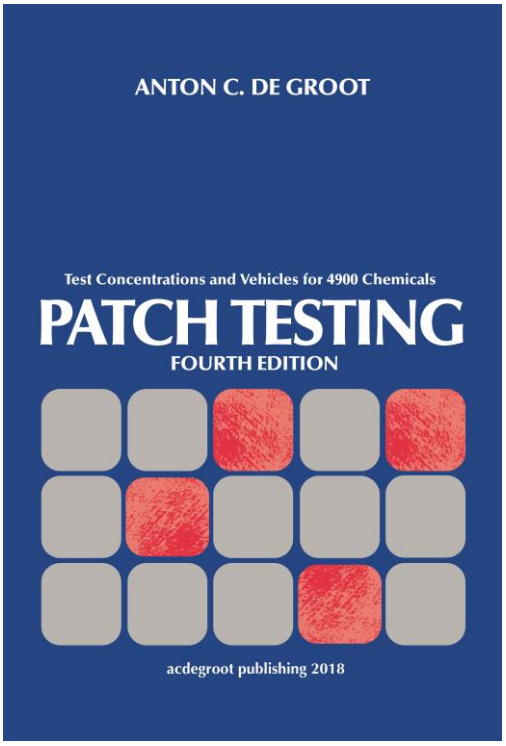
PATCH TESTING, 4TH EDITION: UPDATE 2018 – 2022

Anton C. de Groot



Patch Testing, 4th Edition: Update 2018 – 2022

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INTRODUCTION

This is an addendum to and an update of *Patch Testing*, 4th edition (ISBN 978-90-813233-4-5). It contains information on 255 *new allergens*, both chemicals described as contact allergens after publication of the book and systemic drugs causing various forms of drug eruptions verified by positive patch tests or occupational allergic contact dermatitis. The data presented here have partly been retrieved from *Contact Dermatitis* or *Dermatitis* (the two journals largely devoted to the subject of contact dermatitis) from April, 2018 through March, 2022. Other sources include the 2019 edition of the book Kanerva's Occupational Dermatology (81) and a previously published, but not referenced article on non-irritant patch test concentrations for systemic drugs (75).

However, the majority of new allergens and their data provided in this update stem from two recent books of the author: De Groot AC. *Monographs in contact allergy, Volume 4 – Systemic drugs* and De Groot AC. *Monographs in contact allergy, Volume 3 – Topical drugs*. The data in the book on Systemic drugs concern both cases of drug eruptions with a positive patch test (the large majority) and cases of occupational allergic contact dermatitis from systemic drugs, e.g. in pharmaceutical workers or health personnel. Most of these have been reported before 2018, but were not included in *Patch Testing* 4th edition, as they were published in non-dermatological journals not referenced in that book. They surfaced when the subject of delayed type allergy to systemic drugs was thoroughly reviewed by the author for *Monographs in contact allergy, Volume 4 – Systemic drugs*.

This update does not only provide patch testing and other data on new allergens, but also updated information on 122 contact allergens already mentioned in *Patch Testing*, 4th edition, notably new test concentrations and/or vehicles, modifications of advice previously given or other data. For the updated allergens, only the new information is given; it is recommended to assess these data in conjunction with the corresponding entries in Table 1 of *Patch Testing*, 4th edition. In addition, a short introduction to the indications for and technique of patch testing in drug eruptions is provided below (17,18,74).

EXPLANATION OF TABLE 1

Table 1 below provides an alphabetical listing of 364 individual chemicals or compounds and 31 synonyms for new and updated allergens. Of the 364 chemicals, 242 refer to NEW allergens, not included in the 2018 4th Edition of *Patch Testing*. For the new contact allergens, CAS numbers have been provided. Table 1 has 6 vertical columns, which contain the following information:

1: Name of the chemical
2: Synonyms/other names
3: Patch test concentrations & vehicles, and reference numbers
4: Merck Index number
5: Monographs in the Ingredient Database of the Personal Care Council
6: Comments

Column 1: Name of the chemical

This column lists all chemicals, both 'preferred names' and 'synonyms/other names' alphabetically. 'Preferred names' begin with a capital letter. 'Other names/synonyms' are not capitalized, unless they are trade names (recognizable by ®), abbreviations, official plant names or they begin with the name of a country, city, or a proper name. For cosmetic ingredients the INCI names (International Nomenclature Cosmetic Ingredients, European system) are the preferred names.

Column 2: Synonyms/other names

This column may list one or more synonyms when the corresponding chemical in column 1 is a 'preferred name', or refers to the 'preferred name' when the corresponding chemical in Column 1 is a synonym ('See ….').

Column 3: Patch test concentrations & vehicles, and reference numbers

This column provides for each chemical ('preferred name') in Column 1 concentrations and vehicles for patch testing as recommended by the authors of articles or books referenced (references in brackets).
acet. = acetone; a.i. = active ingredients; alc. = alcohol; DMSO = dimethyl sulfoxide; pet. = petrolatum

Column 4: Merck Index number

A number in this column means that the corresponding chemical in Column 1 is monographed in the Merck Index online edition, the number corresponding to the chemical's Merck Index monograph number.

Column 5: Monographs in the Ingredient Database of the Personal Care Council

A '+' in this column means that the corresponding chemical in Column 1 is monographed in the Ingredient Database of the Personal Care Council (previously CTFA: Cosmetic, Toiletry and Fragrance Association), available at subscription or through the website of the American Contact Dermatitis Society.

Column 6: Comments

This column contains a variety of information, all of which relates more or less directly to patch testing procedures (e.g. 'test concentration may be irritant', '20 controls were negative', 'no controls mentioned', 'risk of patch test sensitization', et cetera). When a chemical has caused photosensitivity, immediate contact reactions (contact urticaria) or patch test sensitization, relevant information and references are given under this heading.
In this column is it also indicated whether the entry is a new contact allergen, not previously shown in *Patch Testing*, 4th Edition ('NEW') or whether it contains updated information on patch test data ('UPDATE PT') already presented in the book. CAS = CAS (Chemical Abstract Service) Registry Number.

PATCH TESTING IN DRUG ERUPTIONS

In recent decades it has been convincingly shown that many delayed drug eruptions/hypersensitivity reactions (appearing >6 hours after intake of a systemic drug) are mediated by delayed-type (type IV) hypersensitivity, as can be demonstrated by a positive patch test to the drug or a positive intradermal test with delayed reading. This subject was recently fully reviewed by the author (17,18) and also reviewed by others (74).

Indications

Patch testing may be useful in the following drug hypersensitivity reactions (17,18):

- Abacavir hypersensitivity syndrome
- Acute generalized exanthematous pustulosis (AGEP)
- Drug reaction with eosinophilia and systemic symptoms (DRESS)/drug-induced hypersensitivity syndrome (DIHS)
- Eczematous eruption
- Erythema multiforme-like eruption
- Erythroderma, widespread erythematous eruption, exfoliative dermatitis
- Fixed drug eruption and generalized bullous fixed drug eruption
- Lichenoid drug eruption
- Localized hypersensitivity reactions to subcutaneous injections (e.g. heparins, local anesthetics)
- Maculopapular eruption
- Photoallergic dermatitis
- Stevens-Johnson syndrome/toxic epidermal necrolysis (SJS/TEN)
- Symmetrical drug-related intertriginous and flexural exanthema (SDRIFE)/baboon syndrome
- Systemic allergic dermatitis (systemic contact dermatitis)
- Urticaria/angioedema (delayed)
- Other less defined drug eruptions

Sensitivity of patch testing

The sensitivity of patch testing (rates of positive reactions) in various investigations has varied widely, depending *inter alia* on the nature of the drug reaction and the drugs involved. Some drugs are frequently patch test-positive, e.g. carbamazepine and some other antiepileptics, pristinamycin, aminopenicillins and iodinated contrast media. Others, however, hardly ever, if at all, produce positive reactions, e.g. allopurinol. Generally speaking, higher rates of positive reactions may be observed with eczematous eruptions, erythroderma, localized hypersensitivity reactions to subcutaneous injections, maculopapular eruptions, DRESS/DIHS, AGEP and the abacavir hypersensitivity syndrome. Low rates of positive drug patch tests have been found in patients with SJS/TEN. In patients with systemic allergic dermatitis (systemic contact dermatitis), a (near) 100% rate of positive reactions should be possible as, by definition, presensitization to a topical drug has taken place in this form of drug reaction. This subject has recently fully been reviewed by the author (19).

Patch test concentrations and vehicles

For patch testing, preferably the pure drugs, not the commercialized tablets used by the patients, should be used, to obtain an exactly defined concentration and to avoid false-positive results (i.e. not indicating hypersensitivity to the active drug material) due to hidden additives in the drug formulations, degradation products or impurities. Most pure systemic drugs can be tested at 10% pet. When the pure chemical is not available, the test material can best be prepared from intravenous powder, the content of capsules or – when also not available – from powdered tablets to achieve a final concentration of the active drug of 10% pet. wt./wt. (17,18). Some experts have recommended 'overall' to dilute commercial preparations to 30% pet. rather than 20% pet., at the same time stating, however, that 'ideally a concentration of 10% of the active ingredient should be obtained' (74). Exceptions are celecoxib (5-10%), captopril (1%), chloroquine (<30%), misoprostol (1%) and possibly sodium valproate (1%), which at 30% pet. (sometimes) induce irritant patch test reactions (74). It is often advised to test carbamazepine, diltiazem and pseudoephedrine at a lower concentration of active ingredients first (e.g., 1%) to avoid very strong patch tests (diltiazem) or exacerbation of the drug hypersensitivity reaction. When negative, the concentrations can be increased gradually to 10% (17,74). Heparins/heparinoids, local anesthetics and iodinated contrast media can be tested as commercial preparations, undiluted. Petrolatum is usually suitable as vehicle, but systemic corticosteroids may be better tested 0.1% and 1% in 70% alcohol to avoid false-negative reactions (17,18).

Non-irritant patch test concentrations of a large number of commercial drugs (expressed in percentages active ingredient) can be found in ref. 75. When positive patch test results are obtained with 'in-house' test preparations, control tests are indicated to exclude irritancy of the used test substances.

Patch testing technique

Drug skin tests should be performed 6 weeks to 6 months (DRESS not sooner than 6 months to avoid viral reactivation) after complete healing of the adverse drug reaction, and at least 1 month after discontinuation of systemic corticosteroid or immunosuppressive therapy. The patch test materials should be occluded for 2 days and the results read after 30 minutes, on D4 or D5 and possibly (especially when corticosteroids, aminoglycoside antibiotics or iodinated contrast media are tested) on D7. When investigating drug-induced photodermatitis, both patch tests and photopatch tests with the suspected drug must be performed. It is recommended to perform the photopatch tests with a 1% (instead of 10%) concentration of the active ingredient; for phenothiazines even lower concentrations (i.e. 0.1%) should be used. For drug photopatch tests UV-irradiation (5 J/cm^2 UVA) is performed upon their removal 2 days after their application. In cases of fixed drug eruptions, patch tests should be performed both on the normal skin of the back and on the residual pigmented site of the fixed drug eruption (17,18,74).

Table 1 Update 2018-2022: Chemicals

UPDATE PT	2: SYNONYMS / OTHER NAMES	3: TEST CONC. & VEH./ REFERENCE	4	5	6: COMMENTS
Abacavir		Abacavir sulfate and glutarate, 1% and 10% pet. (56)			UPDATE PT; occupational allergic contact dermatitis (56)
Aceclofenac		1% and 5% pet. (17)			UPDATE PT
Acemetacin		0.1%, 1%, 10% and 30% pet. (37)	1298		NEW; CAS 53164-05-9; 10 controls were negative (37); occupational allergic contact dermatitis
Acetazolamide		5% pet. (72); pulverized tablets 30% pet. (70,71) #	1322		NEW; CAS 59-66-5
Acetomenaphthone	menadiol diacetate; vitamin K4	0.1% and 0.01% olive oil (17); 1% is irritant (17)	7168		NEW; CAS 573-20-6; occupational allergic contact dermatitis
Acetophenone azine		0.1% and 1% pet. (32); 0.1% acet. or pet. (69)			UPDATE PT
Acexamic acid		5% and 10% pet. (72)	1316		NEW; CAS 57-08-9; see ref. 72 for details
2-acryloyloxyethyl butylcarbamate	See 2-Butylaminocarbonyloxyethyl acrylate				
Actarit		1% and 10% pet. (17)			UPDATE PT
Adalimumab		Commercial preparation (50 mg/ml) undiluted (17)	1406		NEW; CAS 331731-18-1; see ref. 17 for details
Afloqualone		1% pet. (17)	1445		NEW; CAS 56287-74-2; see ref. 17 for details
Alendronic acid/alendronate		10% and 20% pet.; perform adequate control testing!; lower concentrations (0.1% and 1% in water) may be suitable in some patients (17)			UPDATE PT
Allopurinol		Pulverized tablet, 10% and 20% pet. (17) # ; commercial preparation 16.7% a.i. pet. (75)			UPDATE PT; the 16.7% a.i. preparation was negative in >10 individuals; patch tests with allopurinol are always negative

Althiazide mixture with spironolactone		10% pet. (38) # *			NEW; CAS 76270-06-9; occupational allergic contact dermatitis; the 2 ingredients were not tested separately
amfebutamone	See Bupropion				
Aminocaproic acid		1%, 5% and 10% water (17)			UPDATE PT
2-Amino-2-methyl-1-propanol		2% pet. (53)			NEW; CAS 124-68-5
Aminophylline		1% water or pet.; test also ethylenediamine and theophylline 1% pet. (17)			UPDATE PT
3-(Aminomethyl) pyridyl salicylate		1% water; it is preferable to test 3-(aminomethyl) pyridine 1% water, as this is the allergenic part of the compounded formula (72)			NEW; CAS 34148-38-4; see ref. 72 for details
Amiodarone		Commercial preparation 17.05% a.i. pet. (75)	1748		NEW; CAS 1951-25-3; 17.05% a.i. pet. was negative in >10 individuals (75)
Amitriptyline		1% and 10% pet. (17)			UPDATE PT
Amlexanox		1% water; petrolatum may be less suitable for patch testing (17)			UPDATE PT
Amobarbital		Pulverized tablet, 10% pet. (17) #	1837		NEW; CAS 57-43-2; see ref. 17 for details
Amoxapine		1% and 10% pet. (17)	1843		NEW; CAS 14028-44-5; see ref. 17 for details
Amoxicillin mixture with clavulanate potassium	amoxicillin trihydrate and potassium clavulanate; co-amoxiclav	Pulverized tablet 10% and 30% pet.; test also amoxicillin trihydrate 10% pet. and potassium clavulanate 10.0% pet. (17) #; commercial preparation 15% a.i. (75)	1844 and 3609		NEW; CAS 74469-00-4; see ref. 17 for details; commercial preparation 15% a.i. was negative in >100 individuals
Ampiroxicam		% pet. for UVA-photopatch testing; test also piroxicam 1%-5% pet. as this is more reliable than testing ampiroxicam; also			PDATE PT

		patch test thimerosal 0.1% pet. and thiosalicylic acid 0.1% and 1% pet. (17)			
Antipyrine salicylate		Commercial drug 10% pet.; in case of fixed drug eruption, use also DMSO as vehicle (17)	1973		NEW; CAS 520-07-0; see ref. 17 for details
Arachidyl glucoside		5% and 10% pet. (61)		+	NEW; CAS 144982-05-8
Arbekacin		5%, 10% and 20% pet. (72)	2030		NEW; CAS 51025-85-5; see ref. 72 for details
Artemisia argyri leaf oil		5% and 10% pet. (21)		+	NEW; no CAS number found; 6 controls were negative (21)
Articaine	carticaine	Commercial solution 40 mg/ml; test also epinephrine HCl. or bitartrate 1% water (commercial solution contains epinephrine) (17)			UPDATE PT
Atenolol		Commercial preparation 7.3% pet. (75)			UPDATE PT; commercial preparation 7.3% pet. was negative in 10 individuals (75)
Atorvastatin		10% pet. (38) # *; pure drug 0.1% alc. (17); testing also higher concentrations (e.g. 1%) in alcohol and pet. seems appropriate (17)	2125		NEW; CAS 134523-00-5; occupational allergic contact dermatitis; see ref. 17 for details
Atovaquone		Pulverized tablet 10% pet. (17) #	2127		NEW; CAS 95233-18-4; see ref. 17 for details
Azathioprine		0.1%, 1% and 5% pet. (17)			UPDATE PT
Azithromycin		10% pet.; this may occasionally lead to a false-negative reaction; 20% pet. is probably not irritant (17); commercial preparation 16.2% a.i. pet. (75)	2177		UPDATE PT; see ref. 17 for details; commercial preparation 16.2% a.i. pet. was negative in >20 individuals (75)
Aztreonam		Tablet, pulverized, 20% pet.; most beta-lactam antibiotics can be tested 5-10% pet. (17) #	2188		NEW; CAS 78110-38-0; see ref. 17 for details
Bakuchiol		1% and 0.1% pet. (40)		+	NEW; CAS 10309-37-2; 5 controls were negative

Befunolol		1% water; when patch tests are negative but there is suspicion of contact allergy, use 5% (72)			UPDATE PT
Belladonna extract		Atropine 1% water, scopolamine 1% pet. (72)			NEW; CAS 8007-93-0; see ref. 72 for details
Bemiparin		Commercial preparation undiluted (17)	5958		NEW; CAS 9005-49-6 (Heparin); see ref. 17 for details
benzenesulfonamide, *N*-(4-hydroxyphenyl)	See *N*-(4-hydroxyphenyl)benzenesulfonamide				
Benznidazole		5% pet. (64) *; 10% DMSO (17) #	2356		NEW; CAS 22994-85-0
Benzylpenicillin		5% pet. (17)			UPDATE PT
Betamethasone acetate		0.1% and 1% alc. (17)	2452		NEW; CAS 987-24-6; see ref. 17 for details
Betamethasone sodium phosphate		0.1% and 1% alc. (72)	2452		NEW; CAS 151-73-5; see ref. 72 for details
Betamethasone sodium succinate		0.1% and 1% alc. (17)			NEW; CAS not found; see ref. 17 for details
Bibrocathol		Ointment as is; bismuth oxide 5% pet. (72)	2473		NEW; CAS 6915-57-7; see ref, 72.for details
Bismuth subcitrate		Bismuth oxide 240 mg/ml saline patch-scratch test; bismuth oxide 5% pet. (17) # ; commercial preparation 20% pet. and water (77)			NEW; CAS 57644-54-9; see ref. 17 for details; 5 controls were negative (77)
Bis(2,2,6,6-tetramethyl-4-piperidinyl) sebacate	Tinuvin ® 770	5% pet. (44)			NEW; CAS 52829-07-9
Bleomycin		Tablet, pulverized, 30% pet. (17) #	2589		NEW; CAS 11056-06-7; see ref. 17 for details
Bortezomib		1 mg/ml (vehicle?) (17)	2623		NEW; CAS 179324-69-7; see ref. 17 for details
botulin A; botulinum toxin type A	See OnabotulinumtoxinA				
Brimonidine		1%, 5% and 10% pet. (72)			UPDATE PT
Brinzolamide		0.1% DMSO (16)	2652		NEW; CAS 138890-62-7; 10 controls were negative (16)

Brivudine		5% pet. (17)	2655		NEW; CAS 69304-47-8; see ref. 17 for details
Bromhexine		1% and 5% pet. (5)	2668		NEW; CAS 3572-43-8; see ref. 17 for details
Bromisoval		0.1%, 1% and 10% pet. (17) #	2674		NEW; CAS 496-67-3; see ref. 17 for details
Bupropion	amfebutamone	Commercialized bupropion 1%, 5%, 10% and 20% pet. (3) #	2773		NEW; CAS 34911-55-2; 10 controls were negative to bupropion 30% pet. (3)
2-Butylaminocarbonyl-oxyethyl acrylate	2-acryloyloxyethyl butylcarbamate	0.1% pet. (34)			NEW; CAS 63225-53-6; 19 controls were negative (34); occupational allergic contact dermatitis
4-Butylresorcinol		0.5% pet. (31)		+	NEW; CAS 18979-61-8; no controls performed
Calcium pantothenate	pantothenate calcium	5% pet. (20)			NEW; CAS 137-08-6; 20 controls were negative (20)
Capryloyl glycine		1% in water/alc. 50/50 (51)		+	NEW; CAS 14246-53-8; 20 controls were negative
Caprylyl glycol	1,2-octanediol	1% pet. (23)		+	NEW; CAS 1117-86-8; contact urticaria: ref. 45
Carbenicillin		5%-10% pet. (17) #			UPDATE PT
Carbocysteine		Carbocysteine and its metabolite thiodiglycolic acid 10% pet. and other appropriate vehicle (17) #	3072		NEW; CAS 638-23-3; see ref. 17 for details
Carbomer 1342	carbopol 1342; Carbopol Ultrez 20 Polymer ®	0.25% water (24)			NEW; CAS 96827-24-6
Carbopol 974P		10% water (24)			NEW; CAS 151687-96-6
carbopol 1342	See Carbomer 1342				
Carbopol Ultrez 20 Polymer ®	See Carbomer 1342				
Carbromal		1% and 5% pet. (17) #			UPDATE PT
Carmustine		0.1% water (72)	3115		NEW; CAS 154-93-8; see ref. 72 for details

Carteolol		5% water (72)			UPDATE PT
Cefaclor		5%-10% pet. or water (17) #	3184		NEW; CAS 70356-03-5; see ref. 17 for details
Cefadroxil		5%-10% pet. or water (17) #	3185		NEW; CAS 66592-87-8; see ref. 17 for details
Cefalexin		Commercial preparation 10% pet. a.i. (74)	3244		NEW; CAS 15686-71-2; 10% a.i. was negative in >20 individuals (74)
Cefalotin		5%-10% pet. or water (17) #	3251		NEW; CAS 153-61-7; see ref. 17 for details
Cefamandole		5%-10% pet. or water (17) # ; commercial preparation 30% pet. a.i. (75)	3186		UPDATE PT; commercial preparation 30% pet. a.i. was negative in >100 individuals
Cefazolin		10% pet. (33); commercial drug diluted to 10% pet. (67) #			UPDATE PT
Cefmetazole		5%-10% pet. or water (17) #	3197		NEW; CAS 56796-20-4; see ref. 17 for details
Cefodizime		5%-10% pet. or water (17) #			UPDATE PT
Cefonicid		5%-10% pet. or water (17) #	3200		NEW; CAS 61270-58-4; see ref. 17 for details
Cefotaxime		Commercial preparation 30% a.i. (75)			UPDATE PT; the concentration of 30% a.i. was not irritant in >100 individuals (75)
Ceforanide		5%-10% pet. or water (17) #	3202		NEW; CAS 60925-61-3; see ref. 17 for details
Cefotetan		5%-10% pet. or water (17) #	3205		NEW; CAS 69712-56-7; see ref. 17 for details
Cefotiam		5%-10% pet. or water (17) #	3206		NEW; CAS 61622-34-2; see ref. 17 for details
Cefoxitin		10% pet. (33); commercial drug diluted to 10% pet. (67); 5%-10% pet. or water (17) #			UPDATE PT
Cefpodoxime		Commercial preparation 12% a.i. pet. (75)	3212		NEW; CAS 80210-62-4; the concentration was negative in >100 individuals
Cefradine		10% pet.	3255		NEW; CAS 38821-53-3; Chemo

Ceftiofur		5%-10% pet. or water (17) #			UPDATE PT
Ceftizoxime		5%-10% pet. or water (17) #			UPDATE PT
Ceftriaxone		Powder for intravenous use, 10% pet. (33,67); 5%-10% pet. or water (17) # ; commercial preparation 30% a.i. pet. (75)			UPDATE PT; commercial preparation 30% a.i. pet. was negative in >100 individuals (75)
Celecoxib		Commercial preparation 11.45% pet. a.i. (75)			UPDATE PT; the conc. was not irritant in 10 individuals (75)
Certoparin		Commercial preparation undiluted (17)	5958		NEW ; CAS 5958-49-6 (Heparin); see ref. 17 for details
6-Chloro-2-(chloromethyl)-4-phenylquinazoline 3-oxide	2-chloromethyl-4-phenyl-6-chloroquinazoline-3-oxide	10% pet. (38)			NEW; CAS 5958-24-7; occupational allergic contact dermatitis
2-chloromethyl-4-phenyl-6-chloroquinazoline-3-oxide	See 6-Chloro-2-(chloromethyl)-4-phenylquinazoline 3-oxide				
6-Chloropurine		1% and 10% pet. (56)	3433		NEW; CAS 87-42-3; occupational allergic contact dermatitis
8-Chlorotheophylline		10% pet. (17)			NEW; CAS 85-18-7; see ref. 17 for details
Chlorphenesin		1% and 0.5% pet; both concentrations may cause irritant reactions (72)			UPDATE PT
Chlorproethazine		1% pet.; if negative and (photo)allergy is strongly suspected, use 10% pet. (risk of false-positives) (72)	3459		NEW; CAS 84-01-5; see ref. 72 for details
Chlorpropamide		5% pet. (17)	3462		NEW; CAS 94-20-2; see ref. 17 for details
Ciclesonide		0.1% and 1% alc. (72)	3536		NEW; CAS 126544-47-6; see ref. 72 for details
Cilastatin mixture with imipenem		Tablet, pulverized, 20% pet. (17)			NEW; CAS 92309-29-0; see ref. 17 for details
Clemizole		2% pet. (72)	3614		NEW; CAS 442-52-4; see ref. 72 for details
Clindamycin		Hydrochloride, 10% pet. (26) # ; commercial preparation 14.4% a.i.			UPDATE PT; commercial preparation 14.4% a.i. pet. was negative in >10

		pet. (75)			individuals (75)
Clobazam		10% pet. (17)	3626		NEW; CAS 22316-47-8; see ref. 17 for details
Clocortolone pivalate		0.1% and 1% alc. (72)	3633		NEW; CAS 34097-16-0; see ref. 72 for details
Çlofazimine		10% pet. (17)	3637		NEW; CAS 2030-63-9; see ref. 17 for details
Clofenoxyde		1% ethyl acetate (72)			NEW; CAS 3030-53-3; see ref. 72 for details
Clonidine		9% pet. (17)			UPDATE PT
Clorazepic acid		1% water (17)	3662		NEW; CAS 23887-31-2; see ref. 17 for details
Cloxacillin		Beta-lactam antibiotics can generally be tested 5%-10% water and pet. (17) # ; commercial preparation 27.08% a.i (75)			UPDATE PT; commercial preparation 27.08% a.i. was negative in 7 individuals (75)
Clozapine		10% pet. (17)	3676		NEW; CAS 5786-21-0; see ref. 17 for details
Codeine		5% pet. (17)			UPDATE PT
Colistin		5% pet. (17,72)			UPDATE PT
Cortisone acetate		0.1% and 1% alc. (72)	3795		NEW; CAS 50-04-4; see ref. 72 for details
co-amoxiclav	See Amoxicillin mixture with clavulanate potassium				
Copper dibutyl dilaurate		0.5% pet. (81)			NEW; unknown chemical
Copper diethyl dilaurate		0.5% pet. (81)			NEW; unknown chemical
cotrimoxazole	See Sulfamethoxazole mixture with trime-thoprim				
Cyamemazine		0.1%, 1% and 5% pet. (17)	3943		NEW; CAS 3546-03-0; see ref. 17 for details
Cyclamen aldehyde		2.5% pet. (54)			UPDATE PT

Cyclophosphamide		5% saline (17)	4013		NEW; CAS 50-18-0; see ref. 17 for details
o-cymen-5y-ol	See 3-Methyl-4-isopropylphenol				
Cypermethrin		1% water (62)	4034		NEW; CAS 52315-07-8; 5 controls were negative (62); occupational allergic contact dermatitis
Dabrafenib		Content of capsule, 30% pet. (17) #	11719		NEW; CAS 689-166-9; see ref. 17 for details
Dalteparin		Commercial preparation undiluted (17) #	5958		NEW; CAS 9005-49-6 (Heparin); see ref. 17 for details
Danaparoid		Commercial preparation undiluted (17) #	4080		NEW; CAS 308068-55-5; see ref. 17 for details
Dermabond ®	See 2-Octyl 2-cyanoacrylate				
Dexchlorpheniramine		1% water; 5% pet. (72)			UPDATE PT
Dextropropoxyphene		Pulverized tablet, 5% and 20% in water and petrolatum (17) #	9222		NEW; CAS 469-62-5; see ref. 17 for details
Di-C12-C13 alkyl malate		1% and 0.1% pet. (41)		+	NEW; CAS 149144-85-4; 5 controls were negative (41)
Diatrizoic acid		Commercial preparation undiluted; sodium diatrizoate 10% water (17) #	4263		NEW; CAS 117-96-4
Diazepam		Commercial preparation 1.8% a.i. pet. (75)			UPDATE PT; 1.8% a.i. was negative in 10 individuals
2,4-Dichlorophenol		1% and 5% pet. ; 10% is irritant (73)			NEW; CAS 120-83-2
Diclofenac sodium salt		10% pet. (74)			UPDATE PT; the conc. was not irritant in >20 individuals (74)
N,*N*-Diethylaniline		2% pet, 10% alc (81)			CAS 91-66-7
Difluprednate		0.1% and 1% alc. (72)	4441		NEW; CAS 23674-86-4; see ref. 72 for details
Dihydro-1*H*-imidazole monohydrochloride 4,5-		0.1% pet. (72)			NEW; CAS 34301-57-0; see ref. 72 for details

Diltiazem		1% pet. (25)			UPDATE PT; because of very strong patch test reactions to concentrations of 3% and higher, a 1% conc. is advised, not the 10% material commercially available from Chemotechnique
Dimenhydrinate		Tablet, pulverized, 10% pet. or DMSO (17) #	4500		NEW; CAS 523-87-5; see ref. 17 for details
Dimethindene		5% pet. (17,72)			UPDATE PT
N,*N*-Dimethylacrylamide		0.1% pet. (1,47)			NEW; CAS 2680-03-7; 20 controls were negative to 0.032% pet. (47)
Dipivefrin HCl		1% and 5% water (72)			UPDATE PT
Disperse blue 106					UPDATE PT; patch test sensitization at 1% pet.: ref. 79
Disperse blue 124					UPDATE PT; patch test sensitization at 1% pet.: ref. 79
Dithranol		0.001% pet.; test in higher concentration if negative and contact allergy is strongly suspected, but at 0.005% pet., 1/3 of patients may show irritant reactions (72)			UPDATE PT
Domperidone		Commercial preparation 3% a.i. pet. (75)	4737		NEW; CAS 57808-66-9; 3% a.i. pet. was negative in 8 individuals (75)
Dronedarone		Crushed 400 mg film-coated tablets in pet. 'as is' (28) #	4768		NEW; CAS 141626-36-0; photoallergic drug eruption with positive photopatch test
Droxicam		1% and 5% pet. (17)			UPDATE PT
Dutasteride		0.001%, 0.01%, and 0.05% alc. (29)	4788		NEW; CAS 164656-23-9; 20 controls were negative (29); allergic reaction to mesotherapy (subcutaneous injections)
Efavirenz		Capsule content, 50% water (17) #	4839		NEW; CAS 154598-52-4; see ref. 17 for details

Emtricitabine		Tablet, pulverized, 20% pet. (17) #	4892		NEW; CAS 143491-57-0; see ref. 17 for details
Enoxaparin		Commercial preparation undiluted (17)	5958		NEW; CAS 9005-49-6 (Heparin); see ref. 17 for details
Eperisone		1%, 10% and 30% pet. (17) # *	4931		NEW; CAS 64840-90-0; see ref. 17 for details
Ephedrine		10% pet. or water (72)			UPDATE PT
Eprazinone		Pulverized tablet moistened with water (17) #	4958		NEW; CAS 10402-90-1; see ref. 17 for details
Ertapenem		Tablets, pulverized, 10% and 30% water and pet. (17) #; most beta-lactam antibiotics can be tested 5%-10% pet. (17)	5001		NEW; CAS 153832-46-3; see ref. 17 for details
Eslicarbazepine		Tablet, pulverized, 20% pet. (17) #	5024		NEW; CAS 104746-04-5; see ref. 17 for details
Estradiol		5% alc. 96% (72)			UPDATE PT
Estrogens, conjugated		0.625 mg/g pet. (72)	3762		NEW; CAS 12126-59-9; see ref. 72 for details
Ethambutol		Pulverized tablet, 10%-30% pet. (17) #			UPDATE PT
Ethosuximide		Gel from ethosuximide capsule diluted to 10% active ingredients (17) #			UPDATE PT
3-*O*-Ethyl-L-ascorbic acid		10% water (76)			UPDATE PT
Ethylene glycol monoethyl ether acetate		5% MEK (81)			NEW: CAS 111-15-9
Etonogestrel		0.1% and 1% alc. and pet. (17)	5198		NEW; CAS 54048-10-1; see ref. 17 for details
Famotidine		1% and 5% water (17)			UPDATE PT
Felbinac		1% and 5% pet. (72)	5255		NEW; CAS 5728-52-9; see ref. 72 for details
Fenbutatin oxide		0.1% butanol (81)			NEW; CAS 13356-08-6
Fexofenadine		Tablet, pulverized, as is and 50% water (17) #	5367		NEW; CAS 83799-24-0; see ref. 17 for details

Floxacillin	flucloxacillin	10% pet. (17)			UPDATE PT
Fluclorolone acetonide		0.1% and 1% alc. (72)	1166		NEW; CAS 3693-39-8; see ref. 72 for details
flucloxacillin	See Floxacillin				
Fluconazole		Tablet 150 mg 30% pet. (15) # ; commercial preparation 17.6% a.i. pet. (75)	5423		NEW; CAS 86386-73-4; commercial preparation 17.6% a.i. pet. was negative in 9 individuals (75)
Fluindione		Commercial preparation 30% pet. and water (17) #	5435		NEW; CAS 957-56-2; see ref. 17 for details
6-Fluoro-3,4-dihydro-2-(2-oxiranyl)-2*H*-1-benzopyran		10% pet. (38)			NEW; various CAS numbers (ChemIDPlus); occupational allergic contact dermatitis
Fluorometholone		0.1% and 1% alc. (72)	5477		NEW; CAS 426-13-1; see ref. 72 for details
Flurandrenolide		0.1% and 1% alc. (72)			UPDATE PT
Fluvoxamine		1% and 5% pet. (17)	5516		NEW; CAS 54739-18-3; see ref. 17 for details
Fondaparinux		Commercial preparation undiluted (17) #	5528		NEW; CAS 104993-28-4; see ref. 17 for details
Fulvestrant		Commercial solution 250 mg/ml undiluted (55)	5583		NEW; CAS 129453-61-8; one (!) control was negative
Furazolidone		1% and 10% pet.; testing in PEG-400 may be preferable (17)			UPDATE PT
Gabexate mesylate		1% and 10% pet. (17)	5620		NEW; CAS 39492-01-8; see ref. 17 for details
Garenoxacin		10% (probably pet. and probably from pulverized tablets) (17) #	5672		NEW; CAS 194804-75-6; see ref. 17 for details
Geranylgeranyl-hydroquinone		0.5% pet (81)			NEW; CAS 39703-09-8; risk of patch test sensitization: ref. 81
Gliclazide		Tablet, pulverized, 30% pet. and water (17) #	5744		NEW; CAS 21187-98-4; see ref. 17 for details
3-Glyceryl ascorbate		10% water (5)			NEW; CAS 1120360-11-3; 3 controls were negative

Glycyrrhiza inflata root extract		1% alc. (2)			UPDATE PT; 20 controls were negative
Gramicidin		1% and 10% pet. (72)			UPDATE PT
Griseofulvin		1% and 10% pet. (17)			UPDATE PT
Halquinol		5% pet. (17,72)			NEW; CAS 8067-69-4; see ref. 17 for details
Helional	2-methyl-3-(3,4-methylenedioxyphenyl)-propanal	7.5% pet. (54)			UPDATE PT
Hexyl salicylate		12.5% pet. (54)			UPDATE PT
hydrocinnamic acid, 3,5-di-*t*-butyl-4-hydroxy-, octadecyl	See Octadecyl 3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)propionate				
Hydrocortisone probutate		0.1% and 1% alc. (72)			NEW; CAS 72590-77-3; see ref. 72 for details
Hydrocortisone sodium phosphate		0.1% and 1% alcohol (17)	6094		NEW; CAS 6000-74-4; see ref. 17 for details
Hydrocortisone valerate		0.1% and 1% alc. (72)			UPDATE PT
Hydroxychloroquine		Commercial tablet 200 mg, 20% water and pet. (22); sulfate, 0.5%, 1% and 2% saline (63)			UPDATE PT; 6 controls were negative (63); occupational allergic contact dermatitis (63)
10-Hydroxydecenoic acid		0.01% pet. (43)			NEW; CAS 14113-05-4; 5 controls were negative (43)
N-(4-hydroxyphenyl)-benzenesulfonamide	benzenesulfonamide, *N*-(4-hydroxyphenyl)	0.1% pet. (58)			NEW; CAS 5471-90-9; 5 controls were negative occupational allergic contact dermatitis
Hydroxyprogesterone		0.1% and 1% alc. (17)			UPDATE PT
Hydroxyurea		Tablet, pulverized, 20% water (17) #	6158		NEW; CAS 127-07-1; see ref. 17 for details
Ibacitabine		1% and 5% pet. (72)			NEW; CAS 611-53-0; see ref. 72 for details
Ibandronic acid		No reliable data; 1% pet. and water are irritant in 60% of controls and 0.1% in 25% (17)	6192		NEW; CAS 114084-78-5; see ref. 17 for details

Ibuprofen		Commercial preparation 16.3% a.i. (75)			UPDATE PT; the conc. was not irritant in >10 individuals (75)
Indeloxazine		10% and 20% pet. (17) # *	1196		NEW; CAS 60929-23-9; see ref. 17 for details
Interferons	See peginterferon …..				
Iobitridol		Commercial preparation undiluted (17)	6322		NEW; CAS 136949-58-1; see ref. 17 for details
Iodine		0.25% alcohol; this may cause false-positive, irritant reactions, but also allergic *and* irritant patch test reactions (72)			UPDATE PT
Iodixanol		Commercial preparation undiluted (17)			UPDATE PT
Iohexol		Commercial preparation undiluted (17)	6365		NEW; CAS 66108-95-0; see ref. 17 for details
Iomeprol		Commercial preparation undiluted (49)			UPDATE PT; all iodinated contrast media may be tested undiluted (17,18)
Iopamidol		Commercial preparation undiluted (17)	6370		NEW; CAS 60166-93-0; see ref. 17 for details
Iopentol		Commercial preparation undiluted (17)	6372		NEW; CAS 89797-00-2; see ref. 17 for details
Iopromide		Commercial preparation undiluted (17)	6375		NEW; CAS 73334-07-3; see ref. 17 for details
Ioversol		Commercial preparation undiluted (17)	6379		NEW; CAS 87771-40-2; see ref. 17 for details
Ioxaglic acid		Commercial preparation undiluted (17)	6380		NEW; CAS 59017-64-0; see ref. 17 for details
Ioxitalamic acid		Commercial preparation undiluted (17)			NEW; CAS 28179-44-4; see ref. 17 for details
Ipragliflozin		Crushed tablet 10% and 20% in water and pet. (17) #	11865		NEW; CAS 761423-87-4; see ref. 17 for details
Irbesartan		5% pet. (17) #	6397		NEW; CAS 138402-11-6; see ref. 17 for details
Irganox 1076 ®	See Octadecyl 3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)propionate				

Isepamicin		Sulfate, 10% water (17)	6421		NEW; CAS 58152-03-7; see ref. 17 for details
Isoflupredone acetate		0.1% and 1% alc. (72)	6490		NEW; CAS 338-98-7; see ref. 72 for details
Isoniazid		Pulverized tablets 5%, 10% and 30% pet.; pure isoniazid 1% pet. and water have also been used with success, but the low concentration will likely result in some false-negative reactions (17) #			UPDATE PT
Isopropyl lauroyl sarcosinate		5% alc. (10,57)		+	NEW; CAS 230309-38-3; 4 controls were negative (57)
isopropyl methylphenol	See 3-Methyl-4-isopropylphenol				
Isoproturon		1% water (62)	6534		NEW; CAS 34123-59-6; 5 controls were negative; occupational allergic contact dermatitis
Isotretinoin		0.01% alc. (17)	6544		NEW; CAS 4759-48-2; see ref. 17 for details
Ivacaftor		Commercial preparations 75 and 150 mg, 20% saline and pet. (78)	6565		NEW: CAS 873054-44-5; 5 controls were negative; the reactions with ivacaftor in saline were stronger than in pet.
Josamycin		Commercial preparation 1.53% a.i. pet. (75)	6586		NEW; CAS 16846-24-5; 1.53% a.i. pet. was negative in >20 individuals
Ketorolac tromethamine		1% and 5% pet. (72)	6623		NEW; CAS 74103-07-4; see ref. 72 for details
Ketotifen		2.5% pet. (72)			UPDATE PT
Lauryl glucoside		3% pet		+	CAS 110615-47-9; Chemo
Lauryl PCA		20% pet. (60)		+	NEW; CAS 22794-26-9; 5 individuals were negative
Levobunolol		10% pet. (72)			UPDATE PT
Levofloxacin		Tablet, pulverized, 10% and 20% pet. (17) # ; commercial preparation			NEW; CAS 100986-85-4; see ref. 17 for details; commercial preparation

		24.2% a.i. pet. (75)			24.2% a.i. pet. was negative in >20 individuals (75)
Levomepromazine		0.1% and 1% pet. (17)	6788		NEW; CAS 60-99-1; see ref. 17 for details
Lincomycin		5% pet. (17,72)			UPDATE PT
Lormetazepam		Tablet, pulverized, 10% pet. (17) #	6909		NEW; CAS 848-75-9; see ref. 17 for details
Mabuprofen		1%, 2% and 5% pet. (72)			NEW; CAS 82821-47-4; see ref. 72 for details
Manganese tetroxide		Pure (81)			NEW; CAS 1317-35-7
Mefenamic acid		Tablet, pulverized, 10% pet. (17)			UPDATE PT
Meloxicam		Crushed tablet, 10% pet. (46)	7164		NEW; CAS 71125-38-7; cross-reactivity in patients with fixed drug eruption from piroxicam
menadiol diacetate	See Acetomenaphthone				
Meprobamate		3 mg/ml (17)	7199		NEW; CAS 57-53-4; see ref. 17 for details
Meprylcaine		5% pet. (72)	307		NEW; CAS 495-70-5; see ref. 72 for details
Mequitazine		1% pet. (17)	7201		NEW; CAS 29216-28-2; see ref. 17 for details
Methoxsalen		For patch testing: 0.15% alcohol; for photopatch testing a dilution series (0.15%, 0.015%, 0.0015%) may be necessary to differentiate photoallergy from phototoxicity (72)			UPDATE PT
Methyldiphenhydramine	orphenadrine	1% pet. (72)	8245		NEW; CAS 83-98-7; see ref. 72 for details
2,2-Methylenebis(6-*tert*-butyl-4-methylphenol) monoacrylate		0.3% pet. (11)			NEW; no CAS number available; 20 controls were negative
4,4'-Methylenedianiline		0.1% o.o. (81)			NEW; CAS 101-77-9
3-Methyl-4-isopropylphenol	*o*-Cymen-5y-ol; isopropyl methylphenol	1.5% pet. (52)		+	NEW; CAS 3228-02-2; 10 controls were negative

2-methyl-3-(3,4-methylenedioxyphenyl)-propanal	See Helional				
Methylprednisolone		0.1% and 1% alc. (72)			UPDATE PT
Methyl salicylate 2-ethylbutyrate		30% pet. (72)			NEW; CAS 85005-92-1; see ref. 72 for details
Metipranolol		5%-10% pet. (72)			UPDATE PT
Metronidazole		Commercial preparation 21.6% a.i. pet. (75)			UPDATE PT; commercial preparation 21.6% a.i. pet. was negative in >20 individuals (75)
Mezlocillin		5% pet. (17)			UPDATE PT
Morphine		3%, 5% and 10% in 2% acetic acid solution (42)			
Moxifloxacin		Tablet, pulverized, 30% pet. (17) #	7647		NEW; CAS 151096-09-2; see ref. 17 for details
Mupirocin		2% pet. (72)			UPDATE PT
Nadroparin		Commercial preparation undiluted (17)	5958		NEW; CAS 9005-49-6 (Heparin); see ref. 17 for details
Nalmefene		Hydrochloride, 1% water (8)			NEW; CAS 55096-26-9; 20 controls were negatigative; occupational allergic contact dermatitis
Nebivolol		Tablet, pulverized, 20% pet. and saline (17) #	7786		NEW; CAS 601-527-4; see ref. 17 for details
Nicardipine		Tablet, pulverized, 20% water (17) #	7850		NEW; CAS 55985-32-5; see ref. 17 for details
Nicoboxil		1% and 2.5% pet. (72)			NEW; CAS 13912-80-6; see ref. 72 for details
Nicomorphine		1% pet. or water (17)	7875		NEW; CAS 639-48-5; see ref. 17 for details
Niflumic acid		Commercial preparation 2.5% a.i. pet. (75)			UPDATE PT; the conc. was not irritant in >100 individuals (75)
Nifuroxime		0.5%, 2% and 5% pet. (72)	7890		NEW; CAS 6236-05-1; see ref. 72 for details
Nifurprazine		0.5%, 2% and 5% pet. (72)			NEW; CAS 1614-20-6; see ref. 72 for details

Nimesulide		1% and 5% pet.; 10% pet. (17) #	7903		NEW; CAS 51803-78-2; see ref. 17 for details
Nonoxynol-9		2%, 1%, 0.5% and 0.1% water; perform controls, irritant reactions are likely at concentrations of 1% and higher (72)			UPDATE PT
Norhydroxymorphinone		3% pet. (42)			NEW; unknown chemical; occupational allergic contact dermatitis
Octadecyl 3-(3,5-di-*tert*-butyl-4-hydroxyphenyl)propionate	Irganox 1076 ®; hydrocinnamic acid, 3,5-di-*t*-butyl-4-hydroxy-, octadecyl	2%, 0.5% and 0.05% pet. (66)			NEW; CAS 2082-79-3
1,2-octanediol	See Caprylyl glycol				
Octenidine		0.1% water (81)			NEW; CAS 71251-02-0
2-Octyl 2-cyanoacrylate	Dermabond ®	10% pet. (80)			NEW; CAS 133978-15-1
Ofloxacin		Commercial preparation 15% a.i. pet. (75)			NEW; CAS 82419-36-1; 15% a.i. pet. was negative in >20 individuals (75)
Oleoyl tyrosine		1% pet. (6)		+	NEW; CAS 147732-57-8; 3 controls were negative (6)
Omeprazole		0.1%, 0.5% and 1% pet. and alcohol (17) # ; commercial preparation 2.6% a.i. pet. (75)			UPDATE PT; the 2.6% a.i. pet. preparation was negative in >20 controls
OnabotulinumtoxinA	botulin A; botulinum toxin type A	Commercial preparation pure (17)	2632		NEW; CAS 93384-43-1; see ref. 17 for details
Ondansetron		Commercial preparation 9.2% a.i. pet. (75)	8213		NEW; CAS 99614-02-5; 9.2% a.i. pet. was negative in 10 individuals
Ornidazole		Commercial drug 30% and 50% pet. (17) #	8237		NEW; CAS 16773-42-5; see ref. 17 for details
orphenadrine	See Methyldiphenhydramine				
Oxacillin		Commercial drug 30% pet. (65) # ; commercial preparation 30% a.i. pet. (75)	8273		NEW; CAS 66-79-5; commercial preparation 30% a.i. pet. was negative in >100 individuals (75)

Oxcarbazepine		10% pet.; with serious cutaneous adverse re-reactions, starting with 1% pet. may be advisable (17)	8298		NEW; CAS 28721-07-5; see ref. 17 for details
Oxybuprocaine		1% and 5% pet. (72)			UPDATE PT
Oxybutynin		Tablet, pulverized, 30% pet. (17) #	8324		NEW; CAS 5633-20-5; see ref. 17 for details
Pantoprazole		Commercial preparation 6.1% a.i. pet. (75)			UPDATE PT; the 6.1% a.i. pet. preparation was negative in >20 individuals
pantothenate calcium	See Calcium pantothenate				
Paramethasone		Base or acetate, 0.1% and 1% alc. (17)	8403		NEW; CAS 53-33-8; see ref. 17 for details
Pecilocin		1%, 5% and 10% pet. (72)			UPDATE PT
Pefloxacin		Commercial preparation 15.38% a.i. pet. (75)	8442		NEW; CAS 70458-92-3; commercial preparation 15.38% a.i. pet. was negative in >20 individuals
PEG-45/dodecyl glycol copolymer		10% pet. (9)		+	NEW; CAS 67743-86-6; CAS in the article given as 78336-31-9, but this is probably for PEG-22/ dodecyl glycol copolymer
Peginterferon alfa-2a (and recombinant)	Pegasys ®; pegylated interferon alfa-2a	Commercial preparation 30% pet. (17); pure injectable commercialized form as is (75)	8445		NEW; CAS 198153-51-4; see ref. 17 for details; the 'as is' preparation was negative in >10 individuals (75)
Perginterferon alfa-2b (and recombinant	pegylated interferon alfa-2b	pure injectable commercialized form as is (75)	8446		NEW; CAS 215647-85-1; the 'as is' preparation was negative in >10 individuals (75)
Penethamate		25% pet.; commercial product 250.000 IU/ml (17)			UPDATE PT
Penicillin G benzathine		30% water (17); beta-lactam antibiotics may generally be tested 5%-10% pet.	8475		NEW; CAS 41372-02-5; see ref. 17 for details
Periciazine		Crushed tablet, powder pure (17) #	8549		NEW; CAS 2622-26-6; see ref. 17 for details

Phenethicillin		5%-10% pet. (17)			UPDATE PT
Phenoxybenzamine		0.1% water; 1% is irritant and may sensitize (17)			UPDATE PT
2-Phenoxyethyl acrylate	2-propenoic acid, 2-phenoxyethyl ester	0.1% pet. (12)			NEW; CAS 48145-04-6
Piperacillin		5% pet. (17)	`8845		NEW; CAS 61477-96-1; see ref. 17 for details
Piperacillin mixture with tazobactam		Tablet, pulverized, 30% pet. (17)	8845, 10490		NEW; CAS 123683-33-0; see ref. 17 for details
Pirenoxine		1% water (72)	8873		NEW; CAS 1043-21-6; see ref. 72 for details
Pirfenidone		Pirfenidone 801 mg 10%, 1%, 0.1% and 0.01% water (14); 1% pet. (17)	8876		NEW; CAS 53179-13-8; photoallergic drug eruption with positive patch test; 10% and 1% water in plain patch tests may be irritant (14)
Piritramide		Commercial injectable solution (10 mg/ml) (17)	8881		NEW; CAS 302-41-0; see ref. 17 for details
Piroxicam betadex		Test with piroxicam 1.0% pet. (17)			NEW; CAS 96684-40-1; see ref. 17 for details
Pivampicillin		5% pet. (17)			UPDATE PT
Polyacrylamide/C13-14 isoparaffin/laureth-7 mix	Sepigel ® 305	As is (as supplied, concentration unknown) (48)		+	NEW; no CAS number found
Potassium acid oxalate		0.5% water (81)			NEW; CAS 127-95-7
Potassium aminobenzoate		Test *p*-aminobenzoic acid (PABA) 10% pet. (17)	8997		NEW; CAS 138-84-1; see ref. 17 for details
potassium clavulanate	See Amoxicillin mixture with clavulanate potassium				
povidone-iodine	See PVP-iodine				
Practolol		5% and 10% pet. (17)			UPDATE PT
Prasugrel		Hydrochloride, 1%, 5% and 10% pet. (17)	9103		NEW; CAS 150322-43-3; see ref. 17 for details

Prednisolone		Commercial preparation 3.51% a.i. pet. (75)			UPDATE PT; 3.51% a.i. pet was negative in >20 controls (75)
Prednisolone acetate		0.1% and 1% alc. (17,72)			NEW; CAS 52-21-1; see ref. 17 for details
Prednisolone sodium succinate		0.1% and 1% alc. (17)	9111		NEW; CAS 1715-33-9; see ref. 17 for details
Prednisolone tetrahydrophthalate sodium salt		0.1% and 1% alc. (17)	9111		NEW; CAS 10059-14-0; see ref. 17 for details
Prednisolone valerate acetate		0.1% and 1% alc. (72)	9111		NEW; CAS 72064-79-0; see ref. 72 for details
Prednisone		Commercial preparation 3.51% a.i. pet. (75)			UPDATE PT; 3.51% a.i. was negative in 7 individuals
Pregabalin		Crushed tablet 5% pet. (50) #	9113		NEW; CAS 148553-50-8
Pristinamycin		Commercial preparation 20.7% a.i. pet. (75)			20.7% a.i. was negative in >20 individuals (75)
Procaine benzylpenicillin		30% water; test also procaine HCl. 1% or 2% pet. and benzylpenicillin 5% pet. (17)	8476		NEW; CAS 54-35-3; 6130-64-9; see ref. 17 for details
Procinonide		0.1% and 1% alc. (72)			NEW; CAS 58497-00-0; see ref. 72 for details
Proguanil		Tablets, pulverized, 30% pet. (17) #	3361		NEW; CAS 500-92-5; see ref. 17 for details
Promestriene		0.1% alc. (72)			NEW; CAS 39219-28-8; see ref. 72 for details
Propacetamol		1% and 10% pet. (17) #			UPDATE PT
2-propenoic acid, 2-phenoxyethyl ester	See 2-Phenoxyethyl acrylate				
Propiconazole		1% water (62)	9202		NEW; CAS 60207-90-1; 5 controls were negative; occupational allergic contact dermatitis
Propiopromazine		1% water (17)	9213		NEW; CAS 3568-24-9; see ref. 17 for details
Propipocaine		1% pet. (72)	907		NEW; CAS 3670-68-6; see ref. 72 for details
Propylthiouracil		Tablet, pulverized, 10% pet. (17) #	9250		NEW; CAS 51-52-5; see ref. 17 for details

Pseudoephedrine		Start with 1% pet. to avoid recurrence of drug eruptions (74)			UPDATE PT
PVP-iodine		2% water (13); 2% and 5% water (72)			UPDATE PT
Pyridoxine		1% and 10% pet. (17,72)			UPDATE PT
Pyrimethamine		Tablet, pulverized, 30% pet. (17) #	9368		NEW; CAS 58-14-0; see ref. 17 for details
Quinazoline oxide		0.01%, 0.5%, and 1% pet. (81)			NEW; unknown chemical; risk of patch test sensitization: ref 81
Ramipril		Tablet, pulverized, 30% pet. (17) #	9491		NEW; CAS 87333-19-5; see ref. 17 for details
Retapamulin		1% pet. (72)			UPDATE PT
Retinol		1% and 10% acet. (72)			UPDATE PT
Ribavirin		Commercial preparation 20.7% a.i. pet. (75)	9593		NEW; CAS 36791-04-5; 20.7% a.i. pet. was negative in >10 individuals
Rifampicin		Tablet, pulverized, 30% pet. (17) # ; commercial preparation 24.7% a.i. pet. (75)			UPDATE PT; commercial preparation 24.7% a.i. pet. was negative in >20 individuals (75)
Ripasudil		Ripasudil HCl dihydrate 1% and 10% pet. (4)	11878		NEW; CAS 223645-67-8; 3 controls were negative (4)
Risperidone		10% pet. (38) # *	9631		NEW; CAS 106266-06-2; occupational allergic contact dermatitis
Ritodrine		1% and 0.1% water (17)	9635		NEW; CAS 26652-09-5; see ref. 17 for details
Rosuvastatin		Tablet, pulverized, 20% pet. (17) #	9672		NEW; CAS 287714-41-4; see ref. 17 for details
Roxithromycin		Commercial preparation 20.3% a.i. pet. (75)	9679		NEW; CAS 80214-83-1; 20.3% a.i. was negative in >20 individuals
Rupatadine		Crushed 10 mg tablets, 30% in water and pet. (27) #	9700		NEW; CAS 158876-82-5; 15 controls were negative (27)
Secnidazole		Commercial medication 30% pet. and water (59) #	9826		NEW; CAS 3366-95-8

Secukinumab		Commercial preparation for subcutaneous injection undiluted (17)	11827		NEW; CAS 1229022-83-6; see ref. 17 for details
Sepigel ® 305	See Polyacrylamide/ C13-14 isoparaffin/ laureth-7 mix				
Sertraline		1%, 5% and 10% in pet. r alc. (17)	9876		NEW; CAS 79617-96-2; see ref. 17 for details
Sildenafil		Tablet, pulverized, 10% pet. (17) #	9898		NEW; CAS 139755-83-2; see ref. 17 for details
Sirolimus		Sirolimus 0.1% oral solution (72)	9502		NEW; CAS 53123-88-9; see ref. 72 for details
Sisomicin		20% pet. (72)			NEW; CAS 32385-11-8; see ref. 72 for details
Sorafenib		Tablet 0.1%, 1% and 10% pet. (17) #	10116		NEW; CAS 284461-73-0; see ref. 17 for details
Spaglumic acid		1% pet. (72)			NEW; CAS 4910-46-7; see ref. 72 for details
Spirotetramat		1% pet. (7)	10158		NEW; CAS 203313-25-1; 15 controls were negative (7)
Stannous chloride		<1% pet. (30)			UPDATE PT; the 1% concentration in pet. is strongly irritant (30)
Stannous fluoride		0.15% and 0.5% pet. (30)			UPDATE PT
Succinylcholine		5% water (17) #			NEW; CAS 306-40-1; see ref. 17 for details
Sucrose stearate		3.5% water (35); 10% pet. (39)		+	NEW; CAS 25168-73-4; 5 controls were negative (35)
Sulfadiazine silver		5% pet.; test also silver nitrate 1% water and sulfadiazine 5% pet.; test propylene glycol (72)			UPDATE PT
Sulfamethoxazole		Tablet, pulverized, 10%, 20% and 50% pet. # ; for fixed drug eruptions, use open tests with 10%, 20% and 50% in DMSO (17)			UPDATE PT
Sulfamethoxazole mixture with trimethoprim	cotrimoxazole	10% pet.; commercial preparation 24% a.i. pet. (75)	10320		NEW; CAS 8064-90-2; CHEMO; commercial preparation 24% a.i. pet. was negative in >20 individuals (75)

Tacrolimus		5% alc. (72)			UPDATE PT
Talampicillin		5% and 10% pet. (17)	10435		NEW; CAS 47747-56-8; see ref. 17 for details
Teicoplanin		Commercial preparation 30% a.i. pet. (75)			UPDATE PT; 30% a.i. pet. was negative in >20 individuals (75)
Telaprevir		Commercial preparation 11.1% a.i. (75)	10526		NEW; CAS 402957-28-2 ; 11.1% a.i. was negative in >10 controls
Telithromycin		Commercial preparation 19.67% a.i. (75)	10531		NEW; CAS 191114-48-4; 19.67% a.i. was negative in >20 controls
Tenofovir		Tablet, pulverized, 10% pet. (17) #	10559		NEW; CAS 147127-20-6; see ref. 17 for details
Tenoxicam		5% and 10% pet. (17) #	10561		UPDATE PT
Terbinafine		Tablet, pulverized, 30% pet. (17) #	10569		NEW; CAS 91161-71-6; see ref. 17 for details
Terconazole		1% pet., alc. and MEK (72)	10573		NEW; CAS 67915-31-5; see ref. 72 for details
Terfenadine		1% pet. (17)	10576		NEW; CAS 50679-08-8; see ref. 17 for details
Tetrahydrozoline		1% in pet., water and alc. (72)	10634		NEW; CAS 84-22-0; see ref. 72 for details
Tetrazepam		Commercial preparation 7.7% a.i. pet. (75)			UPDATE PT; 7.7% a.i. pet. was negative in 10 controls
Thiobencarb		1% water (81)			NEW; CAS 28249-77-6
Thiocolchicoside		0.5%, 1.5% and 5% pet. and water (72)			UPDATE PT
Thioridazine		0.1% pet.; with 1% pet., photopatch testing with >4 J/cm^2 UVA irradiation will result in phototoxic reactions in most individuals (17)			UPDATE PT
Tinuvin ® 770	See Bis(2,2,6,6-tetramethyl-4-piperidinyl) sebacate				
Tinzaparin		Commercial preparation undiluted (17)	5958		NEW; CAS 9005-49-6 (Heparin); see ref. 17 for details

Tiopronin		5% and 10% pet.; 10% is slightly irritant (17)			UPDATE PT
Tolazoline		Hydrochloride 1%, 2%, 5% and 10% water (72)			UPDATE PT
Tramadol		Commercial prepara-tion 9.32% pet. a.i. (75)			UPDATE PT; the conc. was not irritant in >20 individuals (75)
Tranexamic acid		1% and 10% pet. (17) # *	11000		NEW; CAS 1197-18-8; see ref. 17 for details
Traziquone		0.05% Eucerin (72)			NEW; CAS 68-76-8; see ref. 72 for details
Trazodone		10% pet. (38) # *			ÙPDATE PT
Triamcinolone hexacetonide		0.1% and 1% alc. (72)			UPDATE PT
Triazolam		Tablet, pulverized, 10% pet. (17) #	11035		NEW; CAS 28911-01-5; see ref. 17 for details
Triethanolamine polypeptide oleate condensate		Oleyl polypeptide 25% and 50% alc. (perform controls); triethanol-amine polypeptide oleate condensate 1% pet.; the eardrops undiluted may cause irritant reactions and can be tested at 25% in petrolatum (72)			UPDATE PT
Trifluorothymidine	trifluridine	1%, 5% and 10% pet. (72)			UPDATE PT
triisopropanolamine	see Tris(2-hydroxy-propyl) amine				
Trimebutine		0.5% and 1% water and pet. (17,72)	11138		NEW; CAS 39133-31-8; see ref. 17 for details
Trimeprazine		1% pet.; for photopatch testing use 0.1% pet. (17)			
Trimethoprim		10% pet.; use open tests with trimethoprim 10%, 20% and 50% DMSO for fixed drug eruptions (17)			UPDATE PT
2,2,4-Trimethyl penta-nediol-1,3-diisobuty-rate		5% pet. (36)			NEW; CAS 6846-50-0; 6 controls were negative

Trimethylphlorogluci-nol		Commercial prepara-tion 4% a.i. pet. (75)			NEW; CAS 4463-03-0; the 4.% a.i. pet. preparation was negative in 7 controls
Tris(2-hydroxypropyl) amine	triisopropanolamine	0.5% pet. (81)			NEW; CAS 122-20-3
Tylosin		10% pet. (38) # *			UPDATE PT
Tyrothricin		1%, 2.5%, 5% and 10% pet. (72)			UPDATE PT
Valdecoxib		10% pet. (3) (17) # *	11356		NEW; CAS 181695-72-7; see ref. 17 for details
Valproic acid		1%-5% pet. (17); accor-ding to some authors this may be irritant; the commercial drug 20% water was negative in 25 controls (17)	11369		UPDATE PT; CAS 99-66-1; see ref. 17 for details
Vildagliptin		1%, 10% and 50% pet. (68)	11447		NEW; CAS 274901-16-5; occupational allergic contact dermatitis
Virginiamycin		5% and 10% pet. (72)			UPDATE PT
vitamin K4	See Acetomenaph-thone				

acet. = acetone; a.i. = active ingredients; alc. = alcohol; DMSO = dimethyl sulfoxide; o.o. = olive oil; pet. = petrolatum

See the section 'Patch testing in drug eruptions' above; most pure systemic drugs can be tested at 10% pet. When the pure chemical is not available, the test material can best be prepared from intravenous powder, the content of capsules or – when also not available – from powdered tablets to achieve a final concentration of the active drug of 10% pet. wt/wt. (17,18)
* Uncertain whether the pure chemical or the drug the patient had taken was used for patch testing

AGEP: Acute generalized exanthematous pustulosis
CHEMO: Available from Chemotechnique (www.chemotechnique.se)
DRESS: Drug reaction with eosinophilia and systemic symptoms
SDRIFE: Symmetrical drug-related intertriginous and flexural exanthema

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