

Index

A

aberrant hyperproliferation, 103

actives

- black pepper, 213–214
- moringa oleifera, 206
- skin care marketing, 199–201
- term defined, 182

adhesive patches

- antiaging peptides, 149
- rhizobium gum, 263–265

Adria, Ferran, 323

aging

- antiaging skin care
 - consumer input, 127–128
 - delivery systems, 129–133
 - peptides, 125–126, 147–149.
See also peptides
 - prevention, 128
 - skin care boom, 126–127
 - wrinkle free ingredients, 127
- ECM (extracellular matrix), 69–70, 107–108
 - age-dependent modifications, 115–119
 - cell proliferation, 108–111
 - interaction modifications, 119–121
 - molecular composition, 112–115
 - receptor activity skin care, 121–123
- many levels, 169–170

pollution

- experimental demonstration, 139–141
- LOOH (lipid hydroperoxide), 136–138
- oxidative processes, 135–136

pseudodipeptides (PDPs)

- anti-pollution, 143–144
- anti-toxic aldehyde activity, 141–143
- pollution, 138–139

sodium DNA

- extraction from male sturgeons, 170–171
- in vitro tests, 171–173
- in vivo tests, 173–175
- test conclusions, 175–177

agricultural biotechnology, 1

AHA (alpha hydroxy acids), exfoliation method, 285, 293–295

algae, 301–302

alpha hydroxy acids (AHA), exfoliation method, 285, 293–295

Alteromonas macleodii, 317

amino acids, used by cells to make proteins, 151–153

analytical techniques, flavors, 325–326

anti-inflammatories, sea buckthorn, 207

antiaging

- consumer input, 127–128
- delivery systems
 - demand, 130–131
 - industry optimization, 129–130
 - laboratory advancements, 131–132
 - retail, 133
- emulsions, 177–178
- natural skin care
 - biopein, 207–210

- black pepper, 213–214
 - blue green algae, 212
 - cranberry seed oil, 213
 - desert plankton, 210–211
 - English Broomrape, 211–212
 - lactobionic acid, 212
 - maltodextrins, 214
 - rooibos extract, 214–215
 - sea buchthorn, 207
 - ursolic acid, 211
 - wasabi extract, 215
 - peptides, 125–126, 147
 - adhesive patch, 149
 - amino acids making proteins, 151–153
 - histidine, 147–148
 - in vitro model test, 148–149
 - US patents, 153–158
 - prevention, 128
 - skin care boom, 126–127
 - sunscreen products, 188–189
 - active defined, 182
 - adding actives, 182
 - antiaging defined, 183
 - barrier repair, 189–190
 - defined, 181–182
 - tissue repair, 190–192
 - wrinkle free ingredients, 127
 - antibodies, 54
 - binding process, 55
 - antidandruff, octadecenedioic acid, 246–248
 - antigens, 54
 - antimicrobials
 - properties, PCC (Pure and Clear Chitosan), 235–236
 - wasabi extract, 215
 - antioxidants
 - extremozymes, 205–206
 - sea buchthorn, 207
 - wasabi extract, 215
 - antiwrinkle effects, SHAB antiaging properties, 164–166
 - aromas
 - analytical techniques, 325–326
 - chemistry, 321–322
 - formulation, 322–324
 - future, 324–325
 - physiological stimuli, 326
 - vanilla, 329–331
 - American and European regulations, 331–333
 - economics, 335–336
 - industrial constraints, 335
 - preparation process for vanillin, 333–334
 - aromatic chemistry, 321–322
 - assays
 - quantitative RT-PCR assay, 16
 - ribonuclease protection assay, 15–16
 - ATP bioluminescence, 387–388
 - experimental procedures, 388–389
 - results of experimentation, 389–394
 - Axel, Richard, 344
- ## B
- B-lymphocytes, 54
 - Bacillus licheniformis, 95, 285–286
 - Bacillus subtilis, biosynthetic HA, 161
 - barrier repair, antiaging in sunscreen products, 189–190
 - BEI (Botanical Enterprises, Inc.), FDA-approved botanical drugs, 8–10
 - Benson, Dr. Nicholas, 13
 - beta glucans, 55–56
 - biocatalysts, 239
 - biomimetic reducing agents, 139
 - biopain, natural preservative, 207–210

- biophoton energy, desert plankton, 210–211
- biopigments from microorganisms, 357–360
- biosynthetic HA, 160–164
- biotech cosmetics, 4
- biotechnology, 1–2
 - impact on cosmetic industry, 3–5
 - pharmaceutical industry
 - transformation, 2–3
 - track record table, 2
- Blinder, Ben, 212
- blue green algae, natural skin care, 212
- body creams, sodium DNA, 176
- Botanical Enterprises, Inc. (BEI),
FDA-approved botanical drugs, 8–10
- botanicals
 - drug development, 8–10
 - skin care, 7
 - sunscreen products, 185–186
 - wound healing drugs, 10–11
- Buck, Linda, 344
- butterflies, optical effects, 353–355
- C**
- CA (catecholamines), 57
 - keratinocytes synthesizer, 59–60
 - study of keratinocytes
 - CA determination, 64–65
 - cell cultures, 64
 - cell lines, 63–64
 - cell preparation, 62–63
 - DNA synthesis, 64
 - peptide inhibiting synthesis, 64
 - reagents, 62
 - results, 65–67
 - statistical methods, 65
 - study of keratinocytes
 - CA determination, 64–65
 - cell cultures, 64
 - cell lines, 63–64
 - cell preparation, 62–63
 - DNA synthesis, 64
 - peptide inhibiting synthesis, 64
 - reagents, 62
 - results, 65–67
 - statistical methods, 65
- catalase, sunscreen ingredients, 187–188
- catecholamines (CA), 57
 - keratinocytes synthesizer, 59–60
- cationic lotions, viscosity tests, 233
- cell membranes, phospholipid
oxidation schematic, 136
- cell proliferation, ECM
(extracellular matrix)
 - aging mechanisms, 110–111
 - dermal fibroblasts, 108–109
 - epidermal keratinocytes, 108
- cells
 - defensive factors, 217–218
 - making proteins with amino acids, 152
 - metabolism, desert plankton, 210–211
- ceramide 2, 39–40
- ceramides
 - enhancing skin penetration, 38–41
 - lipid classes, 36
 - schematic of synthesis pathway, 97
 - stratum corneum lipid barrier
composition, 81–82
 - dry skin basics, 88–90
 - structure of matrix, 83–84
 - sunscreen barrier repair, 189–190
- chemical stinging, skin well-being, 49
- chemicals, enhancing skin
penetration, 37–38
- chitin, 225–226
- chitosan, 225–226
 - cloudiness of solutions, 230
 - curl retention gels, 233–235

- emulsion viscosity, 230–233
 - PCC (Pure and Clear Chitosan), 227–228
 - antimicrobial properties, 235–236
 - cosmetic formulations, 228–230
 - technical overview, 236
 - preparation
 - deacetylation degree, 227
 - factors effecting, 226–227
 - raw materials, 227
 - Chlorella vulgaris*, 302–303
 - cholesterol, lipid classes, 36
 - CL-SB (cross-linking subtilisin polymer), protease enzymes, 290–291
 - clinical trials
 - skin sampling, 17
 - well-being (skin) chemical stinging, 49
 - heat, 48–49
 - mechanical stress, 49–50
 - closed cultivation systems, cultivating phototropic microalgae, 306–307
 - CMRs, 367
 - collagen
 - ECM (extracellular matrix), 112–113
 - skin aging, MMPs and TIMPs
 - molecular action, 73–75
 - colors
 - biopigments from microorganisms, 357–360
 - optical effects of butterfly wings, 353–355
 - Thibacillus ferrooxidans*, 356–357
 - consumer marketing, skin care
 - actives, 199–201
 - natural ingredients, 203–204
 - non-surgical alternatives, 202–203
 - targeting trouble spots, 201
 - wellness with neuropeptides, 201–202
 - corneocyte phenotypes, stratum corneum (SC), 86–87
 - corneodesmolysis, stratum corneum improvement
 - glycerol as humectant, 94–95
 - hydroxy acids, 95
 - topical enzymes, 95–97
 - corneodesmosomes, stratum corneum (SC), 84–85
 - cosmeceuticals, 4
 - cosmetics industry
 - biotechnology impact, 3–5
 - biotechnology transfer, 3–5
 - botanical drug implications, 11–12
 - cranberry seed oil, natural skin care, 213
 - cross-linking subtilisin polymer (CL-SB), protease enzymes, 290–291
 - cutaneous aging
 - LOOH (lipid hydroperoxide), 136
 - experimental demonstration, 139–141
 - migration, 138
 - natural protective systems, 138
 - toxicity, 137–138
 - oxidative processes, 135–136
 - PDPs (pseudodipeptides), 138–139
 - anti-pollution, 143–144
 - anti-toxic aldehyde activity, 141–143
 - cytokines, 57
- D**
- defensive factors, cells, 217–218
 - DeHaven, Charlene, 133
 - Delivery System Handbook for Personal Care and Cosmetic Products*, 129
 - delivery systems, antiaging skin care
 - demand, 130–131
 - industry optimization, 129–130
 - laboratory advancements, 131–132
 - retail, 133

- deodorancy, octadecenedioic acid, 248–249
- deoxyribonucleic acid (DNA), sodium. *See* sodium DNA
- dermaceuticals, 4
- dermagenetics, 21–22
- oxidative stress, 22–23
 - behavioral response, 25–26
 - body's response, 24–25
 - chemistry, 23–24
 - single nucleotide polymorphisms (SNP), 26–27
- dermal fibroblasts, cell proliferation, 108–109
- dermal rolling, 148
- dermocosmetics, 4
- desert plankton, natural skin care, 210–211
- DHA (dihydroxyacetone), exfoliation method, 292–294
- Dietary Supplement Health and Education Act of 1994 (DSHEA), 8
- dihydroxyacetone (DHA), exfoliation method, 292–294
- DNA (deoxyribonucleic acid), sodium. *See* sodium DNA
- DNA microarray-based RNA profiling, 17–18
- DNA-Na, 172–173
- Draelos, Zoe Diana, 152
- Drew, Gregory, 213
- dry skin
- hyaluronic acid (HA)
 - chemical structure, 160
 - skin moisturization, 159–167
- sodium DNA
 - aging levels, 169–170
 - body cream, 176
 - extraction from male sturgeons, 170–171
 - in vitro tests, 171–173
 - in vivo tests, 173–175
 - test conclusions, 175–177
- stratum corneum (SC)
- basics, 87–88
 - lipid barrier, 81–84
 - lipid changes, 88–90
- DSHEA (Dietary Supplement Health and Education Act of 1994), 8
- Dunaliella salina, 302–303
- ## E
- ECM (extracellular matrix)
- aging, 69–70, 107–108
 - age-dependent modifications, 115–119
 - cell proliferation, 108–111
 - interaction modifications, 119–121
 - molecular composition, 112–115
 - receptor activity skin care, 121–123
 - excessive MMP action, 75–77
- efficacy
- protease, 291–295
 - testing. *See* skin sampling
- eggshell genes, 367
- elasticity
- aging, 117
 - SHAB antiaging properties, 166–167
 - sodium DNA
 - aging levels, 169–170
 - extraction from male sturgeons, 170–171
 - in vitro tests, 171–173
 - in vivo tests, 173–175
 - test conclusions, 175–177
- elastin
- ECM (extracellular matrix), 113
 - laminin receptors, 120–121

- emulsions
 - antiaging, 177–178
 - chitosan viscosity, 230–233
 - efficacy assessment, 173–175
 - encapsulation, antiaging
 - delivery systems, 131–133
 - endocrine systems
 - homeostasis, 57
 - keratinocytes link, 60–62
 - endorphin precursor release, 45–46
 - English Broomrape,
 - natural skin care, 211–212
 - environmental biotechnology, 1
 - environmental stresses
 - EPS (exopolysaccharides), 267–268
 - inflammation process of skin, 269–271
 - innovative EPS657, 268–269
 - SEPS657
 - biological function of fibroblasts, 272–273
 - expression of ICAM-1
 - by keratinocytes, 271
 - manual shaving skin irritation, 277–279
 - potential for sun and after-sun skin care, 279–282
 - secondary effects of
 - oral isotretinoin, 275–277
 - sensitive and reactive skins, 273–275
 - stimulating keratinocytes proliferation, 271–272
- enzymes
 - aromatic technology, 324–325
 - conversion to proenzymes, 71–73
 - enhancing skin penetration, 36–37
 - proteases, 285
 - cross-linking subtilisin
 - polymer in skin care, 290–291
 - efficacy, 291–295
 - facial cleansers, 289–290
 - keratinized cell exfoliation, 286–287
 - locating stabilizing ingredients, 297–299
 - safety, 291
 - SC (stratum corneum), 287–289
 - stability, 295–297
 - stratum corneum (SC), 85–86
 - sunscreen products, 186–188
- epidermal differentiation, 100–101
- epidermal keratinocytes,
 - cell proliferation, 108
- epidermal neuroendocrine cells, 44
- epithelial cells, 57
- EPS (exopolysaccharides), 267–268
 - EPS657, 268–269
 - inflammation process of skin, 269–271
 - microorganisms, 311–312
 - hydrothermal vents, 313–319
 - searching for new polysaccharides, 312
 - SEPS657 effects
 - biological function of fibroblasts, 272–273
 - expression of ICAM-1
 - by keratinocytes, 271
 - manual shaving skin irritation, 277–279
 - potential for sun and after-sun skin care, 279–282
 - secondary effects of
 - oral isotretinoin, 275–277
 - sensitive and reactive skins, 273–275
 - stimulating keratinocytes proliferation, 271–272
- EPS657, 268–269
- Ereky, Karl, 1
- eugenol, natural vanillin
 - preparation process, 334

exfoliation

- lactobionic acid, 212
- proteases, 285
 - cross-linking subtilisin polymer in skin care, 290–291
 - efficacy, 291–295
 - facial cleansers, 289–290
 - keratinized cells, 286–287
 - locating stabilizing ingredients, 297–299
 - safety, 291
 - SC (stratum corneum), 287–289
 - stability, 295–297

exopolysaccharides (EPS), 267–268

- EPS657, 268–269
- inflammation process of skin, 269–271
- microorganisms, 311–312
 - hydrothermal vents, 313–319
 - searching for new polysaccharides, 312
- SEPS657 effects
 - biological function of fibroblasts, 272–273
 - expression of ICAM-1 by keratinocytes, 271
 - manual shaving skin irritation, 277–279
 - potential for sun and after-sun skin care, 279–282
 - secondary effects of oral isotretinoin, 275–277
 - sensitive and reactive skins, 273–275
 - stimulating keratinocytes proliferation, 271–272

extracellular matrix (ECM)

- aging, 69–70, 107–108
 - age-dependent modifications, 115–119
 - cell proliferation, 108–111
 - interaction modifications, 119–121
 - molecular composition, 112–115
 - receptor activity skin care, 121–123
- excessive MMP action, 75–77

F

- facial cleansers, protease, 289–290
- facial powders, octadecenedioic acid, 254–255
- facial washes
 - octadecenedioic acid, 254–255
 - skin-toning, 254–255
- fatty acids, lipid classes, 36
- FDA (Food and Drug Administration), botanical drug development, 8–10
- ferulic acid, natural vanillin preparation process, 333
- fibroblasts, oxidant targets, 135
- fibronectin, increased production, 117
- fibronectin degradation, 121
- flavors
 - analytical techniques, 325–326
 - aromatic chemistry, 321–322
 - formulation, 322–324
 - future, 324–325
 - physiological stimuli, 326
 - vanilla, 329–331
 - American and European regulations, 331–333
 - economics, 335–336
 - industrial constraints, 335
 - preparation process for vanillin, 333–334
- Food and Drug Administration. *See* FDA
- fragrances
 - future, 350–351
 - molecular biology, 343–344
 - olfactory systems, 344–345
 - application to industry, 348–349
 - limitations of research, 349–350
 - new techniques, 345–347
- free radicals, oxidative stress, 22–23
- Freers, Susan, 214

G

gels

- agents, rhizobium gum, 263–265
- curl retention tests, 234–235

genes, 2–3

- transcription regulation, 71

genomics, 367

- advancements, 21

Georgalas, Art, 132

GHK (glycine-histidine-lycine), 152

glutathion peroxidase (GPO),

sunscreens, 187

glycerol, humectant in

moisturization, 94–95

glycine-histidine-lycine (GHK), 152

GPO (glutathion peroxidase),

sunscreens, 187

green tea, sunscreen ingredients, 186

Green, Barbara, 212

Gruber, Vince, 131

H

HA (hyaluronic acid)

- chemical structure, 160
- skin moisturization, 159–160
 - antiaging properties of SHAB, 164–167
 - biosynthetic HA, 160–164
 - SHAB moisturization properties, 164

heat, skin well-being, 48–49

herbal extracts, natural ingredients, 208–209

Herman, Steve, 125

histidine fragments, 147–148

homeostasis, 57

human genomes, 2–3

hyaluronan, ECM

(extracellular matrix), 113

hyaluronic acid (HA)

- chemical structure, 160
- skin moisturization, 159–160
 - antiaging properties of SHAB, 164–167
 - biosynthetic HA, 160–164
 - SHAB moisturization properties, 164

hydration

- aging loss, 117
- SHAB, 163

hydrogen peroxide, yeast, 217–219

- laboratory production, 219
- LYCD (Live Yeast Cell Derivative), 217–223
- PTYE (peroxide-treated yeast extract), 219–223

hydrothermal vents, microorganisms, 313–319

hydroxy acids, corneodesmolysis, 95

hydroxyl acids, sunscreen barrier repair, 189

I

IgG (Immunoglobulin G), 54

- immune systems, 53–56
 - homeostasis, 57
 - keratinocytes link, 60–62

Immunoglobulin G (IgG), 54

industrial biotechnology, 1

inflammation, skin process, 269–271

integrins, 120

intelligent flavors

- analytical techniques, 325–326
- aromatic chemistry, 321–322
- formulation, 322–324

future, 324–325
physiological stimuli, 326
intense pulse lights, 148
intercellular lipids, 31
intercellular pathway, skin penetration, 32
intrafollicular pathway,
skin penetration, 32–34
iron oxide pigments,
Thibacillus ferrooxidans, 356–357
itching, 103
somatosensory dry skin problems, 101

J–K

Japanese Cosmetic Ingredients
Codex (JCIC), 290

JCIC (Japanese Cosmetic
Ingredients Codex), 290

Judin, Vesa-Pekka, 207

keratinocytes, 57–58
catecholamines (CA) study
CA determination, 64–65
cell cultures, 64
cell lines, 63–64
cell preparation, 62–63
DNA synthesis, 64
peptide inhibiting synthesis, 64
reagents, 62
results, 65–67
statistical methods, 65
epidermal, cell proliferation, 108
link to nervous, immune,
and endocrine systems, 60–62
oxidant targets, 135
stress hormones controller, 58–59
synthesizer of CAs, 59–60

KTTKS peptides, 153, 157–158

L

lactobionic acid, natural skin care, 212

Lanablu, natural skin care, 212

Langerhans cells (LC), 53

Langerhans, Paul, 53

LC (Langerhans cells), 53

Leaders, Dr. Floyd, 7

Lefevre, Eric, 210

liability risks, 369

Liberty Link biotech soybean, 365

lignin, natural vanillin
preparation process, 334

Lintner, Karl, 153

lipid hydroperoxide (LOOH), 136
experimental demonstration, 139–141
migration, 138
natural protective systems, 138
toxicity, 137–138

lipids

biosynthesis enhancement
controlling lipid mixture, 98
rate-limiting factors, 97–98
topically applied enhancers, 98–100

intercellular, 31

LOOH (lipid hydroperoxide), 136
experimental demonstration,
139–141
migration, 138
natural protective systems, 138
toxicity, 137–138

nutrition, 102

stratum corneum barrier
composition, 81–82
dry skin basics, 88–90
structure of matrix, 83–84

liquid foundations,

octadecenedioic acid, 253, 255

Live Yeast Cell Derivative
(LYCD), 217–218

application in cosmetic industry, 218

- laboratory production, 219
 - oxidative stress, 218–219
 - properties, 219
 - molecular weight distribution, 220–222
 - PGE2 synthesis, 222–223
 - RU (respiratory units), 220
 - LKKTET polypeptides, 155
 - LOOH (lipid hydroperoxide), 136
 - experimental demonstration, 139–141
 - migration, 138
 - natural protective systems, 138
 - toxicity, 137–138
 - LYCD (Live Yeast Cell Derivative), 217–218
 - application in cosmetic industry, 218
 - laboratory production, 219
 - oxidative stress, 218–219
 - properties, 219
 - molecular weight distribution, 220–222
 - PGE2 synthesis, 222–223
 - RU (respiratory units), 220
- M**
- macrophages, 54
 - Mahon, Terry, 214–215
 - Maillard flavors, 322
 - Maillard reaction, 294
 - Majeed, Shaheen, 213
 - maltodextrins, natural skin care, 214
 - mammalian olfactory system, 344
 - manufacturing, microalgae, 301–302
 - downstream processes, 307–308
 - phototropic, 302–307
 - upstream process, 303
 - Mast T. Langerhans, 53–56
 - matrikines, sunscreen tissue repair, 190–192
 - matrix metalloproteinases (MMPs)
 - controlling, 70–71
 - gene transcription regulation, 71
 - inhibitor inactivation, 73
 - proenzyme conversion to enzyme, 71–73
 - ECM and skin aging, 69–70
 - excessive action in ECM, 75–77
 - inhibitor cosmetic application, 77–78
 - molecular action of MMPs and TIMPs on collagen, 73–75
 - molecular action on collagen, 73–75
 - McCaulley, Jim, 206
 - MEA (multiple endpoint analysis), 375
 - analyzing skin biocompatibility, 375–376
 - predict phototoxicity in vitro, 380
 - predict skin irritation in vitro, 376–379
 - mechanical stress, skin well-being, 49–50
 - medical biotechnology, 1
 - Merkel's cells, 44
 - Metchnikoff, Elie, 54
 - microalgae, 301–302
 - downstream manufacturing processes, 307–308
 - in vitro effects, 308–309
 - phototropic
 - cultivation, 303–307
 - manufacturing extracts, 302–303
 - upstream manufacturing process, 303
 - microbial contamination, 387–388
 - ATP bioluminescence
 - experimental procedures, 388–389
 - results of experimentation, 389–394
 - microbiology, skin sampling
 - clinical trial, 17
 - DNA microarray-based RNA profiling, 17–18
 - EGIR (Epidermal Genetic Information Retrieval), 14–15

- predicted application, 18–19
 - quantitative RT-PCR assay, 16
 - ribonuclease protection assay, 15–16
 - skin sampling, 14
 - microdermabrasion, 148
 - microorganisms, 311–312
 - hydrothermal vents, 313–319
 - searching for new polysaccharides, 312
 - MMP-1, 74
 - MMP-2, 74
 - MMP-9, 74
 - MMPs (matrix metalloproteinases)
 - controlling, 70–71
 - gene transcription regulation, 71
 - inhibitor inactivation, 73
 - proenzyme conversion to enzyme, 71–73
 - ECM and skin aging, 69–70
 - excessive action in ECM, 75–77
 - inhibitor cosmetic application, 77–78
 - molecular action of MMPs and TIMPs on collagen, 73–75
 - molecular action on collagen, 73–75
 - moisturization
 - HA (hyaluronic acid), 159–160
 - antiaging properties of SHAB, 164–167
 - biosynthetic HA, 160–164
 - personalized, 102
 - SC (stratum corneum)
 - advancements, 101–103
 - biology, 93–94
 - corneodesmolysis improvement, 94–97
 - epidermal differentiation, 100–101
 - lipid biosynthesis enhancement, 97–100
 - somatosensory problems, 101
 - molecular biology, 13
 - moringa oleifera, anti-pollution actives, 206
 - multiple endpoint analysis (MEA), 375
 - analyzing skin biocompatibility, 375–376
 - predict phototoxicity in vitro, 380
 - predict skin irritation in vitro, 376–379
 - myoblast relaxation, 46–48
- ## N
- N-acetyl-Tyr-Arg-hexadecylester (NATAH), 45
 - endorphin precursor release, 45–46
 - myoblast relaxation, 46–48
 - NADH (nicotinamide adenine dinucleotide), 98
 - NADPH (nicotinamide adenine dinucleotide phosphate), 98
 - Nannochloropsis oculata, 302–303
 - nanotechnology, 199–201
 - antiaging delivery systems, 132–133
 - NATAH (N-acetyl-Tyr-Arg-hexadecylester), 45
 - endorphin precursor release, 45–46
 - myoblast relaxation, 46–48
 - National Center for Complimentary and Alternative Medicine (NCCAM), 8
 - natural ingredients
 - consumer marketing skin care, 203–204
 - etremozymes, 205–206
 - moringa oleifera, 206
 - skin care
 - biopein, 207–210
 - black pepper, 213–214
 - blue green algae, 212
 - cranberry seed oil, 213
 - desert plankton, 210–211
 - English Broomrape, 211–212
 - lactobionic acid, 212
 - maltodextrins, 214
 - rooibos extract, 214–215

- sea buchhorn, 207
 - ursolic acid, 211
 - wasabi extract, 215
 - NCCAM (National Center for Complimentary and Alternative Medicine), 8
 - nerve growth factor (NGF), 44
 - nervous systems
 - homeostatis, 57
 - keratinocytes link, 60–62
 - skin well-being, 44
 - neuropeptides
 - skin well-being, 44–45
 - skin wellness, 201–202
 - NGF (nerve growth factor), 44
 - nicotinamide adenine dinucleotide (NADH), 98
 - nicotinamide adenine dinucleotide phosphate (NADPH), 98
 - nonionic lotions, viscosity tests, 232
- O**
- O/W skin whitening cream, 251–253
 - OAM (Office of Alternative Medicine), 8
 - oats, stimulating immune system, 55–56
 - octadecenedioic acid, 239–240
 - clinical efficacy studies, 245–246
 - antidandruff, 246–248
 - deodorancy, 248–249
 - skin toning, 246
 - formulation
 - guidelines, 250–252
 - O/W liquid foundation, 255
 - skin-lightening cream, 252–253
 - skin-toning facial wash, 254–255
 - skin-toning pressed face powder, 255
 - safety studies
 - eye irritancy, 249–250
 - skin mildness, 249
 - skin delivery
 - conclusions, 244–245
 - methods and procedures, 242–243
 - results, 244
 - structural formation, 241–242
 - Office of Alternative Medicine (OAM), 8
 - Olay Regenerist Continuous Night Recovery, 154
 - oleic acids, 38
 - olfactory systems, 344–345
 - application to industry, 348–349
 - limitations of research, 349–350
 - new techniques, 345–347
 - open cultivation systems, cultivating phototropic microalgae, 305
 - Owen, Dr. Donald R., 147
 - oxidative processes, aging, 135–136
 - oxidative stress, 22–23
 - behavioral response, 25–26
 - body's response, 24–25
 - chemistry, 23–24
 - yeast, 217–219
 - laboratory production, 219
 - LYCD (Live Yeast Cell Derivative), 217–223
 - PTYE (peroxide-treated yeast extract), 219–223
- P**
- Packer, Jon, 126
 - patches, rhizobium gum, 263–265
 - pathways, skin penetration, 29–30
 - enhancing, 35–41
 - factors affecting, 30–32
 - intercellular pathway, 32

- intrafollicular pathway, 32–34
- polar pathway, 34–35
- Pauly, Gilles, 206
- PCC (Pure and Clear Chitosan), 227–228
 - antimicrobial properties, 235–236
 - cosmetic formulations, 228–230
 - technical overview, 236
- PDPs (pseudodipeptides), 138–139
- pollution, 138–139
 - anti-pollution, 143–144
 - anti-toxic aldehyde activity, 141–143
- penetration pathways (skin), 29–30
 - enhancing, 35–36
 - ceramides, 38–41
 - chemicals, 37–38
 - enzymes, 36–37
 - vesicular systems, 38
 - factors affecting, 30–32
 - intercellular pathway, 32
 - intrafollicular pathway, 32–34
 - polar pathway, 34–35
- peptides
 - antiaging, 125–126, 147
 - adhesive patch, 149
 - amino acids making proteins, 151–153
 - histidine, 147–148
 - in vitro model test, 148–149
 - US patents, 153–158
 - skin well-being, 44–45
- peroxide-treated yeast extract (PTYE)
 - laboratory production, 219
 - properties, 219
 - molecular weight distribution, 220–222
 - PEG2 synthesis, 222–223
 - RU (respiratory units), 220
- peroxisomal proliferator-activated receptor (PPAR), 93
- Perricone, Dr. Nicholas, neuropeptides, 201–202
- PGE2 synthesis, 222–223
- pharmaceutical industry
 - biotechnology transformation, 2–3
 - impact on cosmetic industry, 3–5
- phototoxicity, MEA (multiple endpoint analysis), 380
- phototropic microalgae
 - cultivation, 302–305
 - closed cultivation systems, 306–307
 - open cultivation systems, 305
 - manufacturing extracts, 302–303
- Phytatek Laboratories, Inc., wound healing botanical drugs, 10–11
- phytochemistry, 7–8
 - botanical drug development, 8–10
 - cosmetic implications, 11–12
 - wound healing botanical drugs, 10–11
- Pickart, Loren, 152
- pigment
 - optical effects of butterfly wings, 353–355
 - Thibacillus ferrooxidans*, 356–357
- pigments, biopigments from microorganisms, 357–360
- pinocytosis, 171
- polar pathway, skin penetration, 34–35
- pollution
 - LOOH (lipid hydroperoxide), 136
 - experimental demonstration, 139–141
 - migration, 138
 - natural protective systems, 138
 - toxicity, 137–138
 - oxidative processes, 135–136
- PDPs (pseudodipeptides), 138–139
 - anti-pollution, 143–144
 - anti-toxic aldehyde activity, 141–143

- polysaccharides
 EPS (exopolysaccharides), 267–268
See also exopolysaccharides
 microorganisms, 311–312
 hydrothermal vents, 313–319
 searching for new
 polysaccharides, 312
 rhizobium gum
 development, 258–260
 freshness sensation, 263–265
 origin, 257–258
 properties, 260–263
- PPAR (peroxisomal proliferator-activated receptor), 93
- precautionary regulations, 361–362
 genetic revolution, 362–365
 genetically modified proteins, 367–369
 liability risks, 369
 Liberty Link biotech soybean, 365
 recalls, 369
 Starlink biotech corn, 365–366
- prevention of damage, sunscreen products
 botanicals, 185–186
 enzymes, 186–188
 vitamins, 183–185
- proenzymes, conversion to enzymes, 71–73
- proteases, 285
 cross-linking subtilisin polymer in skin care, 290–291
 efficacy, 291–295
 keratinized cell exfoliation, 286–287
 locating stabilizing ingredients, 297–299
 safety, 291
 SC (stratum corneum), 287–289
 stability, 295–297
- protective factors, cells, 217–218
- proteins, English Broomrape, 211–212
- proteoglycans, ECM (extracellular matrix), 113
- proteomics, 367
- pseudodipeptides (PDPs), pollution, 138–139
 anti-pollution, 143–144
 anti-toxic aldehyde activity, 141–143
- PTYE (peroxide-treated yeast extract)
 laboratory production, 219
 properties, 219
 molecular weight distribution, 220–222
 PEG2 synthesis, 222–223
 RU (respiratory units), 220
- Pure and Clear Chitosan (PCC), 227–228
 antimicrobial properties, 235–236
 cosmetic formulations, 228–230
 technical overview, 236
- ## Q–R
- quantitative RT-PCR assay, 16
- Reactive Oxygen Species (ROS), 135
- recalls, 369
- reconstituted epidermis (REP), 372
 barrier function, 373–374
 characteristics, 373
 in vitro analysis, 375
 tissue regeneration in bovine serum presence, 372–373
- regulations, precautionary, 361–362
 genetic revolution, 362–365
 genetically modified proteins, 367–369
 liability risks, 369
 Liberty Link biotech soybean, 365
 recalls, 369
 Starlink biotech corn, 365–366
- Relative Polarity Index (RPI), 130
- relaxation (skin), 43
 clinical trials
 chemical stinging, 49

- heat, 48–49
 - mechanical stress, 49–50
 - in vitro studies
 - endorphin precursor release, 45–46
 - myoblast relaxation, 46–48
 - nervous system, 44
 - renewal, sodium DNA
 - aging levels, 169–170
 - extraction from male sturgeons, 170–171
 - in vitro tests, 171–173
 - in vivo tests, 173–175
 - test conclusions, 175–177
 - REP (reconstituted epidermis), 372
 - barrier function, 373–374
 - characteristics, 373
 - in vitro analysis, 375
 - tissue regeneration in bovine serum presence, 372–373
 - respiratory units (RU), LYCD and PTYE effect on, 220
 - RG patches, rhizobium gum, 263–265
 - Rheins, Larry
 - botanicals, 7
 - molecular biology, 13
 - rhizobium gum
 - development, 258–260
 - freshness sensation, 263–265
 - origin, 257–258
 - properties, 260–263
 - ribonuclease protection assay, 15–16
 - risk assessments, tissue engineered skin, 371–372
 - MEA (multiple endpoint analysis), 375–380
 - REP (reconstituted epidermis), 372–375
 - RNA, skin sampling
 - clinical trial, 17
 - DNA microarray-based RNA profiling, 17–18
 - EGIR (Epidermal Genetic Information Retrieval), 14–15
 - gaining information from skin, 14
 - predicted application, 18–19
 - quantitative RT-PCR assay, 16
 - ribonuclease protection assay, 15–16
 - Roca, Jordi, 324
 - rooibos extract, natural skin care, 214–215
 - ROS (Reactive Oxygen Species), 135
 - Rosen, Meyer, 129
 - RPI (Relative Polarity Index), 130
 - RU (respiratory units), LYCD and PTYE effect on, 220
- ## S
- Saccharomyces cerevisiae, 217–218
 - sandwich model, 83
 - SC (stratum corneum), 29
 - corneocyte phenotypes, 86–87
 - corneodesmosomes, 84–85
 - dry skin
 - basics, 87–88
 - lipid changes, 88–90
 - enzymes, 85–86
 - lipid barrier
 - composition, 81–82
 - structure of matrix, 83–84
 - moisturization
 - advancements, 101–103
 - biology, 93–94
 - corneodesmolysis improvement, 94–97
 - epidermal differentiation, 100–101
 - lipid biosynthesis enhancement, 97–100
 - somatosensory problems, 101

- protease, 287–289
- subtilisin, 286
- scalp dandruff, octadecenedioic acid, 246–248
- scents
 - future, 350–351
 - molecular biology, 343–344
 - olfactory systems, 344–345
 - application to industry, 348–349
 - limitations of research, 349–350
 - new techniques, 345–347
- Scholz, Durant, 215
- sea buckthorn, natural ingredients, 207
- second toxic messengers, 141
- SEPS657 effects
 - biological function of fibroblasts, 272–273
 - expression of ICAM-1 by keratinocytes, 271
 - manual shaving skin irritation, 277–279
 - potential for sun and after-sun skin care, 279–282
 - secondary effects of oral isotretinoin, 275–277
 - sensitive and reactive skins, 273–275
 - stimulating keratinocytes proliferation, 271–272
- SHA (sodium hyaluronate), 159
- SHAB cream
 - antiaging properties
 - antiwrinkle effects, 164–166
 - skin elasticity, 166–167
 - HA biosynthetic, 160–164
 - moisturization properties, 164
 - skin cream testing, 162
- Singh, Patricia, 207
- single nucleotide polymorphisms (SNP), 26–27
- skin care
 - botanicals, 7
 - consumer marketing
 - actives, 199–201
 - natural ingredients, 203–204
 - non-surgical alternatives, 202–203
 - targeting trouble spots, 201
 - wellness with neuropeptides, 201–202
 - natural ingredients
 - biopein, 207–210
 - black pepper, 213–214
 - blue green algae, 212
 - cranberry seed oil, 213
 - desert plankton, 210–211
 - English Broomrape, 211–212
 - extremozymes, 205–206
 - lactobionic acid, 212
 - maltodextrins, 214
 - moringa oleifera, 206
 - rooibos extract, 214–215
 - sea buckthorn, 207
 - ursolic acid, 211
 - wasabi extract, 215
 - phytochemistry, 7–8
 - botanical drug development, 8–10
 - cosmetic implications, 11–12
 - wound healing botanical drugs, 10–11
 - subtilisin, 290–291
- skin irritations, MEA (multiple endpoint analysis), 380
- skin penetration, 29–30
 - enhancing, 35–36
 - ceramides, 38–41
 - chemicals, 37–38
 - enzymes, 36–37
 - vesicular systems, 38
 - factors affecting, 30–32
 - intercellular pathway, 32
 - intrafollicular pathway, 32–34
 - polar pathway, 34–35

- skin sampling
 - clinical trial, 17
 - DNA microarray-based RNA profiling, 17–18
 - EGIR (Epidermal Genetic Information Retrieval), 14–15
 - gaining information from skin, 14
 - predicted application, 18–19
 - quantitative RT-PCR assay, 16
 - ribonuclease protection assay, 15–16
- skin tone, octadecenedioic acid, 239–240
 - clinical efficacy studies, 245–249
 - formulation guidelines, 250–255
 - safety studies, 249–250
 - skin delivery, 242–245
 - structural formation, 241–242
- Smith, John A., 154
- SNAP-25 amino acids, 156–157
- SNP (single nucleotide polymorphisms), 26–27
- SOD (superoxide dismutase),
- sunscreen enzymes, 187
- sodium DNA
 - aging levels, 169–170
 - extraction from male sturgeons, 170–171
 - in vitro tests, 171–173
 - in vivo tests, 173–175
 - test conclusions, 175–177
- sodium hyaluronate (SHA), 159
- stability, protease, 295–297
- Starlink biotech corn, 365–366
- stratum corneum (SC), 29
 - corneocyte phenotypes, 86–87
 - corneodesmosomes, 84–85
 - dry skin
 - basics, 87–88
 - lipid changes, 88–90
 - enzymes, 85–86
 - lipid barrier
 - composition, 81–82
 - structure of matrix, 83–84
 - moisturization
 - advancements, 101–103
 - biology, 93–94
 - corneodesmolysis improvement, 94–97
 - epidermal differentiation, 100–101
 - lipid biosynthesis enhancement, 97–100
 - somatosensory problems, 101
 - protease, 287–289
 - subtilisin, 286
- Streptococcus zooepidemicus strain, biosynthetic HA, 161
- stress hormones, 102–103
- stresses
 - EPS (exopolysaccharides), 267–268
 - EPS657, 268–269
 - inflammation process of skin, 269–271
 - oxidative, 22–23
 - behavioral response, 25–26
 - body's response, 24–25
 - chemistry, 23–24
 - yeast, 217–223
- pollution
 - LOOH (lipid hydroperoxide), 136–141
 - oxidative processes, 135–136
 - PDPs (pseudodipeptides), 138–144
- SEPS657
 - biological function of fibroblasts, 272–273
 - expression of ICAM-1 by keratinocytes, 271
 - manual shaving skin irritation, 277–279

- potential for sun and after-sun skin care, 279–282
 - secondary effects of oral isotretinoin, 275–277
 - sensitive and reactive skins, 273–275
 - stimulating keratinocytes proliferation, 271–272
 - sunscreen products
 - active defined, 182
 - adding actives to, 182
 - antiaging activity, 188–192
 - defined, 181–182
 - formulations, 192–193
 - prevention of damage, 183–188
 - structural glycoproteins, ECM (extracellular matrix), 113–114
 - subtilisin, 286
 - skin care products, 290–291
 - sunscreen products
 - active defined, 182
 - adding actives to, 182
 - antiaging activity, 188–189
 - barrier repair, 189–190
 - defined, 183
 - tissue repair, 190–192
 - defined, 181–182
 - formulations, 192–193
 - prevention of damage
 - botanicals, 185–186
 - enzymes, 186–188
 - vitamins, 183–185
 - superoxide dismutase (SOD), sunscreen enzymes, 187
- T**
- Tarver, Helen, 125
 - testing, tissue engineered skin, 371–372
 - MEA (multiple endpoint analysis), 375–380
 - REP (reconstituted epidermis), 372–375
 - Thibacillus ferrooxidans, iron oxide pigments, 356–357
 - TIMPs (tissue inhibitor of metalloproteinase), molecular action on collagen, 73–75
 - tissue engineered skin, 371–372
 - MEA (multiple endpoint analysis) analyzing skin biocompatibility, 375–376
 - predict phototoxicity in vitro, 380
 - predict skin irritation in vitro, 376–379
 - REP (reconstituted epidermis) barrier function, 373–374
 - characteristics, 373
 - in vitro analysis, 375
 - tissue regeneration in bovine serum presence, 372–373
 - tissue inhibitor of metalloproteinase (TIMPs), molecular action on collagen, 73–75
 - tone (skin), octadecenedioic acid, 239–240
 - clinical efficacy studies, 245–249
 - formulation guidelines, 250–255
 - safety studies, 249–250
 - skin delivery, 242–245
 - structural formation, 241–242
 - topical delivery systems
 - antiaging skin care demand, 130–131
 - industry optimization, 129–130
 - laboratory advancements, 131–132
 - retail, 133
 - consumer marketing
 - actives, 199–201
 - natural ingredients, 203–204
 - non-surgical alternatives, 202–203
 - targeting trouble spots, 201

wellness with neuropeptides,
201–202

topical enzymes, corneodesmolysis, 95–97

toxic aldehydes, 136

transcription factors, 103

transepidermal water loss (TEWL),
163–164
SHAB cream, 163

TWEL (transepidermal water loss),
163–164
SHAB cream, 163

U–V

ursolic acid, natural skin care, 211

US patents, antiaging peptides, 153
amino acids from milk, 154–155
KTTKS in fusion peptide, 157–158
LKKTET polypeptide, 155
RGS amino acid sequence, 155–156
SNAP-25 amino acids, 156–157

vanilla, 329–331
American and European
regulations, 331–333
economics, 335–336
industrial constraints, 335
natural vanillin
authentication, 336–339
expert comparisons, 339–341
preparation process, 333–334

vanillins, 329–331
authentication, 336–339
expert comparisons, 339–341
preparation process, 333–334

vesicular systems, enhancing skin
penetration, 38

viscosity
chitosan, 228–233
emulsions, 230–233

vitamins, sunscreen products, 183–185

W

wasabi extract, natural skin care, 215

well-being (skin), 43
clinical trials
chemical stinging, 49
heat, 48–49
mechanical stress, 49–50

in vitro studies
endorphin precursor release, 45–46
myoblast relaxation, 46–48

nervous system, 44
neuropeptides, 44–45

Wiechers, Johann, 130

wound healing, botanical drug
development, 10–11

wrinkles
antiaging skin care
consumer input, 127–128
peptides, 125–126
prevention, 128
skin care boom, 126–127
wrinkle free ingredients, 127
SHAB antiaging properties, 164–166

X–Y–Z

Yarosh, Daniel, 211

yeast, 217–218
laboratory production, 219
LYCD (Live Yeast Cell Derivative),
217–218
application in cosmetic industry,
218
properties, 219–223
oxidative stress, 218–219
PTYE (peroxide-treated yeast extract)
laboratory production, 219
properties, 219–223

Ziskin, Nat, 210