order to access the full information.

In this twenty-first issue of “The Patch Tester” we are taking a look at the website of. The Skin Health Institute of Melbourne Australia and one of its offshoots... The Contact Allergen Bank of Australia.

You may ask why this far-away skin clinic has been selected for special attention.
This website is just a small part of the organisation (almost a conglomerate!) and the multiple services offered by The Skin Health Institute of Australia and associated entities around the persona of Professor Rosemary Nixon, assisted by her various professional colleagues.

The Skin Health Institute is a stand-alone, private, not for profit, dermatology sub-specialist outpatient centre in Carlton, Melbourne, where it serves as a home for dermatology in Melbourne.

Patch testing is undertaken at the Skin Health Institute and referrals for patch testing are sent by external Dermatologists to the Institute.

The Occupational Dermatology Research and Education Centre (ODREC)c is closely associated with the Skin Health Institute, as is the Australian Skin Cancer Foundation.

ODREC offers patch testing services as well as consultancy services for, for example, to industry, including:

- Investigation of skin problems in individuals and groups of workers
- Training and advice on skin management in the workplace
- Advice on Return-To-Work options
- In the past, ODREC has provided services to a range of industries including;
- Aircraft manufacturing
- Food processing
- General manufacturing
- Mining
- Pharmaceutical manufacturing

These services have involved work site inspections, skin assessments and a comprehensive written report, including recommendations for skin protection.
The Skin Health Institute is one of the very few in the world in the establishment and active operation a Contact Allergen Bank service, called the Contact Allergen Bank of Australia (CABA).

44 Website Review

Contact Allergen Bank Australia was based on a concept that originated in Denmark, and is a comparatively recent initiative in Australia that assists Australian Dermatologists in diagnosing allergic contact dermatitis (ACD) by providing patch test services to those Australian Dermatologists who require patch test capability but have chosen not to set up their own in-house patch test service.

CABA involves the preparation of individualised patch tests, which are ordered by the external individual Dermatologist for their individual patient. This may be the Australian Baseline Series of 60 haptens/allergens, or any of a number of different screening panels or individual haptens/allergens.

Once ordered, these patch tests are then prepared at the Skin Health Institute in Melbourne, and mailed to the Dermatologist, together with a test sheet, prepared from their unique computerised patch testing program, PatchCams©.

Such a postal service is particularly useful in Australia for the all-too-few Dermatologists who do not have the adequate volume of potential ACD patients who would need patch testing to motivate their setting up their own patch test service within their practice. The CABA service is therefore potentially much more clinically useful for the Dermatologist than using a small scale, ready-to-use patch test screening system with a small and partly outdated hapten/allergen panel.

CABA aims to:

- Provide Australian Dermatologists, particularly those in regional centres, with access to comprehensive patch testing resources, available in a timely manner
- Improve the prognosis of patients with contact dermatitis, with the identification of allergens relevant to their skin condition
- Collect data on the results of patch testing nationally
- Enable dermatologists to develop experience and expertise in contact dermatitis, without the costs of purchasing haptens/allergens or paying for dedicated nursing staff.

The CABA Clinical Nurse Consultant, Amanda Palmer, runs the entire CABA service.
Once registered for CABA, the individual Dermatologists have access to the CABA website, which offers many information sheets and patch testing guides.

You are invited to notify us If there is a website you would like to have reviewed in a future issue of The Patch Tester or if there is a society or other website that you would like to have included in these lists.

Dermatology Society Websites

ILDS:	*International League of Dermatology Societies*	www.ilds.org
ICDRG:	*International Contact Dermatitis Research Group*	www.icdrg.org
EADV:	*European Academy of Dermatology & Venerology*	www.eadv.org
ESCD:	*European Society of Contact Dermatitis*	www.escd.org
ACDS:	*American Contact Dermatitis Society*	www.contactderm.org
APEODS:	*Asia-Pacific Envmntl & Occupational Dermatology Society*	www.apeods.org
EAACI SAM:	*European Academy of Allergy & Clinical Immunology*	www.eaaci.org
BAD:	*British Association of Dermatology*	www.badannualmeeting.co.uk
AAD:	*American Academy of Dermatology*	www.aad.org
PDA:	*Pacific Dermatolologic Association*	www.pacificderm.org
APD:	*Association of Dermatology Professors*	www.dermatologyprofessors.org
NDA:	*Nordic Dermatology Association*	www.nordicdermatology.com
GDA:	*German Dermatology Society*	www.derma.de
FSA:	*French Society of Dermatology*	www.sfdermato.org
CDA:	*Caribbean Dermatology Association*	www.caribbeanderm.org
ACD:	*Australian College of Dermatologists*	www.dermcoll.edu.au
NZDS:	*New Zealand Dermatology Society*	www.nzdsi.org
DNA:	*Dermatology Nurses Association*	www.dnanurse.org
DermNET NZ:	*Dermatology Infomation Resource for Patients*	www.dermnetnz.org

Dermatology Meeting Websites

www.eadv.org
www.aad.org
www.dermatologymeeting.com
www.asiaderma.sg
www.dubaiderma.com
www.cairoderma.com

Dermatology - International

18th – 21st June 2025
International Society of Dermatology
Rome, Italy
https://www.icd2025rome.org/

21st - 26th June 2027
ILDS - World Congress of Dermatology
Guadalajara, Mexico
https://www.ilds.org/what-we-do/world-congress-of-dermatology/

8th - 11th April 2025
World Congress of Pediatric Dermatology
Buenos Aires, Argentina
https://www.wcpd2025.com/

1st - 3rd July 2025
British Association of Dermatologists
Glasgow, Scotland
https://badannualmeeting.co.uk/

The webpage at www.waset.org/ is one potentially very useful source of information of Dermatology congresses in 2025.

WASWT is the World Academy of Science, Engineering and Technology. Their webpage states numerous dermatology-related congresses and conferences for 2025.