AA. See Amino acids	AES. See Alkyl ether sulfates (AES)
AAR. See Aspartic acid racemization (AAR)	Aethiopathogenesis, of cellulite, 606
Absorption bases, and petrolatum emulsions, 125	AFM. See Atomic force microscopy (AFM)
Absorption coefficients, of principal skin	African skins, 10
components, 276	After-sun preparations
Accumulation, glycation end products	anti-inflammatory substances, 333-334
body weight, and age, 263–265	antioxidants, 334–335
measurement, 263	moisturizers, 333
smoking, and age, 263-265	other ingredients, 334–336
ACD. See Allergic contact dermatitis (ACD)	After-sun products
Acetone, 162, 168, 177. See also Dihydroxyacetone	green tea extract in, 334
(DHA)	preparations and active ingredients of, 332–336
ACH. See Aluminum chlorohydrate; Buffered	relevant effects of sunlight on skin, 331–332
aluminum salts	skin care after sun exposition, 332
Acne cosmetica, 439	AGE. See Advanced glycation end products (AGE)
Acne neonatorum, 614, 620	Age. See also Aging
Acne type, sensitive skin, 34	friction coefficient and, 419–420
Acrylates, 558	markers, 234
Actinic aging	and skin sensitivity, 68
with ages, 16	Aging, 233–240
in ethnic races, 13–14	
	active cosmetic ingredients, 626–628
Active compounds, oral cosmetics	antiaging actives, 627
choline-stabilized orthosilicic acid	extrinsic, 292–293, 677–678
(ch-OSA), 682	formulating effective cosmeceuticals
glycosaminoglycans, 681–682	botanical extracts, 133
minerals, 680–681	peptide/vitamin derivatives/botanicals,
multicomponent supplements, 683	130–133
polyphenolic compounds, 681	intrinsic, 291–292, 677
polyunsaturated fatty acids, 682–683	photoaging, 625
screening of, 679	physiological changes in cutaneous
vitamins, 679–680	dermal changes, 625–626
Acute irritant dermatitis, 471	epidermal changes, 626
Acyl ethylenediamines, 779	reactive oxygen species, 625
Acyl glutamates, 775	types, 236
Acyl peptides, 775	α-glycosylrutin (AGR), 627
AD. See Atopic dermatitis (AD), and skin	AGR. See α-glycosylrutin
sensitivity	AHA. See α-hydroxy acids (AHA)
Adenosine triphosphate (ATP), 175	α-hydroxy acids (AHA), 296, 333, 627, 746, 751
ADI. See Autosomal dominant ichthyosis vulgaris	federal laws for products containing, 840
(ADI)	lactic acid, 111
ADPV. See Adsorption differential pulse	Alcohol ethoxy sulfates (AEOS), 770
voltametry	Alcohol-free formulated systems, 637
Adsorption differential pulse voltametry	Alcohols, comedogenic scores of, 584
(ADPV), 198	Aliphatic acetates, 749
Advanced glycation end products (AGE), 261.	Alkali/acidic aggression tests, of skin buffering
See also Glycation end products	capacity, 215, 218
AEOS. See Alcohol ethoxy sulfates (AEOS)	Alkaline
Aerosol dispensers, EU legislation, 835	formulations, 124
Aerosols	hydrolysis, 769
antiperspirant, 638–639	Alkane sulfonates, 773
deodorants, 648	Alkanolamides, 782

Alkoxylated alcohols, 780	Animals
Alkoxylated lanolin derivatives, 361	protection
Alkoxylated polysiloxanes, 785	ban on testing, 828
Alkyl	EU (horizontal) legislation for, 833–834
betaines, 777	tests, 814
carbohydrates esters, 784	Anionic surfactants, 769–775
dimethicones, 373	carboxylates, 769–771
esters, 750	phosphates esters, 774–775
glyceride sulfates, 772	sulfates, 771–772
phosphates, 774	sulfonates, 772–774
polyglycol ether, 770	Antiadhesives, 646–647
sulfates, 771	Antiaging actives, 627
sulfonates, 772–773	Antiaging products, 295–296
Alkylamines, 775–776	oral cosmetics, 297
Alkyl-aryl sulfonates, 773	Anticellulite products/treatment, 608–609.
Alkyl ether sulfates (AES), 771–772	See also Cellulite
Alkylimidazolines, 776	Anti-inflammatory ingredients, 463
Alkyl polyglycosides (APG), 771, 781	cooling compounds, 334
Alkyl quaternary cellulose polymers, 367	hamamelis, 333
Allergens. See also Six fragrance allergens	polyhydroxy acids, 333
antioxidants	Anti-irritants
propyl gallate, 557	for dryness/tightness perception, 465
sodium metabisulfite, 557	for negative sensory skin feel, 465
category-specific ingredients, 557–558	for stinging, burning, and itching sensations,
coloring agents, 558	464–465
emulsifiers, 558	Anti-irritation
excipients, 558	by mild surfactants, 458
fragrance ingredients, 555–556, 557	by nonionic surfactants, 458
identification, 558–559	
preservatives, 556–557	by polymers, 462
	by primary surfactants, 459
Allergic contact dermatitis (ACD), 437,	by proteins/peptides, 462–463
438, 443	by refattening agents, 463
kojic acid and, 590	by secondary surfactants, 459
nail polishes and, 752, 754	Anti-itch testing, 573–579
sodium metabisulfite and, 557	electronic devices for, 576
Allergic reactions, nail	histamine-induced itch human model, 573–576
cyanoacrylate nail preparations, 763–764	models and efficacy of antiprurities, 577–579
methacrylic acid–containing primers, 764	questionnaires for, 577
sculptured nails, 763	scratch behavior measurement, 576
Allergic type, sensitive skin, 35	Antimicrobial active
ALS. See Ammonium lauryl sulfate (ALS)	glycerolether, 645–646
Aluminum chlorohydrate (ACH), 631	glyceryl fatty acid ester, 645
Aluminum zirconium glycine (AZG), 632	sucrose fatty acid ester, 645
Amide ether sulfates, 772	triclosan, 645
Amines, 694	Antimicrobial properties, of skin
Amino acids (AA), 364	in ethnic races, 52–53
in buffering capacity of skin, 217–218	Antioxidant efficiency, vitamin E prodrugs,
Ammonium lauryl sulfate (ALS), 771	349–350
Ammonium titanium lactate (ATL), 633	Antioxidants, 296, 301–307, 324, 334–335
Amodimethicones, 373, 696	antioxidant network, 306
Amontons' law, for friction coefficient of	against oxidative stress, 463–464
skin, 415	polyphenols, 305
Amphoteric surfactants, 778–779	propyl gallate, 557
Anatomical differences	regulation of gene transcription, 307
between baby and adult skin, 613-615	sodium metabisulfite, 557
Anatomical sites, skin sensitivity	thiol, 304–305
exposed skin, 68	vitamin C, 303–304
vulva, 68–70	vitamin E, 301–303
Anatomic sites	Antioxidative defense system, 627
friction coefficient and, 419-420	Antiperspirants, 631–639, 644
friction coefficient in, 419-420	aluminum zirconium glycine, 632
hexyl nicotinate (HN) in, 26-27	application forms for, 633
Anhydrous aerosol formulations, 633-634	aerosols, 638–639

[Antiperspirants	Auxiliary ingredients, conditioners
application forms for]	emulsifiers, 699
roll-ons, 636–638	humectants, 699
sticks, 634–636	preservatives, 698
biology of sweat glands in the human axilla, 631	thickness, 698–699
buffered aluminum salts, 632	AZG. See Aluminum zirconium glycine
current model/theory of, 632	
drug delivery system for, 633	D
film-forming polymers, 633	Baby care products, 613–620. See also Cosmetics
formulation work for, 633	acne neonatorum, 620
lyotropic liquid crystals, 633	baby and adult skin
silicones in, 378	anatomical differences, 613–615
sweat reduction by, 632	physiological differences, 615–616
titanium metal chelates, 633 Antipruritics	cleansing cosmetics, 617–618 diaper rash, 620
evaluation, 573–579	miliaria, 620
electronic devices for, 576	protecting cosmetics, 618–619
histamine-induced itch human model, 573–576	for skin and hair, 616–619
questionnaires for, 577	Baby wipes, 618
scratch behavior measurement, 576	Bacitracin <sup>®</sup> , 803
models and efficacy of, 577-579	Bacterial enzyme inhibitors, 646
and seawater, 547	Barrier creams (BC), 197
Anti-sensory irritation, 464	brief data of recent experiments of, 202-203
α-olefin sulfonates (AOS), 772	Barrier models, skin, 95–96
AOS. See A-olefin sulfonates (AOS)	Basal cell carcinomas (BCC), 240
APG. See Alkyl polyglycosides (APG)	Basal cells, 538
Apligraf <sup>®</sup> , 541	Basal membrane, baby vs. adult skin, 613
Apocrine glands, 631	Bath products, for babies, 617
baby vs. adult skin, 615	Baumann skin-type indicator (BSTI), 29–37
Apocrine secretion odor-binding proteins, 643	skin aging, 36–37
Appendages, in HN absorption, 26–27	skin hydration, 29–33
AQP3. See Aquaporin-3 (AQP3)	oily skin <i>versus</i> dry skin, 29–32
Aquaporins (AQP3), 31–32	skin care for O–D parameter, 32–33
Aquaporins (AQP), 96 Arbutin, 589	skin pigmentation, 35–36
Arbutin, 589 Arm immersion model, 477	skin sensitivity, 33–35 acne type, 34
Artificial nails	allergic type, 35
advantages, 760	rosacea type, 34
composition and technique, 755–760	sensitive <i>versus</i> resistant skin, 33–34
hospital, 764	stinging type, 34–35
microbial contamination, 764–765	BC. See Barrier creams
preformed plastic tips, 757–758	BCC. See Basal cell carcinomas (BCC)
unwanted effects, 760–761	Behind-the-knee (BTK) test, 381–382
Artocarpus lakoocha extracts, 591	chemical irritation, 489
Ascorbic acid, 679	DAP of sensory effects, 386
skin-whitening agents, 590	results for products, 387
Asian skins, 10	polarized light-enhanced visual scores of
ASOB/ASOB2. See Apocrine secretion	sensory effects, 383–386
odor-binding proteins	unaided visual scores of sensory effects,
Aspartate aminotransferase (AST), 542	382–383
Aspartic acid racemization (AAR), 243	upper arms and lower forearms, 490–491  Bending measurements hair 712–713
Aspirin, anti-itch testing, 574 Asteatotic eczema, 440	Bending measurements, hair, 712–713 Benzophenone-3, 558
ASTERIORIC ECZERIA, 440 ATF. See Bureau of Alcohol, Tobacco, and Firearms	Benzophenones, 317
(ATF)	Benzoyl peroxide (BPO), 303
ATL. See Ammonium titanium lactate	Benzylnicotinate (BN), 653
Atomic force microscopy (AFM), hair, 718–719	Berloque dermatitis, 440
Atopic dermatitis (AD), and skin sensitivity, 70	Betamethasone-17-valerate (BM17V), 543
ATP. See Energy production	Bidirectional reflection distribution function
Australia, regulation of UV filters, 313	(BRDF) measurements, of visibility of skin
Autofluorescence measurement, skin, 263	surface, 411
Autosomal dominant ichthyosis vulgaris	Biochemical penetration enhancement, 185
(ADI), 167	Biocidal Products Directive, 832

Bioengineering instruments	BSTI. See Baumann skin-type indicator (BSTI)
advantages in using, 820	BTK test. See Behind-the-knee (BTK) test
calibration of, 820	Buffer capacity, of skin, 215-218. See also Skin
disadvantages, 821–823	hydration
calibration, 821	acid/alkali aggression test, 215
claims made by the cosmetic industry, 821	CO <sub>2</sub> participation in, 217
hydration measurements, 822	eccrine sweat contribution to, 216
measuring units, 821	free amino acids and, 217–218
mechanical measurements on the skin,	free fatty acids/sebum in, 215–216
821–822	keratin contribution to, 216
sensitive skin, 822–823	SC thickness and, 216-217
single limited parameter, 821	water-soluble constituents, 216
standardization of, 820	Buffered aluminum salts (ACH), 632
validation of, 820	Bureau of Alcohol, Tobacco, and Firearms
Bioengineering measurement methods, for testing	(ATF), 841
skin hydration, 135–139	Butcher broom, 558
clinical relevance of, 139	Butylene glycol, 109
dynamic measurements	Butyl methoxydibenzoylmethane (BMDBM),
moisture accumulation test, 137–138	317, 788
plastic occlusion stress test, 138–139	BVR. See Blood vessel reactivity (BVR)
sorption-desorption test, 137	Byakko-ka-ninjin-to (BN), anti-itch testing, 576
*	byakko-ka-iniijii-to (biv), anti-nen testing, 570
near-IR-based spectroscopic measurements, 139 static measurements	
	Caenorhabitis elegans, 266
long-term tests/multiple applications, 137	Caffeine, 540, 541
short-term tests/single application, 136–137	Calcium
Bioengineering tests, skin sensitivity	
colorimetry, 87 corneometry, 87	cell signaling in skin, 173–174
. *	regulations, skin, 174–176 California, Safe Cosmetics Act (2005) of, 841
corneosurfametry, 87–88	
ISI, 88	Calmodulin, 174
LDV, 87	CAMP. See Cyclic adenosine monophosphate
TEWL, 86–87	(cAMP)
Biomechanical properties	Camphor, 750
with age, 16	derivatives, 316
in ethnic races, 13	Canadida albicans, 53, 647
in geographical locations, 18–19	Cannabidiol®, 803
between sexes, 15	CAP. See Contact allergy patch
Biotin, 680	Capillaroscopy, 740
Bismuth oxychloride crystals, 128	Capsaicin, 654–655
Blood-flow measurement	anti-itch testing, 575
in cutaneous vascular reactivity to HN, 25	for skin sensitivity test, 85
Blood vessel reactivity (BVR), 45–46	Carbon dioxide (CO <sub>2</sub> ), role in buffering capacity of
BMDBM. See Butyl methoxydibenzoylmethane	skin, 217
(BMDBM)	Carbonyl stress, 262
BN. See Benzylnicotinate	Carbopol Aqua CC polymer, 699
Body-cleansing products, 362	Carboxamide cooling agents, 666–670
Body creams, baby, 618	Carboxylates
Botanicals, 130–133	ester carboxylates, 770
Bowman's membrane, 537	ether carboxylates, 770–771
Brain activation maps, 79, 80	salts, 769–770
Brain pattern analysis, sensitive skin, 76–80	β-Carotene derivatives, 679
materials, 76–78	CAT. See Catalase
methods, 76–78	Catabolic aging, 239
rationale, 76	Catalase (CAT), 678
results, 78–79	Catechin, chemical structure, 305
Branched esters, 129	Cationic guar gum, 366–367
BRDF. See Bidirectional reflection distribution	Cationic polymers, 695
function (BRDF) measurements	Cationic surfactants, 458, 692–694, 775–778
"Brick and mortar" model, 91–92	alkylamines, 775–776
Brightness, of lipstick, 399	alkylimidazolines, 776
Bromine, 551	amines, 694
Browning reaction. See Maillard reaction	compatibility with anionics, 693
"Brown spot," subclinical melanoderma, 285	conditioner properties, 692–693

[Cationia aunfastanta]	Colina 226
[Cationic surfactants]	Colleger 114 244 245 247
esterified quaternaries, 778	Collagen, 114, 244, 245–247
ethoxylated alkylamines, 778	Collagenase (MMP-1), 307 Color
hydrophobicity, 692–693	of lipstick, 399
quaternary ammonium compounds, 776–778	of skin, 407
Caucasian population. TEWL in, 41–43 Caucasian skin, 10	
· · · · · · · · · · · · · · · · · · ·	anatomical sites, 17–18
CBF. See Cutaneous blood flow (CBF)	in ethnic races, 11–12
C6-Cn fatty acids, 644	interaction between sex, 14
CD. See Contact dermatitis; Corner density Cellular membranes, 670	related to age, 16 Colorants, 750
Cellular senescence, 234–235 Cellulite, 603	Colorimeters to asses skin radiance, 408–409 Colorimetry, for skin sensitivity test, 87
etiology of, 604–606 matricial-interstitial unit's alterations, 605	Coloring agents, 558 Combing measurement, hair, 724–725
predisposing factors, 605–606	Comedogenesis, 286
vascular modifications, 605	Comedogenicity in rabbit, 583–586
stages in progression of, 603–604	discussion, 585–586
symptoms of, 603	materials and methods, 583–584
objective evaluation of, 606–608	results, 584–585
treatments of, 608–609	Comedogenic scores
Ceramide lipids, 94, 95	of cocoa butter, 585
CETAB. See Cetrimonium bromide	of esters and alcohols, 584
Cetrimonium bromide (CETAB), 692	of petrolatum products, 585
Cetrimonium chloride, 692	of surfactants, 584
Chamber scarification test, 200, 475, 476	Commercial conditioners, 690–691
Charge couple device (CCD) camera, 283, 284	Compartmental analysis, prodrugs, 350
Chatelain, 542	Complexion, skin, 407
Chemical irritants, 455	Conditioners
Chemical peels, skin-whitening agents, 592	auxillary ingredients of, 698–699
Chemical penetration enhancers (CPE), 185	commercial, 690–691
classifications of, 185–191	hair. See Hair conditioners
mechanisms of, 191–192	intensive treatment, 690
Chitosan, 646	leave-in, 690
Chitosan-PCA, 363	Confocal microscopy, hair, 719–720
Chloasma. See Melasma	Congenital ichthyosis (CI), 167
Chloracne, 439	Consumer Commitment Code, for
Choline-stabilized orthosilicic acid	cosmetics, 842
(ch-OSA), 682	Contact allergic reactions
Ch-OSA. See Choline-stabilized orthosilicic acid	allergens. See Allergens
Chromophores, 276	application site, 554
mapping, 278	composition, 553
Chronic paronychia, 748	concentration of ingredients, 554
CI. See Congenital ichthyosis (CI)	contact time, 555
Cinnamates, 316	cross-sensitivity, 554
CIR. See Cosmetic Ingredient Review (CIR)	frequency of use, 553
Citrulline, 218	penetration-enhancing agents, 554
Cleansers	pharmaceutical products, 554
baby care products, 617–618	purity of ingredients, 554
skin care product, 98–99	skin conditions, 554–555
Cleansing effect, of silicones, 375–376	Contact allergy patch (CAP), 200
Cleansing milk, baby, 618	Contact angle measurement, skin wettability,
Clear anhydrous gel sticks, 635	427–428
Clear hydroalcoholic roll-on, 637	data analysis, 429–430
Clear O/W emulsions sticks, 636	Contact sensitivity, UV filters, 319
Clear water-in-silicone emulsion gels, 636	Contact SIAscopy, 277–278
Clinical scoring, of skin radiance, 412	Cooling agents, 334
Cocamidopropyl betaine, 558	carboxamide, 666–670
Cocamidopropyl dimethylamine, 558	as insect repellent, 670
Cocamidopropyl-PG-dimonium chloride	menthol related, 664-666
phosphate, 558	Cooling ingredients, 661–672
Cocoa butter, comedogenic scores of, 585	menthol, 661–666
Cocomonoglyceride sulfate (CMGS), 772	Copper-zinc superoxide dismutase (SOD), 678

Cornea	Dandruff, assessment of, 289
damage to the, 537–538	Dangerous Preparations Directive, EU, 831–832
irritation testing, 541–542	Dangerous Substances Directive, EU, 830–831
reconstructed models, 538	DAP. See Descriptive analysis panel (DAP)
use of reconstructed corneal epithelia in safety	DD. See Dyskeratosis follicularis (DD)
assessment, 538–539	DDD. See Dermal drug delivery (DDD)
Corneocytes, 6, 7, 91, 167, 275	Dead Sea
Corneometer®, 499	salt baths, 547
Corneometry, for skin sensitivity test, 87	water therapy, 547–548
Corneosurfametry, for skin sensitivity test,	Decorative products, 391–404
87–88	formulations of, 391–397
Corner density (CD), 141	eye makeup products, 396
Cortical cells, hair, 705	face makeup products, 394–396
Corticosteroids, and skin sensitivity, 70	lipstick, 392–393
Corynebacterium xerosis, 647	nail enamel, 393–394
Coryneform, 643	interaction with skin care products, 398
Cosmeceutical antiaging products, 295	quantitative assessment of properties of, 398–404
Cosmeceuticals, 121	silicones used for, 373–376
Cosmetic, Toiletry, and Fragrance Association	Delayed-type hypersensitivity (DTH), 682
(CTFA), 357	Delicate skin, 60
Cosmetically sensitive skin, 60	Delipidization, of PHSC, 810
Cosmetic Ingredient Review (CIR), 840, 842	Dendrimers, 790
Cosmetic Science and Technology, 2	Dendrites, 543–544
Cosmetic Toiletry and Fragrance Association	Deodorants, 643–649
(CTFA), 842	aerosols, 648
Cosmetology, 1	antimicrobial active-containing, 645–646
Council Directive 76/768/EEC, 1	antiperspirant active-containing, 644
CPE. See Chemical penetration enhancers (CPE)	application forms for, 647–649
Creams, brittle nails, 747–748	concepts for controlling underarm odor
Creatine, 627	antiadhesives, 646–647
Creatine kinase, 269	bacterial enzyme inhibitors, 646
Critical surface tension ( $\gamma_c$ ), skin wettability,	chitosan, 646
428–429	odor-inhibiting precursor mimics, 646
data analysis, 430	product/skin-mediated perfume
CSSS. See Cyanoacrylate skin surface stripping	transformations, 646
(CSSS)	drug delivery system for, 647
CTFA. See Cosmetic, Toiletry, and Fragrance	esterase inhibitors, 645
Association; Cosmetic Toiletry and	formulation for, 647
Fragrance Association (CTFA)	odor-masking, 644
Cultural factors skin consitivity, 70	odor-neutralizing, 644
Cultural factors, skin sensitivity, 70 "21-day" cumulative irritation assay. See	odor-quenching, 644–645
Cumulative irritation testing	pump sprays, 648–649 silicones in, 378
Cumulative irritation testing, 475–476, 513	sticks, 647
Cutaneous aging, physiological changes in	strategies to reduce underarm odor, 644
dermal changes, 625–626	vitro evaluation of, 647
epidermal changes, 626	vivo evaluation of, 647
reactive oxygen species, 625	Deodorizers, 633
Cutaneous blood flow (CBF), 166	Deoxyarbutin, 591, 601
Cutaneous inflammatory cytokines, 548, 551	Dermal absorption, baby and adult skin, 615–616
Cuticle, 687	Dermal changes, aging, 625–626
cells, hair, 705	Dermal drug delivery (DDD), 183
removers, 745–747	Dermal function tests, sensitive skin, 64
softeners, 747	Dermatitis. See also Allergic contact dermatitis
Cutometer®, 294	(ACD); Irritant contact dermatitis (ICD)
Cyanoacrylate nail preparations, 763–764	friction, 440
Cyanoacrylate skin surface stripping (CSSS), 87, 88	retinoid, 296
Cyclic adenosine monophosphate (cAMP), 173	Dermatoglyphics, 141–142
Cyclodextrins, for topical applications, 792	Dermis, 5
Cyclomethicones, 362, 697	baby vs. adult skin, 613
Cysteic acid, 689	normal skin, 7
Cystine S-sulfonate, 689	Dermo-epidermal junction (DEJ), 540
Cytochrome P 450 IA1 (CYP IA1), 543	Descemet's membrane, 537

Descriptive analysis panel (DAP)	Dry skin, 5, 7–9
and feminine care products, 382	vs. oily skin, 29–32
and products tested in BTK test, 387	3D skin models. See Three-dimensional skin
Desquamation, 97	models
Detergent-based elastic vesicles, 798	DTH. See Delayed-type hypersensitivity
Detergents, EU legislation on, 832	Dysfunctional skin, hydration effects in, 161–162
Dexpanthenol, 333	Dyskeratosis follicularis (DD), 167
DHA. See Dihydroxyacetone	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
D-homoserine lactone, 668	
Diaper	EC. See European commission
area, 615–616	Eccrine sweat glands, 631
rash, 620	baby vs adult skin, 615
Dibenzoylmethane derivatives, 558	ECM. See Extracellular matrix
Dibenzylidene sorbitol, 635	Ectoine, 335
Dibutyl phthalate, 750	ECVAM. See European Center for the Validation of
Dicetyldimonium chloride, 692	Alternative Methods
Diet, and skin hydration, 100	EDTA. See Ethylenediaminetetraacetate
Dietary fatty acids, 682	EKV. See Erythrokeratoderma variabilis (EKV)
Dihydroxyacetone (DHA), 339	Elastic properties, skin, 821
action mechanism of, 340–341	Elastic vesicles
additives of, 341	detergent-based, 798
application of, 341	ethosomes, 802–803
chemical structure of, 340	nonphospholipid-based, 800–802
chemistry of, 339–340	overview, 797
formulation of, 340	as penetration enhancers, 803–804
history of, 339	phospholipid-based, 798
indications, 342	skin interaction, 797–798
safety in, 342	surfactant effects, 800
sunscreen activity, 341–342	transfersomes, 799
tanning agents, 342–343	Elastin, 244–250
Dihydroxyphenyl alanine (DOPA), 544	Electrical conduction
Dimethicone copolyols, 372–373	antomical area, 18
emulsifiers, 125	in ethnic races, 12
foaming by, 377	increase with age, 16
in hair conditioning, 376, 696, 698	between sexes, 14
phosphates, 697	Electrokinetic measurements, hair, 720-722
as resin plasticizer, 378	Electromyography, 177
Dimethicones, 362, 372–373. See also Silicones	Electronic devices, itch measurement, 576
alkyl, 373	Electron paramagnetic resonance (EPR), for SC
in FDA list, 375	probe
in hair conditioning, 695–696	apparatus, 207
Dimethyldiallylammoniumchloride (DMDAAC),	order parameter calculation, 210–212
367	conventional, 210
Dimethylsulfoxide, for skin sensitivity, 85	simulated and conventional, 211–212
3-[4,5-dimethyl-thiazol-2-yl]-2,5-diphenyl	by slow-motional EPR simulation, 210–211
tetrazolium bromide (MTT), 522, 523	skin penetration enhancer effects, 213
Dipalmitoylethyl hydroxyethylmonium methosulfate, 694	spin probe, 207–210
	line shapes due to motion of, 209–210
DMDAAC. See Dimethyldiallylammoniumchloride	nitroxide probe, 207–208
DNA vaccines, 790	single-chain aliphatic, 208–209
Domain mosaic model, 94, 95	surfactants effects, 213
Doxyl stearic acid (DSA) spin probe, 208–209	Electron spectroscopy for chemical analysis
experimental and simulated EPR spectra	(ESCA), 697
of, 211	Electron spin resonance (ESR) spectroscopy,
experimental EPR spectra of, 212	hair, 717
schematic representation of conformation in SC	Electron transport system, 628
membrane, 211	(E)-3-methyl-2-hexenoic acid (E-3M2H), 643
Draize model, 471–473, 537, 538	E-3M2H. See (E)-3-methyl-2-hexenoic acid
scoring system in, 472	Emolliency, of silicones, 373–374
Drosophila melanogaster, 261	Emollients, 98, 99, 746
Drug skin penetration, from elastic	definition, 358
vesicles, 798	esters, 129
Drug skin permeation, from ethosomes, 803	and friction coefficient of skin, 420-423

[Emollients]	Erythama 222 404
hydrophilic lipids, 360–361	Erythema, 332, 494 Erythrokeratoderma variabilis (EKV), 167
hydrophobic, 360	ESCA. See Electron spectroscopy for chemical
lanolin, 361	analysis Escherichia coli 225
lecithin, 361–362	Escherichia coli, 335
lipophilic, 359–360	ESR. See Electron spin resonance (ESR)
occlusive, 359–360	spectroscopy, hair
silicone derivatives, 362	Esterases, 543
Emulsifiers	inhibitors
conditioners ingredients, 699	triethylcitrate, 645
and contact allergic reactions, 558	zinc glycinate, 645
types of, 122	Esterified quaternaries, 778
Emulsion-based cleanser, 98–99	Esters, 782–784
Emulsions	carboxylates, 770
for aging population, 127–128	comedogenic scores of, 584
defined, 121	Estradiol partition coefficient, polymers effect, 811
types of, 121–122	Ethanol, 185
absorption bases/petrolatum, 125	Ethers, 780–781
multiple, 124–125	carboxylates, 770–771
oil-in-water, 121, 123–124	Ethics, in human testing
oil-in-water-in-oil, 124–125	cosmetic products testing, 813–814
water-in-cyclomethicone, 125	human safety tests, 814–817
water-in-oil, 121, 124	Ethnicity
water-in-oil-in-water, 124–125	aging and, 237, 292
water-in-silicone, 125	friction coefficient and, 419–420
water-soluble ointment bases, 125	and skin sensitivity, 65–67
Encapsulation systems, for topical applications	Ethoquats. See Ethoxylated quaternaries
cyclodextrins, 792	Ethosomes, 802–803
liquid crystals, 793	7-ethoxycoumarin-O-deethylase (ECOD), 543
microemulsions, 792–793	Ethoxy-diglycol solution, 745
microparticles, 787–788	Ethoxy group (EO), 771
multiple emulsions, 793	Ethoxylated alcohols, 770
nanoemulsions, 791	Ethoxylated alkylamines, 778
nanoparticles, 788–791	Ethoxylated derivatives, 783
overviews, 787	Ethoxylated fats, 781
vesicles, 791–792	Ethoxylated fatty acids, 782
Endocrine aging, 237–239	Ethoxylated glycerides, 360
Enoxacin®, 803	Ethoxylated mono and diglycerides, 360
Environmental aging, 236–237	Ethoxylated oils, 781
Environmental factors, skin sensitivity, 70	Ethoxylated/propoxylated fatty alcohols, 361
Environmental impact, on skin hydration, 97–98	Ethoxylated quaternaries, 693
Environmentally sensitive skin, 60	Ethylenediaminetetraacetate (EDTA), 198
Environmental Working Group (EWG), 840	EU. See European union
Enzyme inhibition, 185	EU Council Directive 93/35/EEC, 813
EO. See Ethoxy group (EO)	Europe, regulation of UV filters, 313
EO/PO block polymers, 780–781	European Center for the Validation of Alternative
Eosinophils, in rosacea type skin, 34	Methods (ECVAM), 345, 539, 541
EpiDerm <sup>®</sup> , 541	European Chemicals Agency (EChA), 831
Epidermal changes, aging, 626	European Commission (EC), 683
Epidermal keratinocytes	European Committee for Standardization, 326
role in inflammation of ICD, 444	European Economic Community Directive, 342
skin hydration, 31	European Food Safety Authority (EFSA), 832
Epidermal melanin unit, 543	European Union (EU) legislation, 825–835
Epidermis	animal testing ban, 828
baby vs adult skin, 613	annexes to cosmetics directive, 827-828
normal skin, 6	definition, 825
schematic diagram, 92	horizontal regulations, 833–835
skin irritation prediction, 532-535	on aerosol dispensers, 835
stratum corneum, 91–96	for animal protection, 833-834
water-soluble constituents, 216	General Product Safety Directive (GPSD), 834
EpiSkin <sup>®</sup> , 541	on nominal quantities for skin care, 834-835
EPR. See Electron paramagnetic resonance (EPR)	on prepackaged products, 834–835
ERK2. See Extracellular signal-related kinase 2	impact on US cosmetics industry, 841-842

[European Union (EU) legislation]	Fibroblast proliferation, 548, 551
public information prerequisite, 826–827	Fibroblasts, 540
recast proposal, 828–830	Fibronectin, 538
safety prerequisite and responsibilities, 825	Fick's law of diffusion, 158, 159
SCC(NF)P, 827–828	Filaggrin, 93
technical information file (TIF) prerequisite,	NMF derived from, 31
826–827	Film-forming antiperspirant polymers, 633
	Finasteride, 543
vertical regulations, 830–832	
Biocidal Products Directive, 832	Flavonoids, 305, 333
Dangerous Preparations Directive,	structure, 268
831–832	Flexabrasion test, hair, 710–712
Dangerous Substances Directive, 830–831	Fluorescence spectroscopy, hair, 713
on detergents, 832	Fluorosurtactants, 785
on food additives, 832	Flyaway reduction, by silicones, 377
Legislation on Medical Devices, 832	Foaming, by dimethicone copolyols, 377
Medicinal Products Directive, 832	Fontana–Masson staining, 544
REACH, 830–831	Food additives, EU legislation on, 832
Evaporimeter, 499	Food and Drug Administration (FDA), 1, 121,
Evaporimetry, 167	192, 325
EVOO. See Extra virgin olive oil	hydroquinone and, 600
EWG. See Environmental Working Group	Food and Drug administration (FDA), 631
(EWG)	Four-hour patch test, 475
Exaggerated immersion test, skin sensitivity, 86	FPLA. See Fair Packaging and Labeling Act (FPLA)
Exfoliant agents, 369	Fractal analysis, hair, 723-724
Exfoliation, 627	Fragrance ingredients, 555–556
Experimental gingivitis model, skin inflammation	labeled substances, 557
assessment in, 485–486	Franz-type glass diffusion cells, 201
Exposed skin, and skin sensitivity, 68	Fraxel laser, 599
Extracellular matrix (ECM), 325, 331	Free radicals, 324
Extracellular signal-related kinase 2 (ERK2), 351	Friction/friction coefficient, of skin, 432–433
Extra virgin olive oil (EVOO). See Olive oil	Amontons' law for, 415
Extrinsic aging, 292–293, 677–678	anatomic region/age/gender/race, 419–420
Eyeliners, 396	defined, 415
Eye makeup products	experimental designs for measuring, 415–417
formulations of, 396	factors affecting, 417–424
	hydration, 417–419
quantitative assessment of properties, 400	lubricants/emollients/moisturizers for
Eyeshadows, 396	
	measuring, 420–423
	normal load, 417
Face	probes measuring, 423–424
creams, baby, 618	Fringe projections analysis, 608
foundations, 394–395	Frosch–Kligman soap chamber patch test, 542
quantification of properties of, 401–403	FTC. See Federal Trade Commission (FTC)
raw materials for, 397	Fullerene, 790
makeup. See Face makeup products	Functional silicones, 372–373
Face makeup products	
formulation, 394–396	
face powders, 395–396	GAG. See Glycosaminoglycans (GAG)
foundations, 394–395	Gap junction proteins (GJP), 799
quantitative assessment of properties, 401-404	Gender
foundation, 401–403	differences, skin pH, 223
skin radiance, 403–404	effects on aging, 292
Facial wrinkles, evaluation, 293-294	friction coefficient and, 419-420
Fair Packaging and Labeling Act (FPLA), 841	and skin sensitivity, 65
Farnesol, 558	General Product Safety Directive (GPSD), 834
Fatty acid	Gene transcription regulation, antioxidants, 307
isethionates, 774	GFP. See Green fluorescent protein (GFP)
mono and diglycerides, 360	GH. See Growth hormone (GH)
Fatty alcohols, 779–780	GHS. See Global harmonization system (GHS)
FDA. See Food and Drug Administration (FDA)	GJP. See Gap junction proteins (GJP)
Federal cosmetic regulations, US, 839–841	Global harmonization system (GHS), 2
Federal Food, Drug, and Cosmetics Act (1938), 839	β-Glucocerebrosidase activity, 349
Federal Trade Commission (FTC), 841	Glucocorticoids, 542–543
1 Cacrai 11 auc Commission (1.1 C), 041	Gracocorricolas, 544-545

Glutathione (GSH), 304–305, 306 skin-whitening agents, 590	[Hair] surface analysis
Glutathione S-transferase (GST), 543	combing, 724–725
Glycation control techniques	electrokinetic measurements, 720–722
protection against AGE formation, 267–269	fractal analysis, 723–724
protection against glycation consequences,	permeability analysis, 720–722
269–270	profilometry-FT, 723–724
Glycation end products	wettability, 722–723
accumulation, in skin, 263-265	surfaces
consequences	chemically treated, 689–690
functional, 266–267	virgin, 689
structural, 265	tensile properties of
formation, 261–262	post-yield region, 709
glycation control techniques, 267–270	stress/strain curves, 706–707
glycoxidative aging process, 261	tensile testers, 709–710
overview, 261	yield region, 708
Glyceraldehydes, 339	texture analysis, 725–726
Glycerin, 107, 110 Glycerol, 94, 99	Hair conditioners commercial, 690–691
esters, 783	conditioning, 687–689
Glycerolether, 645–646	hair fiber surface, 689–690
Glyceryl fatty acid ester, 645	ingredients of
Glycol	auxiliary, 698–699
esters, 782	cationic surfactants, 692–694
ethers, 750	lipophilic conditioners, 694
Glycosaminoglycans (GAG), 253, 254, 626,	polymers, 695
681–682	silicones, 376–378, 695–698
Glycoxidative model, skin aging, 262	Hamamelis, 333
GPX. See Selenoenzyme glutathione peroxide	Handbook of Cosmetic Science and Technology, 2
Gravitational aging, 239–240	Headspace analysis, 646
Green fluorescent protein (GFP), 799	HEC. See Hydroxyethyl cellulose
Growth hormone (GH), 239	Hemidesmosomes, 538, 539
Guar gum. See Cationic guar gum	Hemoglobin, skin color and, 407
Guerbet alcohols, 694	Henna, 749
Guinea pig immersion assay, 474	Herpes zoster, 655
Gynoid lipodystrophy. See Cellulite	Heterocyclic ammonium salts, 777
	Hexyl nicotinate (HN), 166, 653 absorption by appendages, 26–27
HA. See Hyaluronic acid (HA)	chemical structure, 25
Hair. See also Hair conditioners	clinical study of, 25
baby care products for, 616-619	comparisons between groups and anatomic
baby vs adult skin, 614	sites, 26–27
cortical cells, 705	description of, 25
cuticle cells, 705	skin reactivity to, 27
damage, 687–689	High-performance liquid chromatography
dimensions, 705	(HPLC), 809
drying aids, 377	Hispanic skin, 10
dynamic mechanical analysis, 710–713	Histamine-induced itch human model, 573–576
bending measurements, 712–713	HLB. See Hydrophilic-lipophilic balance (HLB)
flexabrasion test, 710–712	HN. See Hexyl nicotinate (HN)
torsion measurements, 712–713	HNO <sub>3</sub> . See Nitric acid (HNO <sub>3</sub> )
graying, 288	Homeostasis, 176–178
luster measurements, 726–729	Hormonal changes, in cutaneous tissues, 292
mechanical fatiguing, 710 microfluorometry, 720	Hormone replacement therapy (HRT), 239, 681 Hormones, produced by skin, 238
microscopy. See Microscopy, hair	"Horny layer," skin. See Stratum corneum
optical properties, 726–729	Host factors, skin sensitivity
permanent wave evaluation, 730–731	age, 68
shaft, 705	anatomical sites
shaft moisturization, 147	exposed skin, 68
shine, by phenyl trimethicone, 377	vulva, 68–70
spectroscopy. See Spectroscopy, hair	cultural factors, 70
strengthening, 378	environmental factors, 70

[Host factors, skin sensitivity]	Hydroalcoholic pump sprays, 648
ethnicity, 65–67	Hydrocortisone, anti-itch testing, 575
gender, 65	Hydrogenated tallow octyl dimonium chloride, 694
HP. See Hydroxypropyl	Hydrolipidic film, 5, 434
HPLC. See High-performance liquid	Hydrolipidic layer, 432, 614
chromatography (HPLC)	Hydrolyzates, 365
HPT. See Human patch test (HPT)	Hydrophilic lipids, 360–361
HRIPT. See Human repeated insult patch tests	Hydrophilic-lipophilic balance (HLB), 122–123, 780
(HRIPT)	Hydrophobic compounds, 540–541
HRT. See Hormone replacement therapy (HRT)	Hydrophobic emollients, 360
Human antioxidant defense system, components	Hydrophobic fatty acid esters, 359
of, 678	Hydrophobic/hydrophilic balance, skin
Human axilla, sweat glands in, 631	wettability, 429
Human experimental models, 471	data analysis, 430
Human maximization test, 816	Hydrophobicity, 692–693
Human patch test (HPT), 518, 525–526, 529–530	Hydroquinone, 544
Human repeated insult patch tests (HRIPT), 816	pigmentation disorders' treatment, 599
Human safety tests	Food and Drug Administration (FDA)
ethical considerations, 814–815	and, 600
irritance assessment, 816	skin-whitening agent, 587–589
Notes of Guidance, 815	Hydroxy acids, 296
predictive allergenicity tests, 816–817	Hydroxycitronellal, 531
prerequisites, 815	Hydroxyethyl cellulose (HEC), 367, 698
requirements, minimal, 817	Hydroxypropyl (HP), 366
sensitization potential assessment, 816	Hygroscopic substances. See also Humectants
Human vs. animal skin, 169	chemistry of, 108
	Hyperaemia, post-occlusive cutaneous reactive,
Humectants, 127, 362–363, 746	511
amino acids, 114–115	
butylene glycol, 109	Hyperkeratotic dermatoses, 145–146
chemical formulas of, 108	Hypoallergenic products, 559
conditioners ingredients, 699	Hypodermis
glycerin, 107, 110	baby and adult skin, 614
hyaluronan (hyaluronic acid), 111	normal skin, 7
lactic acid, 111–112	Hypothesized mechanism, capsaicin-induced
moisture-binding ability at various humidity,	analgesia, 655
109	0 ,
panthenol, 112–113	
PCA, 113	ICCR. See International Committee on Cosmetic
propylene glycol, 114	Regulations (ICCR)
proteins, 114–115	ICD. See Irritant contact dermatitis (ICD)
sorbitol, 115	IL 8, 542
urea, 115–116	Imidazoline, 776
Hyaluronan (hyaluronic acid), 111	Immersion tests, 476
Hyaluronic acid (HA), 161	irritant effects of detergent, 476
skin aging and, 37	Immune function, 678–679
skin hydration and, 31, 33	Impedance properties, 822
Hydrating substances, 107–116. See also	Imperceptible perspiration, 144
Humectants	Individual UV filters, 316
amino acids, 114–115	Infant skin, 160, 161
butylene glycol, 109	Infection defense, baby and adult skin, 616
creams and lotions, 122–125	Inflammation, 679
glycerin, 107, 110	Inflammatory mediators
0:	
hyaluronan (hyaluronic acid), 111	cellophane tape adsorption of, 481–482
lactic acid, 111–112	sebutape adsorption of
panthenol, 112–113	cytokine levels, sun-exposed vs. unexposed
PCA, 113	skin, 484
propylene glycol, 114	in EG model, 485–486
proteins, 114–115	IL-1ra/IL-1α ratio, 482–483, 485
sorbitol, 115	Inflammatory skin reactions
urea, 115–116	skin tape application methods for assessing
Hydration, 279	mRNA fragments, 487
dysfunctional skin, 161–162	structural proteins, 486
measurements, photoaging, 294	surface assessment and grading of, 481
medicaremento, priotoaging, 271	carrace acceptation and grading of, 101

Infrared (IR) spectroscopy, hair, 713–714 Infrared radiation (IRR), 331 defined, 323 protection against, 325, 327 skin effects of, 324–325	ISI. See Irregularity skin index (ISI) Isoelectric point, 689 Isopropyl dibenzoylmethane, 558 Itching. See Pruritus
wavelength ranges in, 323 Insect repellent, cooling compounds as, 670 Instron <sup>®</sup> tensile tester, 709 Integrating sphere spectrophotometry, hair, 715–716	KC. See Keratinocytes α-Keratin filaments, 739 Keratin, 6, 174, 741
Integrins, 538 Intensive treatment conditioners, 690 Intercellular lipids, interaction with surfactants, 457	and buffering capacity of skin, 216 granulation, nail, 753 Keratinization
Interference pigments, 128	disorders, 167
Interleukin (IL) 1\alpha, 541, 542	nail, 740
International Committee on Cosmetic Regulations (ICCR), 842	normal skin, 6–7 Keratinized squamous cells, 275 Koratinized va poploratinized valvel skin
International Cosmetic Ingredient Dictionary and Handbook, 339	Keratinized vs nonkeratinized vulval skin sensitivity, 69
International Nomenclature of Cosmetic Ingredients (INCI), 826, 830	Keratinocytes (KC), 6, 91, 174, 346 Keratotic/pigmented tumors, 146–147
Intrinsic aging, 291–292, 625, 677	Kligman formula, 598–599
vs. photoaging, 235	Koebner phenomenon, 760
Invisible dermatoses, 481	Kojic acid, 589–590
In vitro methods, for skin protection, 197–198, 201	
In vivo methods cosmetic materials testing, 471	L595, elastic vesicles, 800
for skin protection, 198–201	Labia major, 505
Ionic surfactants, 775–778	Labia minora, 505
amphoteric surfactants, 778–779	Lactate dehydrogenase (LDH), 347, 542
anionic surfactants, 769–775	Lactic acid, 111–112
cationic surfactants, 775–778	for skin sensitivity test, 85
Iontophoresis, 183	Lamellar lipid
IRR. See Infrared radiation	arrangement, 96
Irregularity skin index (ISI), 88	water permeability, 96
Irritance assessment, human safety tests, 816	Laminin, 538
Irritant contact dermatitis (ICD), 42, 509–515 acneiform, 439, 448	Langerhans cells, 548, 740 Lanolin, 361, 781
acute, 437–438, 447	fatty acid, 361
delayed, 438, 447	LAS. See Linear alkylbenzene sulfonate (LAS)
airborne, 440	Laser Doppler flowmeter (LDF), 25, 166, 170
asteatotic irritant eczema, 440	Laser Doppler imaging system, cellulite
chronic, 438–439	evaluation, 607
clinical classification, 437–440, 447–449	Laser Doppler velocimetry (LDV)
clinical manifestation, 445	for blood flow, 45–46
cumulative, 448 epidemiology, 445–447	for skin sensitivity, 64, 87 Laser excitation source and optics for measurement
friction dermatitis, 440	of skin hydration, 154–155
irritant reaction, 438, 447–448	Laser therapy, pigmentation disorders, 599
non-erythematous/suberythematous irritation,	Lateral force microscopy (LFM), hair, 718–719
439, 448	Lateral torsion method, 821
subjective/sensory irritation, 439-440, 448-449	Laurtrimonium chloride, 693
traumatic, 439, 448	LDF. See Laser Doppler flowmeter (LDF)
traumiterative, 448	LDH. See Lactate dehydrogenase (LDH)
Irritant dermatitis	LDV. See Laser Doppler velocimetry (LDV)
classification of, 472	Leave-in conditioners, 690
clinical features of, 471	Leave-on products, 555
Irritant reaction, ICD, 438, 447–448	Lecithin, 361–362
Irritant reactivity tests, sensitive skin, 63–64	Legislation on Medical Devices, 832
Irritation	Leukonychia, 748
Asian vs Caucasian, 511–514 black vs Caucasian, 509–511	LFM. See Lateral force microscopy (LFM), hair Light-cured gels, 758–760
genital vs. upper arm skin, 505–507	Linear alkylbenzene sulfonate (LAS), 773
suberythematous, 439	Lipid hydroperoxide (LPO), 349

Lipids, 745	Matrix metalloproteinases (MMP), 236, 325, 331,
stratum corneum, 94	679
structure, and skin, 253–258	McGill Pain Questionnaire, 577
Lipodystrophy, gynoid. See Cellulite	MEA. See Multiple endpoint analysis
Lipoic acid, 306	Mean gray level (MGL), 141
Lipophilic conditioners, 694	Mechanical fatiguing, of hair, 710
Lipophilic emollients, 359–360	MED. See Minimal erythemal doses
Lipophilic ingredients, 634	Medicinal Products Directive, 832
Lipopolypeptides, 297	Medium ethoxylates lanolin alcohols, 361
Liposomes, 185	Mehylnicotinate (MN), 653
Lipstick	Melanin, 175, 597
formulation of, 392–393	pigmentation, 678
quantitative assessment of properties of,	skin color and, 407
399–400	Melanin-stimulating hormone (MSH), 544
color/brightness/streakiness, 399	Melanocytes, 740, 741
moisturizing effect, 399–400	Melanoderma, 283–285
Liquid crystals, for topical applications, 793	Melanoidins, 341, 342
Loricrin and SPRR2, 539	Melanosomes, 11, 543–544
Low ethoxylates triglycerides, 360	of ethnic races, 50–52
Low-molecular-weight polyethylene glycols, 363	Melasma, 597–598
L-phenylalanine, 175	Menstrum, 133
LPO. See Lipid hydroperoxide	Mentha arvensis, 661, 664
L-tyrosine, 175	Mentha piperita, 664
Lubricants, friction coefficient of skin, 420–423	Menthol
Luster measurements, hair, 726–729	anti-itch testing, 574
Lyotropic liquid crystals, 633	background, 661–662
	chemistry, 663–664
TM and	cooling agents related to, 664–666
MacroDerm <sup>TM</sup> , 809	major Impurities in, 664
Macular interfollicular subclinical melanoderma,	menthoxy-related coolants, 665
285	natural, 664
Magnesium, 548	stereoisomers of, 663
Magnesium-L-ascorbyl-2-phosphate (VC-PMG),	synthetic, 664
590	vs. cooling strengths, 669
Magnesium lauryl sulfate [Mg(LS) <sub>2</sub> ], 771	Menthol ethylene glycol carbonate (MGC), 664
Magnetic resonance imaging, cellulite evaluation,	Menthol propylene glycol carbonate (MPC), 664
608	Menthoxy-related coolants, 665
Maillard reaction, 340	Menthyl anthanilate, 317
Makeup products. See Decorative products	Menthyl 3-hydroxybutyrate (MHB), 666
Malassezia, 145	Mercapto-silanol complex, 745
Manicure	Metabolism, 349
buffing, 747	Metal oxides, odor-quenching deodorants, 644–645
cuticle removers, 745–747	Methacrylic acid-containing primers, 764
cutting, 745	2-methacryloyloxethylphosphorylcholine polymer (pMPC), 161
daily care, 747–748	
exceptional effects of, 749 filling, 745	Methemoglobinemia, 764 Methionine sulfoxide, 340
nail polish remover, 745	Methyl (chloro)isothia-zolinone, 554
pumicing, 745	3-methylcholanthrene, 543
unwanted effects of, 748–749	
whitening, 747	MGC. See Menthol ethylene glycol carbonate MGL. See Mean gray level
Mannitol, 540–541	[Mg(LS) <sub>2</sub> ]. See Magnesium lauryl sulfate [Mg(LS) <sub>2</sub> ]
Margin of safety (MoS) approach, 616	MHB. See Menthyl 3-hydroxybutyrate
Mascaras	Microbial contamination, 126
evaluation of curving and lengthening power	Microcomedones, 287
of, 400	Microemulsions
formulation, 396	440
"Mask of pregnancy." See Melasma	pump sprays, 649 for topical applications, 792–793
MAT. See Moisture accumulation test	
Mathematical optical model construction, skin,	Microencapsulation, 787 Microflora, 225, 226, 643
275–276	Microfluorometry, hair, 720
Matricial-interstitial unit's alterations, cellulite	Microparticles, for topical applications, 787–788
etiology, 605	Micropigmentary sunblocks, 317, 318

Microrelief, skin	[Nail]
evaluation, 293–294	daily care, 747-748
using ULEV method, 285–286	esthetic role, 742
Microscopy, hair	histology, 737–741
AFM, 718–719	makeup products
confocal, 719–720	formulations of, 393–394
LFM, 718–719	quantitative assessment of properties of, 404
optical, 717	nonallergic reactions, 761–762
SEM, 717–718	physicochemistry, 741–742
SPM, 718	physiology, 742
Microvascular sensitivity, 654	plate, 737–739
Miliaria, 620	polish. See Nail polish
Minerals, 680–681	prosthesis, 765
Miniemulsion. See Nanoemulsions	varnishes, 751–752
Minimal erythemal dose (MED), 326, 350	whitening, 747
Mixed skin, 9	Nail polish
MMP. See Matrix metalloproteinases (MMP)	advantage, 753
MMP-1 (collagenase), 307	composition, 749–751
MMS. See Monomenthyl succinate	hospital, 754
MN. See Mehylnicotinate	hypoallergenic, 752
Modified maximum average scores (MMAS), 538	nail varnishes, 751–752
Moisture accumulation test (MAT), 137–138	quick drying, 752
Moisture-binding ability	remover, 745
of humectants, at various humidity, 109	unwanted effects, 753–754
Moisturizers, 295, 333	use, 752
and friction coefficient of skin, 420–423	water based, 752
Moisturizing	Nalfurafine, anti-itch testing, 577
and lipstick, 399–400	N-alkyl amino acids, 779
skin, 159–160	<i>N</i> -alkyltrimethyl ammonium salts, 776
Molecular photoprotective agents, 335–336	Nanocapsules, 789
Monoalkyl quaternaries, 693	Nanoemulsions, for topical applications, 791
Monoesters, 543, 770	Nanoparticles, for topical applications, 788–791
disodium salts, 773	Nanospheres, 789
Monoglycerides, 360	Nasolabial fold, and skin sensitivity, 63
Monomenthyl succinate (MMS), 664	National Advertising Division (NAD), 840
Mosaic subclinical melanoderma (MSM), 283–285	National Formulary (NF), 124
depigmented skin, 289	National Rosacea Society, 34
Mouse ear model, 474–475	
MPC. See Menthol propylene glycol carbonate	Natural menthol, 664 Natural moisturizing factors (NMF), 8, 31, 92–94,
	107, 127, 159, 177, 363
MSM. See Mosaic subclinical melanoderma	
MTT. See 3-[4,5-dimethyl-thiazol-2-yl]-2,5-diphenyl tetrazolium bromide (MTT)	NCS. See Noncontact SIAscopy (NCS)
	Near infrared spectroscopy (NIR), hair, 715 Neoagarobiose, 591
Mucondialdehyde, 343	· ·
Multiple emulsions, 124–125	Nerve growth factor (NGF), 655
for topical applications, 793 Multiple endpoint analysis (MEA), 347	Neurondocrine receptors, in skin, 238
	Neurophysiology, SPSS, 75–80
patch test HPT chemicals, 529–530	Neuroreceptors, surfactants and, 458
	Neurotransmitters, produced by skin, 238
PVS chemicals, 528–529	Neutralization, 694
topical test	NF. See National Formulary
HPT chemicals, 525–526	NGF. See Nerve growth factor
PVS chemicals, 523–524	Nicotinate occlusion test, skin sensitivity, 85
	Nicotinates, 654 Niosomes, 185
N 1 1 (NIA C) F01	
N-acetyl glucosamine (NAG), 591	NIR. See Near infrared spectroscopy (NIR), hair
NAD. See National Advertising Division (NAD)	Nitrovida probas for EPP, 207, 208
NAD(P)H:quinone reductase (NQR), 543	Nitroxide probes, for EPR, 207–208
NaHCO3. See Sodium bicarbonate	NMF. <i>See</i> Natural moisturizing factor (NMF) <i>N</i> , <i>N</i> -dimethyl-p-toluidine, 764
Nail	
allergic reactions, 762–764	Nonallergic reactions, nail, 761–762 Noncontact SIAscopy (NCS), 279–280
anatomy, 737	Non-erythematous irritation. <i>See</i> Suberythematous
artificial. See Artificial nails	irritation irritation. See Suberythematous
buffing, 747	mmanon

Nonhistaminic itching, 655	Orange staining of nail plate, 753
Non-hydrocarbon speciality surfactants, 785	Orangewood stick, 746
Noninvasive bioengineering measurements, for	Order parameter calculation, EPR, 210–212
cellulite, 606–608 Nonionic surfactants, 458, 779–785	conventional, 210 simulated and conventional, 211–212
alkanolamides, 782	by slow-motional EPR simulation, 210–211
amine oxides, 784–785	Organic solvents, 745
esters, 782–784	OTC. See Over-the-counter
ethers, 780–781	Over-the-counter (OTC) drugs, 631, 672
fatty alcohols, 779–780	Over-the-counter (OTC) moisturizers, 33
Nonirritating, 489	O/W. See Oil-in-water
Nonphospholipid-based elastic vesicles, 800–802	O/W/O emulsions. See Oil-in-water-in-oil
Nonspecific cation channels (NSCC), 175 Non-surfactant compounds, 538. <i>See also</i>	emulsions Oxidative hair dyes, 557
Surfactants	Oxidative stress, 301
Normal skin, 6–7	and Photoprotection, 348
Notes of Guidance, human safety tests, 815	Oximetry, 754
NQR. See NAD(P)H:quinone reductase (NQR)	•
NSCC. See Nonspecific cation channels (NSCC)	
Nucleoskeletal proteins, 540	PABA. See Para-aminobenzoic acid (PABA)
Nutritional complements, sun protection with, 328	Panthenol, 112–113
	Papillae, 626
Ostor - 1 00	Papillary dermis, 7
Oatmeal, 99	PAR-2. See Protease-activated receptor-2 Para-aminobenzoic acid (PABA), 316, 558
Occlusive agents, 127 Occlusive emollients, 359–360	Paraffin wax, 360
Occlusive patches, 475	Paraphenylenediamine (PPD), 557
Octocrylene, 316	Partition coefficient (PC) SC/water, polymers
Odor-inhibiting precursor mimics, 646	effect
Odor-masking deodorants, 644	materials, 809–810
Odor-neutralizing deodorants, 644	methods, 809–810
Odor-quenching deodorants	overview, 809
metal oxides, 644–645	results, 810–811 Patch test
zinc ricinoleate, 644 O-D parameter, skin care for, 32–33	dermatological clinic data, 565–567
Oil-in-water, 332	irritant properties of material, 489
emulsions, 340, 690	upper arms and lower forearms, 490, 491–492
Oil-in-water-in-oil (O/W/O) emulsions, 124–125	PBS. See Phosphatebuffered saline
Oil-in-water (O/W)	PCA. See Pyrrolidone carboxylic acid (PCA)
micro-emulsion gel, 638	PCPC. See Personal Care Products Council (PCPC)
Oil-in-water (O/W) emulsions, 121, 123–124,	Pearson correlation, 534
635–636 Oily skin, 5, 9	Peelings, 627
sebum secretion, 32	PEG. See Polyethylene glycol PEG-7 glyceryl cocoate, 360
vs. dry skin, 29–32	PEG-8-L, elastic vesicles, 801
Oleic acid/glycerol monolaurate, 633	Pendant organic groups, 371–372
Oleochemistry, 769	Penetration enhancement
Olive oil, 335	biochemical, 185
Onychocorneal band, 737	chemical, 185
Onychocytes, 737	physical, 183–184
Onycholysis, 747 Open comedones, 287	Peptide, 130 Percentage water resistance retention (%WRR), 327
Optical microscopy, hair, 717	Percutaneous absorption, 165
Optical pathways, in skin, 408	compound used to measure, 170
Optical properties, hair, 726–729	corelation with TEWL, 165–168
Oral cosmetics, 677–683	qualitative reasoning for, 170–171
active compounds in. See Active compounds, in	measurement methods, 169-170
oral cosmetics	Perifollicular dots, of subclinical melanoderma, 284
aim of, 677–679	Permeability
antiaging, 297	analysis, hair, 720–722 of silicones, 375
antiaging products, 297 legislation concerning, 683	Personal care products, skin hydration and, 98–99
Oral treatments, for cellulite, 609	Personal Care Products Council (PCPC), 839, 842
	· · · · · · · · · · · · · · · · · · ·

Petrolatum, 99, 160, 477 comedogenic scores, 585	Polarized light-enhanced visual scores, 383–386 Polarized light photography, radiance/
pH, 222	complexion, 409
according to age, 16	Polarized light visualization system, skin irritation
in ethnic races, 12, 49	assessment by
incidence of sites, 18	BTK testing, 490–491
influence of sex, 14	burning sensations, 494
PHA. See Polyhydroxy acids	cross-polarized light, 494-495
Pharmacokinetic parameters, baby and adult	enhanced visual grading, 491–494
skin, 615	feminine protection products, 493
Phase inversion temperature (PIT), 649	milder patch conditions, 495
Phenylbenzimadazole sulfonic acid, 316	patch tested with SLS, 494
Phenyl trimethicones, 373	skin conditions, 494
Phosphatebuffered saline (PBS), 201	subjects, 490
Phosphates esters, 774–775	test designs, 489
acyl glutamates, 775	test materials for, 489
acyl peptides, 775	upper arms and lower forearms, 490
Phospholipid elastic vesicles, 798	visual grading, 493, 494, 495–496
ethosomes, 802–803 transfersomes, 799	Polyamides, 698 Polybarrier technology, 633
Phospholipids, 747	Polydimethylsiloxane (PDMS). <i>See</i> Dimethicones
Photoaging, 236–237, 291, 678	Polyethylene glycol (PEG), 121
objective evaluations of, 293–294	Polyethylene glycol (PEG)-2 cocomonium
Photodamage, of skin	chloride, 693
in ethnic races, 53–54	Polyhydroxy acids (PHA), 333
Photography, skin radiance, 409	Polymers, 129–130, 695
Photoirritation, 440	alkyl quaternary cellulose, 367
Photolyases, 335	film-forming antiperspirant, 633
Photooxidative stress, antagonists of, 335	hydrophobicity of, 363
Photoplethysmography (PPG), 510	incubation, 810
Photostability, 324	molecular weight of, 363
Phototoxicity, 440	natural
Phototype aging, 237	cationic cellulose derivatives, 367
PHSC. See Powdered human stratum corneum	cationic guar gum, 366–367
(PHSC)	chemically modified protein derivatives,
Physical blockers, UV filters, 317–318 Physical penetration enhancement, 183–184	365–366 proteins, 364–365
Physiotherapy	positive charge density of, 363
for cellulite, 608–609	synthetic quaternized, 367–368
revulsive products in, 656–658	Polymethylcyclosiloxanes, 362
Phytoestrogens, 681	Polyphenolic compounds, 681
Phytophotodermatitis, 440	Polyphenols, 305
Pig ear test, 518	Polyunsaturated fatty acids (PUFA), 682–683
Pigmentation, 348, 597–599	Polyvinyl pyrrolidone (PVP), 365
alternative whitening agents, 601	Pomade acne, 439
regulatory updates for treatment agents, 600	Post-inflammatory hyperpigmentation, 598
Tri-Luma for treating, 599–600	Post-inflammatory pigment alteration (PIPA). See
Pigments, 750	Post-inflammatory hyperpigmentation
in decorative products, 391–392	Post-occlusive cutaneous reactive hyperaemia, 511
Pilosebaceous, 144	Potassium, 548 hydroxide, 745
PIPA. See Post-inflammatory hyperpigmentation PIT. See Phase inversion temperature	Powdered human stratum corneum (PHSC),
PIT-emulsion pump sprays, 649	809–811
Plant extracts	Powders
anticellulite products, 609	baby, 618–619
used in commerical antiaging products, 297	face, 395–396
Plant polyphenols. See Flavonoids	raw materials for, 397
Plant Protection Directive, 832, 833	and friction coefficient, 421
Plasticizers, 750	PPD. See Paraphenylenediamine (PPD)
Plastic occlusion stress test (POST),	PPG. See Photoplethysmography (PPG)
138–139	Pramoxine, anti-itch testing, 574
p-menthane, carboxamide coolants, 668	Predictive allergenicity tests, human safety,
PNF. See Proximal nail fold (PNF)	816–817

Predictive tests	Quaternary ammonium compounds, 692
on animals, 567–568	alkyl betaines, 777
on human volunteers, 567–568	heterocyclic ammonium salts, 777
Prednicarbamate (PC), 543	quaternized APG, 777–778
Prednilosone, 541	tetra alkyl ammonium salts, 776–777
Prepackaged products, EU legislation on, 834-835	Quaternium-18 bentonite (Q18B) gels, 198
Preservatives, 556–557	Quaternized protein hydrolyzates, 366
conditioners ingredients, 698	Quats. See Quaternary ammonium compounds
system, 126	Quenchers, 335
Pre-validation study (PVS) chemicals, 518, 523–524, 528–529	Questice, 670
PRIMOS® system, 294	
Proanthocyanidins, 681	Pabbit comederanicity in E92 E96
Procyanidins, 305, 681	Rabbit, comedogenicity in, 583–586
Prodrug molecules, 185	Racemization. See Aspartic acid racemization
Product/skin-mediated perfume transformations,	(AAR) Racial differences, in skin properties, 67
646	Raman effect, qualitative description of the,
Profilometry, of skin relief, 410	152, 154
Profilometry-FT analysis, hair, 723–724	Raman methods for the study of hydration of the
Propionibacteria, 227	skin
Propionibacterium acnes, 34	relationship between the Raman spectrum of
Propoxylated lanolin alcohols, 361	skin and the local water concentration,
Propylene glycol, 114	156–158
Propyl gallate, 557	validation of the quantitative in vivo water
Prostaglandins, 173–174, 471, 542	concentration measurement, 158
Protease-activated receptor-2 (PAR-2), 348	water concentration gradients and measurement
Proteins, 114–115	of the stratum corneum thickness,
collagen, 244, 245–247	158–159
elastin, 244–250	Raman microspectroscopy, applications of
natural polymers, 364–365	hydration effects in dysfunctional skin, 161–162
protein structure, 250–252	moisturizing the skin, 159–160
structure, skin, 250–252	water distribution in the skin for different skin
Provocative use tests (PUT), 566	types, 160–161
Proximal nail fold (PNF), 737, 746	Raman spectra, in-vivo, 154–156, 162
Pruritus, 573	Raman spectrometer for measurement of skin
anti-itch testing, 573–579	hydration, 155
Pseudomonas aeruginosa, 647, 764	Raman spectroscopy, hair, 713-714
Psoralen-UVA (PUVA), 342	Raman spectrum of skin and the local water
Psoriasis, 145–146	concentration, relationship between,
psoriasis vulgaris, 547, 548, 551	156–158
Psoriasis area and severity index (PASI), 547	Raynaud's phenomenon, 740
Psychophysical tests, of skin, 75	RBC glutathione peroxidase, 551
PUFA. See Polyunsaturated fatty acids	RCS. See Reactive carbonyl species (RCS)
Pump sprays, deodorants	REACH. See Registration, Evaluation, and
hydroalcoholic, 648	Authorization of Chemicals (REACH)
microemulsion, 649	Reactive carbonyl species (RCS), 261
PIT-emulsion, 649	Reactive oxygen species (ROS), 175, 261, 293, 324,
PUT. See Provocative use tests (PUT) PUVA. See Psoralen-UVA	331, 625, 678
	in skin inflammation, 37
PVP. See Polyvinyl pyrrolidone PVP-protein copolymers, 365–366	Reactive skin, 60
PVS chemicals. <i>See</i> Pre-validation study (PVS)	Reactivity-based approaches, 335
chemicals	Reconstituted human skin (RHS) models, 345
Pycnogenol, 601, 681	deleterious effects of solar radiation/sunscreen
Pyrrolidone carboxylic acid (PCA), 363	efficacy testing, 350–352
1 yrrondone carboxyne acid (1 C/1), 505	histological section of, 347
	research on, 346–347
O10P Cas Oustornium 10 hantanita asla	Reconstructed human epidermis (RHE), 345
Q18B. See Quaternium-18 bentonite gels	Reconstructed skin equivalents
QST. See Quantitative sensory testing (QST)	barrier function and penetration, 540–541
Quantitation, of cutaneous thermal sensation, 84–85	melanocytes, studies with, 543–544
	pharmacotoxicology, 542–543 skin equivalents, 539–540
Quantitative hydration evaluation, 822 Quantitative sensory testing (QST), 84	skin equivalents, 539–540 Refatteners, 358
Quantitative scribory testing (QD1), OT	included to the state of the st

Refattening additives. See Refatteners	SCOPE. See Synergistic combinations of
Refractive index (RI), 129	penetration enhancers (SCOPE)
Registration, Evaluation, and Authorization of	Scopolamine, 192
Chemicals (REACH), 830–831, 842	Scratch behavior measurement, 576
Regression method, for testing skin hydration, 135	Scrubbing products, 455
Repeated exposure occlusive irritation test	Sculptured nails, 763
(ROIT), 200	technique, 755–757
Repeated open application tests (ROAT), 566, 816	SD. See Standard deviation (SD)
Repetitive irritation test (RIT), 198, 474	SDS. See Sodium dodecyl sulfate (SDS)
Resistant skin vs. sensitive skin, 33–34	Seawater
Resveratol, 296	application on inflamed skin, 547
Rete pegs, 128	composition at 3.5% salinity, 548
Reticular dermis, 7	effects on inflammed skin, 549-550
Retinoic acid, 130	therapy, 547–551
Retinoids, 296	Sebaceous glands, baby vs. adult, 614
anticellulite products, 609	Seborrheic production
Retinol, 679	according to sites, 19
Reviscometer®, 294	in ethnic races, 13
Revulsive products, 653–658	incidence of sexes, 15
capsaicin, 654–655	Sebum, 9
clinical applications, 653	contribution to buffering capacity of skin,
nicotinates, 654	215–216
nonclinical applications, 653	excretion, 286–288
used in physiotherapy and sport, 656–658	secretion
RHE. See Reconstructed human epidermis	in ethnic races, 49
Rheology modification, by silicones, 376	from oily skin, 32
RHS. See Reconstituted human skin	SED. See Standard erythemal dose
RI. See Refractive index	Selenoenzyme glutathione peroxide (GPX), 678
Rinse-off products, 555	Selenoproteins, 551
Risk assessment, baby care products, 617	Self-perceived sensitive skin (SPSS)
RIT. See Repetitive irritation test	neurophysiology, by fMRI, 75–80
ROAT. See Repeated open application tests (ROAT)	brain pattern analysis, 76–80
ROIT. See Repeated exposure occlusive irritation	overview, 75
test	tests, 75–76
Roll-ons, antiperspirant	SELS (surface evaluation of living skin) method,
clear hydroalcoholic, 637	286
O/W emulsion, 637	SEM. See Scanning electron microscopy (SEM), hair
O/W micro-emulsion gel, 638	Sensitive skin, 33–35. <i>See also</i> Skin irritation
suspension, 638	acne type, 34
W/O emulsion, 637	allergic type, 35
W/Si (water-in-silicone) emulsion, 637	classification
ROS. See Reactive oxygen species (ROS)	cosmetically sensitive skin, 60
Rosacea type, sensitive skin, 34	delicate skin, 60
Rubefacient, 653	environmentally sensitive skin, 60
True crucicity occ	reactive skin, 60
	stingers, 60
Cafa Compation Act (200E) of California 941	very sensitive skin, 60
Safe Cosmetics Act (2005), of California, 841	clinical methods
Salicylates, 316	dermal function tests, 64
Salicylic acid, 540, 592	irritant reactivity tests, 63–64
Santolite <sup>®</sup> , 749	sensory reactivity tests, 60–63
Sarcosinates, 775	defined, 59–60
SBCs. See Sunburn cells	evaluation methods, 61–62
SC. See Stratum corneum; Stratum corneum (SC)	host factors
Scaliness, skin surface	age, 68
evaluation using ULEV method, 285–286	anatomical sites, 68–70
Scanning electron microscopy (SEM), hair, 717–718	cultural factors, 70
Scanning probe microscopy (SPM), hair, 718	environmental factors, 70
Scarification index, 476	ethnicity, 65–67
SCCP. See Scientific Committee on Consumer	gender, 65
Products	overview, 59
SCI. See Skin capacitance imaging	peculiar case, 9
Scientific Committee on Consumer Products	questionnaire, 823
(SCCP), 325, 346, 827–828	questionnane, 020

[Sensitive skin]	[Silicones
racial differences, 67	reasons for use in skin care products]
rosacea type, 34	enhanced efficacy, 375
sensitive <i>versus</i> resistant skin, 33–34	flexibility in formulation, 376
sensory responses, 65	permeability, 375
sensory testing methods. See Sensory testing	protection, 375
methods, sensitive skin	rheology modification, 376
stinging type, 34–35	substantivity, 374
tests, 75–76, 83–88	siloxane backbone, 371
bioengineering tests, 86–88	used for hair strengthening, 378
overview, 83	used in hair care products, 376–378
sensory testing methods, 84–86	Silicon image sensor (SIS), 141
vs. resistant skin, 33–34	Siloxane backbone, 371
Sensitivity reactions, UV filters, 318–319	Silybum marianu, 681
Sensitization potential assessment, human testing,	Silymarın, 681
816 Sancowy officets of invitation	Single-application patch testing, 475
Sensory effects of irritation	Single-chain aliphatic spin probes, EPR, 208–209
DAP of, 386	Single solarsimulated radiation (SSR), 350
polarized light-enhanced visual scores of,	SIS. See Silicon image sensor
383–386	Six fragrance allergens
unaided visual scores of, 382–383	clinical patch testing, 563
Sensory reactivity tests, sensitive skin, 60–63	diagnostic patch tests, 564–565
Sensory responses, in sensitive skin, 65	false-positive reactions, 563
Sensory/subjective irritation, 339–340, 448–449	linked to specific consumer product, 567
Sensory testing methods, sensitive skin	scoring system, 567, 568
exaggerated immersion test, 86	SKALP, 539
itching response evaluation, 85–86	Skin. See also Specific entries
nicotinate occlusion test, 85	absorption, 349
sodium lauryl sulfate occlusion test, 85	acidic character and buffer capacity, 215–218
stringing test, 85	aging. See Skin aging
thermal sensory testing, 84–85	barrier function and penetration, 540–541
washing test, 86	barrier models, 95–96
Sepigel, 698	biophysical characteristics, 10–19
Serratia marcescens, 764	cancers, risk assessment, 289
Sertaconazole nitrate, anti-itch testing, 577	classifications by types
SFE. See Surface free energy (SFE) $(\gamma_s)$	dry skin, 7–9
SG. See Stratum granulosum (SG)	mixed skin, 9
Shampoos haby 617 618	normal skin, 6–7
baby, 617–618	oily skin, 9
2-in-1, 697–698	sensitive skin, peculiar case, 9
Shea butter, 334	cleanser effects, skin pH, 227–228
SIAscans, 277	color. See Color, of skin
SIAscopy. See Spectrophotometric intracutaneous	complexion, 407
analysis (SIAscopy) Side effects, cosmetics, 813	cosmetological requirements, 5 equivalents, 346–349
SIFT. See Skin irritation function test (SIFT)	applications of, 347–349
Silicones, 695–698	research on reconstructed human skin,
acrylate copolymers, 373	346–347
	friction/friction coefficient of. See Friction/
in antiperspirant and deodorant products, 378	friction coefficient, of skin
blends, 372 chemical structure of, 372	
	glycerin, effects on, 110
conditioning properties of, 696–697	hyaluronan (hyaluronic acid), effects on, 111
in cosmetics/toiletries industry, 372–373	hydration effects, 161–162
cyclomethicone, 697	hyperpigmentation, 591
derivatives, 362	infants, 160, 161
functional, 372–373	infrared radiation, 324–325
2-in-1 shampoos, 697–698	lactic acid, effects on, 112 main functions of, 92
longer-lasting permanent wave and coloring	
products, 378	measurements, 17
pendant organic groups, 371–372	moisturizing, 159–160. See also Raman
reasons for use in skin care products, 373–376	microspectroscopy
cleansing effect, 375–376 emolliency, 373–374	optical pathways, 408 panthenol, effects on, 113
211.011.cite, 7, 0, 0, 1	partition, circulo on, 110

[Skin]	[Skin feel agents]
PCA, effects on, 113	emollients/refatteners, 358–362
pigmentation, 5, 11	exfoliating agents, 369
propylene glycol, effects on, 114	humectants, 362–363
seawater and its effects on inflammed, 549-550	polymers, 363–368
sensitivity. See Sensitive skin	surfactants, 368–369
surface microrelief, ULEV method, 285-286	Skin flora, 221–228
surface scaliness, ULEV method, 285-286	cosmetic effects, 227–228
ultraviolet radiation, 323–324	overview, 221
urea, effects on, 115	skin cleanser effects, 227-228
Skin aging, 36–37, 141	skin pH effects, 226-227
catabolic aging, 239	Skin hydration, 29-33, 64. See also Buffer capacity,
cellular/intrinsic, 36–37	of skin; Skin wettability
cellular senescence, 234–235	dietary impact on, 100
cutaneous, 37	electrical changes for, 418-419
endocrine aging, 237–239	environmental impact on, 97–98
environmental aging, 236–237	in ethnic races, 43–45
ethnic aging, 237	friction coefficient and, 417-419
gravitational aging, 239–240	mechanisms of, 91–101
intrinsic aging vs. photoaging, 235	aquaporins, 96
overview, 233	desquamation, 97
photoaging, 236–237	stratum corneum, 91–96
phototype aging, 237	tight junctions, 96
types, 236	oily skin versus dry skin, 29-32
wrinkles, 240	overexposure to water, 99
Skin appearance/texture, formulating for	personal care products and, 98-99
immediate improvement in	skin care for O-D parameter, 32-33
emollient esters, 129	tests for
interference pigments, 128	bioengineering measurement methods,
polymers, 129–130	135–139
soft focus effects, 128–129	regression method, 135
Skin capacitance imaging (SCI), 141-147	Skin hydration
dermatoglyphics, 141–142	laser excitation source and optics for
hair shaft moisturization, 147	measurement of, 154–155
hyperkeratotic dermatoses, 145–146	measurement of, 151-152. See also Raman
keratotic/pigmented tumors, 146–147	methods
skin pores, 144–145	comparison of some methods for, 153
skin surface hydration, 143–144	software for measurement of, 155-156
skin surface patterns, 141	Skin inflammation. See also Skin irritation
surfactants, 145	protein mediators of
Skin care. See also Skin care products	cellophane tape adsorption of, 481–482
after sun exposition, 332	sebutape adsorption of, 482–486
for O-D parameter, 32-33	reactive oxygen species (ROS) in, 37
Skin care products, 121–133	techniques to study, 481
DHA. See Dihydroxyacetone (DHA)	Skin interaction, elastic vesicles, 797–798
different types of emulsifiers, 122	Skin irritants, 456
different types of emulsions, 121-122	Skin irritation. See also Skin inflammation
emulsion based, 121	animal models for testing
emulsions for aging population, 127–128	bioengineering methods and, 477
formulating effective cosmeceuticals for aging	Draize rabbit models, 471–474
population, 130–133	human models, 475
formulating for immediate improvement in	mouse ear model, 474–475
appearance and texture, 128–130	cell viability measurement, 522
formulating hydrating creams and lotions,	direct topical test, 521, 523–527
122–125	due to surfactants
future formulation challenges, 133	causes of, 455
interaction with decorative products, 398	mechanism of interaction, 457-458
preservative systems, 126	monomers role in, 459
silicones used for, 373–376	effect of divalent cations on
SkinEthic <sup>TM</sup> , for skin irritation testing, 517–535	magnesium, 465
Skin feel agents	zinc, 465–466
anionic, 362–363	erythema, 494
criteria of selection of, 358	factors predisposing to cutaneous, 445

[Skin irritation]	[Skin radiance
histology, 521	methods for measuring]
IL-1α Release, 522	assessment of skin ability to reflect light,
interaction between MTT and chemicals, 522	411–412
molecular mechanisms of, 443-445	assessment of skin microcirculation, 407-408
epidermal keratinocytes role in inflammation	assessment of skin relief, 409-410
of, 444	colorimeters, 408–409
upregulation adhesion molecules, 444	photography, 409
MTT interaction with chemicals, 522, 523	quantification of, 403–404
patch test, 521, 527–529	Skin reactivity, to HN, 27
polarized light visualization system to assess	Skin relief
BTK testing, 490–491	according to sites, 17
cross-polarized light, 494-495	assessment of, 409-410
enhanced visual grading, 491–494	in ethnic races, 11
individuals' patch tested with SLS, 494	influence of sex, 14
milder patch conditions, 495	related to age, 15-16
skin conditions, 494	Skin scrub agents, 369
subjects, 490	Skin structure
test materials for, 489	GAG, 253
upper arms and lower forearms, 490	lipids, 253–258
visual grading, 493, 494, 495–496	overview, 243
visual scoring and instrumental scoring	proteins
methods, comparison between, 495	collagen, 244, 245–247
prediction models, 522	elastin, 244–250
reconstituted human epidermis, 518	protein structure, 250–252
statistical analysis, 522	techniques, 243
statistical reproducibility, 531–532	water, 253
test chemical coding, 518	Skin surface
tests to assess, 489	analysis, with SIAscope, 278–279
topical test vs. patch test, 529–531	contact thermography, cellulite evaluation,
Skin irritation function test (SIFT), 518	607
Skin microcirculation	hydration, 143–144
assessment of, 407–408	patterns, 141
perfusion of, 656	proteins and surfactants, 457
Skin microflora. See Microflora, skin	topography measurement, 608
Skin microrelief	Skin surface biopsies (SSB), 199
in ethnic races, 46–49	Skin surface water loss (SSWL), 138–139
evaluation, 293–294	Skin tape application methods
Skin organ culture (SOC) models, 346	for assessing inflammatory skin reactions
deleterious effects of solar radiation/sunscreen	mRNA fragments, 487
efficacy testing, 350–352	structural proteins, 486
histological section of, 347	Skin thickness measurement, 64
Skin penetration enhancer effects, EPR, 213	Skin types, water distribution in the skin for
Skin pH, 221–228	different, 160–161. See also Raman
cosmetic effects, 227–228	microspectroscopy
effects on skin flora, 226–227	Skin wettability, 427–432. See also Skin hydration
gender differences, 223	contact angle measurement and, 427–428
origin, 221–222	critical surface tension and, 428–429
overview, 221	data analyses, 429–431
pH values, 222	hydrophobic/hydrophilic balance and, 429
protective role, 226	Skin-whitening agents, 587–593
skin cleanser effects, 227–228	ascorbic acid, 590
Skin photo-adaptation inducers, 335	glutathione, 590
Skin pigmentation, 35–36	hydroquinone, 587–589
Skin pores, 144–145	kojic acid, 589–590
Skin protection	pigmentation disorders' treatment, 597–601
in vitro methods, 197–198, 201	SLEB. See Subepidermal low echogenic band
in vivo methods, 198–201	(SLEB)
Skin protective materials, evaluation of, 477	SLES. See Sodium lauryl ether sulfate (SLES)
Skin radiance	SLN. See Solid lipid nanoparticles (SLN)
clinical scoring, 412	SLS. See Sodium lauryl sulfate; Sodium lauryl
defined, 407	sulfate (SLS)
methods for measuring, 407–412	Smoking, effects on aging, 293

Soap	Standard operating procedures (SOPs), 820
for baby, 618	Staphylococcus aureus, 647
chamber test, 476	State cosmetic regulations in US, 841
and friction coefficient of skin, 423	Stearalkonium chloride, 692
SOC. See Skin organ culture	Stearamidopropyl dimethylamine, 694
SOD. See Copper-zinc superoxide dismutase	Stearyl alcohol, 634
Sodium, 547–548	Sticks
Sodium bicarbonate (NaHCO3), 644	antiperspirants. See Sticks, antiperspirants
Sodium chloracetate, 770	deodorants, 647
Sodium dodecyl sulfate (SDS), 511 Sodium hydroxide, 745	Sticks, antiperspirants emulsions
Sodium lauryl ether sulfate (SLES), 772	clear O/W, 636
Sodium lauryl sulfate (SLS), 98, 197, 455, 499,	W/O, 636
542, 771	gel
induced irritation in human face, 499-502	clear anhydrous, 635
irritation to, 477	white anhydrous, 635
occlusion test, skin sensitivity, 85	soft
Sodium metabisulfite, 557	clear water-in-silicone emulsion gels, 636
Soft focus effects, 128–129	white/anhydrous creams, 636
Software for measurement of skin hydration,	suspension, 634
155–156	Stingers, 60
Solar lentigos, 598	Stinging test
Solid lipid nanoparticles (SLN), 789	skin sensitivity, 501
Sonophoresis, 183	Stinging type, sensitive skin, 34–35
Sorbitan, 783–784 Sorbitol, 115	Strain curves, vs. time curves, 821–822 Stratum cornoum, 91–96, 340
esters, 783–784	Stratum corneum, 91–96, 340 lamellar lipid
Sorption-desorption test, 137	arrangement, 96
Spectrometer, 16	water permeability, 96
Spectrophotometric intracutaneous analysis	lipids, 94
(SIAscopy)	organization, 94–96
chromophore mapping, 278	structural models, 94–96
contact SIAscopy, 277–278	natural moisturizing factor (NMF), 92-94
defined, 275	Stratum corneum (SC), 67, 68, 151, 176, 185, 346,
hydration level assessment, 279	359, 539, 740
mathematical optical model construction,	EPR probes for, 207–213
275–276	role in ICD, 444
noncontact SIAscopy, 279–280	skin hydration, 29, 31–32
surface analysis, 278–279	skin sensitivity and, 33, 35
Spectroscopy	thickness, and measurement of, 158–159
cellulite evaluation, 608 hair	thickness contribution to buffering capacity of skin, 216–217
ESR, 717	water content in, 440
fluorescence, 713	Stratum granulosum (SG), 176, 539, 740
infrared (IR), 713–714	Stratum spinosum, 539
integrating sphere spectrophotometry, 715–716	Streakiness, of lipstick, 399
NIR, 715	Stress/strain curves, hair, 706–707
Raman, 713–714	Stringing test, skin sensitivity, 85
X-ray, 716	Strivectin-SD <sup>®</sup> , 297
SPF. See Sun protection factor	Strontium
Spin probes, in EPR, 207–210	salts, anti-itch testing, 575
EPR line shapes due to motion of, 209	and selenium, 548, 551
nitroxide probes, 207–208	Subepidermal low echogenic band (SLEB), 250, 294
single-chain aliphatic, 208–209	Suberythematous irritation, 439, 448
SPM. See Scanning probe microscopy (SPM), hair	Submicron emulcion (SME) See Nancomulcions
Sport revulsive products used in, 656–658	Substantivity of silicones 373-374
SPRR3, 539	Substantivity, of silicones, 373–374 Sucrose fatty acid ester, 645
SPSS. See Self-perceived sensitive skin (SPSS)	Sulfates
SSB. See Skin surface biopsies	alkyl ether sulfates (AES), 771–772
SSR. See Single solarsimulated radiation	alkyl glyceride sulfates, 772
Standard deviation (SD), 501	alkyl sulfates, 771
Standard erythemal dose (SED), 328	amide ether sulfates, 772

Sulfo fatty acid esters, 774	Synchrotron X-ray microdiffraction, 738
Sulfonates	Syndets
alkyl-aryl sulfonates, 773	baby, 618
alkyl sulfonates, 772–773 fatty acid isethionates, 774	Synergistic combinations of penetration enhancers (SCOPE), 193
sulfo fatty acid esters, 774	Synthetic detergents. See Syndets
sulfosuccinates, 773	Synthetic menthol, 664
taurides, 774	Synthetic quaternized polymers, 367–368
Sulfosuccinates, 773	
Sunblocks, 317–318	
Sunburn, 293	Takasago process, 662
Sunburn cells (SBC), 350	Tanning agents, 342–343
Sun care products, silicones for, 373–376	Tape stripping, 63, 340
Sun protection	Taurides, 774 TDD. See Transdermal drug delivery (TDD)
infrared radiation, 324–325 against IRR, 327	TEALS. See Triethanolamine lauryl sulfate (TEALS)
nutritional, 328	Technical information file (TIF) prerequisite,
ultraviolet radiation, 323–324	826–827
against UVR, 326-327	T4 endonuclease V (T4N5), 335
water/sweat resistance, 327	Tensile properties, of hair
Sun protection factor (SPF), 311, 326	post-yield region, 709
Sunscreens, 324	stress/strain curves, 706–707
baby care, 619	tensile testers, 709–710
and contact allergic reactions, 558	yield region, 708
legislation concerning, 325	Tensile testers, hair, 709–710
nomenclature, 313–315 water/sweat resistance, 327	Testosterone, 541, 543 Tetra alkyl ammonium salts, 776–777
Surface-active agents. See Surfactants	Tetraphthalydine dicamphor sulfonic acid, 317
Surface area/body weight ratio	Tewameter®, 499
baby vs. adult skin, 615	TEWL. See Transepidermal water loss (TEWL)
Surface free energy (SFE), of skin, 429	(dTEWL). See TEWL after SLS exposure (dTEWL)
data analysis, 430–431	TEWL after SLS exposure (dTEWL), 501
Surface proteins, surfactant interaction with, 459–460	Texture analysis, hair, 725–726
Surface-smoothing agents, 295	Thermal degradation, 331
Surfactant-containing products, 456	Thermal sensory testing, 84–85
anti-irritants for. See Anti-irritation	Thermoreception, 670–672 Thickeners, 340
Surfactants, 121, 122, 145, 368–369 amphoteric, 369	Thickness, conditioners ingredients, 698–699
anionic, 369	Thin-layer chromatography (TLC), 809
comedogenic scores of, 584	Thinners, 750
effects, EPR, 213	Thiol antioxidants, 304-305
and elastic vesicles, 800	Thixotropic agents, 750
interaction with	Three-dimensional (3D) skin models, 345
with lipids or membranes, 461	Tight junctions, 96
with living cells in vitro, 461	Tight skin vs. wrinkled skin, 36–37
with proteins in vitro or in vivo, 460	Time curves vs. strain curves, 821–822
with skin in vivo, 461–462 ionic, 769–779	Tincture, 133 Titanium dioxide ( $TiO_2$ ), 317, 318
mixed micelles of, 459	Titanium metal chelates, 633
mixtures, skin irritation in, 460	TLC. See Thin-layer chromatography (TLC)
non-hydrocarbon speciality, 785	TMP. See Trimethylpsoralen (TMP)
non-ionic, 779–785	T4N5. See T4 endonuclease V
skin care, 98	α-Tocopherol, 302, 303, 679
skin irritation by, 455	α-Tocopherol acetate (α-TAc), 349
in standard animal irritation assays, 537–538.	δ-Tocopherol glucoside (δ-TG), 349
See also Non-surfactant compounds	Tocopherols, 301–303, 679
Suspension sticks, 634	Tocotrienols, 307
Sweat contribution to buffering capacity of skin, 216	Toluene, 749 Toluene sulfonamide/formaldehyde resin
glands	(TSFR), 749
apocrine, 631	Topical dermato-cosmetic products, for
eccrine, 631	cellulite, 609
resistance, 327	Torsion measurements, hair, 712–713

Tosylamide/formaldehyde resin, 557–558	Uniaxial tension test, 822
Toxicity, of UV filters, 318–319	United States (US)
Toxic reactions, nail. See Allergic reactions, nail Transdermal drug delivery (TDD), 183	cosmetic industry impact of EU legislations on, 841–842
FDA-approved, 191–192	PCPC role, 839, 842
Transepidermal water loss (TEWL), 8, 32, 86–87, 143, 165, 199, 331, 474, 499, 542, 547, 616, 820	response to changing regulations, 842–843 federal laws, 839–841
with age, 16	definition of cosmetics, 839
anatomical sites, 18	for products containing AHA, 840
comparison between regions, 500	regulation of UV filters, 312–313
comparison between two age groups, 500	state laws, 841
correlation with percutaneous absorption, 165–168	Unites States Pharmacopeia (USP), 125 "Unripe" skin, 613
qualitative reasoning for, 170–171	Urea, 115–116
correlation study, 500–501	Urinary radioactivity, 169
effect of potassium on, 548	USP. See Unites States Pharmacopeia
in ethnic races, 12, 41–43	UV filters, 296, 311–319, 324
increase in, 29	adverse reactions (toxicity), 318–319
investigational study, 499–500	definitions, 311
between sexes, 14–15	formulation, 318
for skin sensitivity measurement, 64	history, 311–312
Transfersomes, 799	individual, 316
Transient receptor potential (TRP), 655, 670	mechanism of action, 313
Trans-8-methyl-N-vanillyl-nonenamide. See	nomenclature, 313–315
Capsaicin	physical blockers, 317–318
Traumiterative ICD, 448	regulatory, 312–313
Triazones, 317	technologies, 627
Tricetylmonium chloride, 693	UVA, 317
Trichobacteriosis, ULEV method for examining,	UVB, 316–317
288–289 Tui-lana (45	UV irradiation, in vivo, 167
Triclosan, 645	UV light, 678, 689
Triethylaity to cotay and inhibitors (45	aging and, 292–293
Triethylcitrate, esterase inhibitors, 645	UV-light enhanced visualization (ULEV) method,
Tri-Luma, 599–600	283–289
Trimethylpsoralen (TMP), 789	comedogenesis, 286
Trimethylsilylamodimethicones. See	dandruff assessments, 289
Amodimethicones	hair graying assessment, 288
TRP. See Transient receptor potential	sebum excretion assessment, 286–288 skin cancer's risk assessment, 289
TRPM8 receptor channel, 671 TSFR. See Toluene sulfonamide/formaldehyde	skin surface microrelief and scaliness evaluation,
resin (TSFR) Turbo-PUVA, 342	285–286 subclinical melanoderma, 283–285
Tyrosinase activity, 544	trichobacteriosis examination using, 288–289
Tyrosinase activity, 544	whitening agents assessment, 285
	UVR. See Ultraviolet radiation (UVR)
III EV. Co. IIV light on home and spice alignation	ovice out a violet radiation (ovic)
ULEV. See UV-light enhanced visualization (ULEV) method	1 W 1 600
Ultrasonic imaging of skin, cellulite evaluation,	van der Waals, 693
607–608	Vellus hair follicles, in ethnic races, 50
Ultrasound measurements, of photoaging, 294	Vernix caseosa, 97–98, 614
Ultraviolet radiation (UVR), 13, 316–317, 331	Vertical suction method, 821
antioxidants, 324	Very sensitive skin, 60
defined, 323	Vesicles, for topical applications, 791–792
free radicals, 324	Virgin hair surfaces, 689
free radical scavengers, 324	Viscoelastic properties of skin, 821
photostability, 324	using Cutometer®, 294
protection against, 326–327	VisioScan camera, 283, 284
skin effects of, 323–324	Vitamin C, 303–304
sunscreens, 324	Vitamin E 201 202
UV filters. See UV filters	Vitamin E, 301–303
wavelength ranges in, 323	oral supplementation, 591
Umbelliferae, 440	Vitamins, 679–680

Volatile siloxanes, 372

Unaided visual scores of sensory effects, 382–383

Voltage-sensitive  ${\rm Ca}^{2+}$  channels (VSCC), 176 Vulva, 505 Vulvar skin sensitivity, 68–70

Washing test, 86 irritant effects of detergent, 477 Water content. See Skin hydration Water distribution, in skin, 160-161 Water-in-cyclomethicone emulsions, 125 Water-in-oil-in-water (W/O/W) emulsions, 124-125 Water-in-oil (W/O), 332 emulsions, 121, 124, 635-636 Water-in-silicone emulsions, 125 Water overexposure, skin hydration and, 99 Water resistance (WR), 326 Australian/New Zealand guideline, 327 the Colipa guideline, 327 FDA guideline, 327 Water-soluble constituents of epidermis, 216 Water-soluble ointment bases emulsions, 125 Water structure, and skin, 253, 256 Wavelength ranges infrared radiation, 323 ultraviolet radiation, 323 Waving evaluation, hair, 730-731 Wettability measurement, hair, 722–723 White/anhydrous creams, 636 White anhydrous gel sticks, 635 Whitening products, skin care assessment using ULEV method, 285 Wilkinson Sword Ltd., cooling agents of, 666-667 Wing cells, 537
Witch hazel. See Hamamelis
W/O. See Water-in-oil
W/O emulsions. See Water-in-oil, emulsions
World Health Organization (WHO), 361
W/O/W emulsions. See Water-in-oil-in-water
emulsions
WR. See Water resistance
Wrinkled skin vs. tight skin, 36–37
Wrinkles, 240
facial, 293–294
%WRR. See Percentage water resistance retention
W/Si (water-in-silicone) emulsion roll-on, 637

Xanthines, anticellulite products, 609 Xenobiotic metabolism, 543, 544 Xeroderma pigmentosa skin model, 348 Xerosis. *See* Dry skin X-linked recessive ichthyosis (XRI), 167 X-ray spectroscopy, hair, 716 XRI. *See* X-linked recessive ichthyosis (XRI)

Young's modulus, 822

ZAG. See Aluminum zirconium glycine Zinc gel formulation, 200–201 glycinate, esterase inhibitors, 645 ricinoleate, odor-quenching deodorants, 644 Zinc oxide (ZnO), 317, 318