

Index

Note: Page numbers followed by *t* refer to tables.

A

A1C

- aloe, 21–22
- α-lipoic acid, 163
- banaba, 25
- berberine, 29–32
- bitter melon, 40–42
- chia, 46
- chromium, 49–53
- cinnamon, 57–58
- coenzyme Q10 (CoQ10), 174–175
- fenugreek, 63–64
- flaxseed, 69–70
- garlic, 195–196
- ginkgo, 200
- ginseng, 76–78
- gymnema, 83
- holy basil, 88–89
- honey, 92–93
- ivy gourd, 97
- magnesium, 101–103
- milk thistle, 107–108
- mulberry, 113–114
- pine bark extract, 216
- probiotics, 124
- psyllium, 131
- supplement use, 240
- tea, 136–137
- turmeric, 142–143
- vinegar, 149
- vitamin D, 231
- zinc, 155–156
- abdominal fullness, 263*t*
- abdominal pain, 246*t*
- abdominal upset, 248*t*–249*t*, 276*t*
- abortifacient, 39, 208, 250*t*
- acarbose, 113
- acemannan, 20, 246*t*
- acetaminophen (Tylenol®), 56, 68, 107, 194, 242, 255*t*, 262*t*, 279*t*
- acetate, 272*t*
- Acetic acid (vinegar), 147–151, 270*t*–271*t*
- acetyl-Coenzyme A (acetyl-CoA), 160, 189, 252*t*, 273*t*, 278*t*
- acne, 152, 204
- acupuncture, 1
- acute hepatitis, 20, 246*t*
- acute necrotizing eosinophilic myocarditis (ANEM), 189, 278*t*
- acyl CoA cholesterol transferase, 68, 255*t*
- adaptogen, 75
- addiction, 6, 68
- adenosine monophosphate (AMP), 20
- adenosine monophosphate activated protein kinase (AMPK), 28, 39, 49, 56
- adenosine monophosphate activated protein kinase (AMPK) activation, 147, 246*t*, 248*t*, 250*t*, 252*t*–253*t*, 270*t*–271*t*
- adenosine triphosphate (ATP), 160, 170, 273*t*, 276*t*
- adenosine triphosphate citrate lyase, 189, 278*t*
- adhyperforin, 225, 285*t*

adipogenesis, 282t
 adiponectin, 46, 50, 135–136, 142, 252t, 267t
 adipose tissue, 152, 208
 advanced glycation end product formation pathway, 166, 275t
Aegele marmelos (bael tree), 4
 aegeline, 4
 African American population, 2
 aging, 214
 Agriculture Improvement Act of 2018, 237
 “agua de Jamaica”, 211
 ajoene, 193, 279t
Akkermansia muciniphila, 122, 264t
 alcohol, 238, 262t–263t
 alcohol hangover, 117, 120, 263t
 alcoholic cirrhosis, 106
 alcohol-related neuropathy, 166
 aldose reductase inhibition, 28, 106, 248t, 262t
 algal-derived eicosapentanoic acid (EPA), 180
 Aljawad, FH, 174
 alkaloid, 62, 96, 254t, 260t
 all-cause mortality, 182, 232
 allergic hypersensitivity, 62
 allergic reaction
 α -lipoic acid, 161, 273t
 benfotiamine, 166
 chia, 45, 251t
 cinnamon, 56
 fenugreek, 254t
 flaxseed, 68
 garlic, 279t
 ginkgo, 198, 280t
 honey, 91, 259t
 ivy gourd, 260t
 milk thistle, 107, 262t
 psyllium, 129
 red yeast rice, 219, 284t
 allergy, 240, 265t, 277t
 allicin, 193, 279t
 alliin, 193, 279t
 alliinase, 193
 allithiamine. *See* benfotiamine
Allium sativum (garlic). *See* garlic
 allopathic medication, 3
 aloe (*Aloe vera L.*), 2, 7, 20–23, 246t
 aloeresin A, 20, 246t
Aloe vera L. (aloe). *See* aloe
 aloin, 7
 α -2 agonist activity, 28, 248t
 α -adrenergic activity, 28, 248t
 α -amylase inhibition, 134, 266t
 α -glucosidase inhibition
 aloe, 20, 246t
 berberine, 28, 248t
 bilberry, 34, 249t
 bitter melon, 39, 250t
 cinnamon, 56, 253t
 hibiscus, 208, 282t
 mulberry, 112–113, 263t
 nopal, 117
 pine bark extract, 214, 283t
 tea, 134, 266t
 turmeric, 141, 268t
 zinc, 152, 272t
 α -ketoglutarate dehydrogenase enzyme complex, 160
 α -linolenic acid, 45, 68, 180, 251t
 α -lipoic acid (ALA), 26, 160–165, 168, 243, 255t, 273t–274t
 Alpha Lipoic Acid in Diabetic Neuropathy (ALADIN I and III) trials, 161
 α -momorcharin, 39
 altitude sickness, 198
 Alzheimer’s disease, 11, 152, 160, 198
Amanita phalloides poisoning, 106, 160
 American blueberry (*Vaccinium corymbosum*), 34
 American Botanical Council (ABC), 2
 American Diabetes Association (ADA), 25, 100, 186, 238, 240
 American ginseng, 2. *See also* ginseng
 American Heart Association (AHA) Scientific Advisory, 185
 amino acid, 62, 91, 147, 259t, 270t
 amitriptyline, 171, 276t
Amorphophallus konjac K. Koch (glucomannan). *See* glucomannan
 amphetamine, 135, 266t
 amyloid polypeptide, 152, 272t
 anabolic steroid, 4, 7
Anaerobutyricum hallii, 264t
 analgesic effect, 75, 285t
 analgesic medication, 76
 analgesic properties, 87, 256t
 anaphylactic reaction, 68

- andanamide, 238
- Anderson, R, 50
- anemia, 138, 153
- anencephaly, 62
- angina, 136, 183
- angiotensin converting enzyme (ACE)
 - activity, 75, 208–209, 214, 256*t*
- angiotensin converting enzyme (ACE)
 - inhibition, 45, 251*t*, 282*t*
- angiotensin-converting enzyme (ACE)
 - inhibitor, 109, 162, 172, 216, 283*t*
- angiotensin II, 193, 279*t*
- angiotensin receptor blockers ARBs, 5, 24, 225
- animal data, 87
- anorexia, 222, 276*t*
- antacid, 100, 161, 230, 273*t*, 286*t*
- anthocyanin, 34, 208, 282*t*
- anthocyanoside, 35, 249*t*
- anthraquinone, 7, 20
- anti-aging effect, 134
- anti-androgenic properties, 87
- anti-arrhythmic properties, 180
- antibacterial activity, 193, 225
- antibiotic
 - benfotiamine, 166, 275*t*
 - flaxseed, 69, 255*t*
 - garlic, 194
 - gymnema, 82
 - magnesium, 261*t*
 - milk thistle, 107, 262*t*
 - probiotics, 264*t*
 - vitamin D, 230
 - zinc, 153, 272*t*
- anticancer treatment, 62
- anticoagulant drug
 - bilberry, 249*t*
 - cannabidiol (CBD) supplement, 238
 - cinnamon, 253*t*
 - fenugreek, 63, 254*t*
 - fish oil (ω -3 fatty acid), 181, 277*t*
 - flaxseed, 255*t*
 - garlic, 279*t*
 - ginkgo, 280*t*
 - holy basil, 88, 258*t*
 - honey, 92, 259*t*
 - supplement use, 240
 - turmeric, 142, 268*t*
- anticoagulant effect, 171
- anticonvulsant agent
 - benfotiamine, 275*t*
 - cannabidiol (CBD) supplement, 238
 - garlic, 194, 279*t*
 - ginkgo, 199, 280*t*
 - psyllium, 265*t*
 - red yeast rice, 221, 284*t*
 - vitamin D, 230, 286*t*
 - zinc, 153, 272*t*
- antidepressant, 8, 76, 221, 226, 243, 256*t*–257*t*, 280*t*
- antidepressant-induced sexual dysfunction, 198
- antifungal, 264*t*
- anti-glaucoma product, 36
- antihyperlipidemic agent, 129, 204, 221, 265*t*, 281*t*
- antihypertensive action, 68
- antihypertensive effect, 208
- antihypertensive medication
 - banaba, 24, 247*t*
 - berberine, 28, 31, 248*t*
 - coenzyme Q10 (CoQ10), 171, 276*t*
 - fish oil (ω -3 fatty acid), 181, 277*t*
 - flaxseed, 69, 255*t*
 - garlic, 194, 279*t*
 - ginseng, 76, 256*t*
 - psyllium, 129, 265*t*
 - St. John's wort, 243, 285*t*
 - turmeric, 268*t*
- antihypertensive properties, 193
- anti-inflammatory activity, 106, 238, 242
- anti-inflammatory drug, 50, 87, 286*t*
- anti-inflammatory effect, 75, 141, 166, 180, 249*t*, 259*t*, 262*t*, 275*t*, 277*t*
- anti-inflammatory properties, 34, 214, 268*t*, 274*t*, 283*t*
- antimicrobial drug, 123, 259*t*
- antimicrobial effect, 91
- antiobesity treatment, 62
- antioxidant
 - α -lipoic acid, 160–161, 273*t*
 - bilberry, 36, 249*t*
 - case study, 242
 - chia, 45, 251*t*
 - coenzyme Q10 (CoQ10), 170, 276*t*
 - fenugreek, 62
 - flaxseed, 68
 - ginkgo, 198, 201, 280*t*

- honey, 91
 - milk thistle, 106, 262*t*
 - mulberry, 112, 263*t*
 - pine bark extract, 214, 283*t*
 - probiotics, 122, 264*t*
 - tea, 134, 266*t*
 - turmeric, 141, 268*t*
 - zinc, 152, 272*t*
 - antioxidant response element (ARE), 160
 - antiplatelet activity, 34, 199
 - antiplatelet agent
 - bilberry, 249*t*
 - cinnamon, 253*t*
 - fenugreek, 254*t*
 - flaxseed, 255*t*
 - garlic, 194, 279*t*
 - ginkgo, 280*t*
 - holy basil, 88, 258*t*
 - honey, 92, 259*t*
 - pine bark extract, 283*t*
 - turmeric, 142, 268*t*
 - antiplatelet effect, 266*t*
 - antiplatelet properties, 34, 69, 87, 135, 142, 193, 268*t*
 - antipsychotic medication, 199, 257*t*, 262*t*, 280*t*
 - antiretroviral drug, 107, 194, 262*t*
 - antiseptic, 147
 - antithrombotic effect, 180, 214, 278*t*, 283*t*
 - antiviral effect, 225
 - anxiety, 135, 225, 266*t*
 - anxiolytic, 237
 - apigenin, 87, 258*t*
 - apixiban, 40
 - apolipoprotein B, 181, 205, 277*t*
 - appetite, 286*t*
 - appetite suppression, 135, 150, 265*t*, 267*t*
 - arachidonic acid pathway, 180
 - Aristolochia serpentaria*, 7
 - arrhythmia, 230, 286*t*
 - arsenic, 7
 - Artemisia absinthium*, 84
 - arthritis, 34, 56, 89, 180, 214
 - artichoke, 26
 - ASCEND (A Study of Cardiovascular Events in Diabetes) study, 182–183
 - Asian population, 2
 - aspartame, 129, 265*t*
 - aspirin, 34, 87–88, 142, 194, 199
 - asthma, 62, 82, 91, 198, 214
 - Astra Zeneca, 184
 - Atherosclerosis Risk in Communities Study (ARIC), 101
 - atherosclerotic cardiovascular disease, 186
 - atherosclerotic lesion, 112
 - athletic supplementation, 6
 - atorvastatin, 171, 174, 242
 - atrial fibrillation, 183
 - attention deficit hyperactivity disorder (ADHD), 152
 - Aung, T, 183
 - autoimmune disease, 230
 - Ayurvedic medicine, 82, 87
 - azole antifungal, 221, 284*t*
- B**
- bael tree, 4
 - banaba (*Lagerstroemia speciosa* L.), 24–27, 247*t*
 - barbituate, 266*t*
 - benfotiamine (also known as Vitamin B1, Allithiamines), 166–169, 243, 275*t*
 - benign prostatic hyperplasia (BPH), 117, 263*t*
 - benzodiazepine, 238
 - benzoic acid, 214, 283*t*
 - benzoquinone nucleus, 170, 276*t*
 - berberine (*Coptis chinensis* [*Huanglian* or *French*]), 6, 26, 28–34, 39, 109, 222, 242, 248*t*
 - β -1,4 glycosidic bond, 204
 - β -2 agonist, 100, 261*t*
 - β agonist, 6
 - β blocker, 24, 50, 135, 172
 - beta-carotene, 96, 260*t*
 - β -cell, 134, 170, 180, 257*t*, 272*t*
 - β -cell function, 75, 77, 141–142, 152–153, 256*t*, 268*t*
 - β -cell regeneration, 279*t*
 - β -cell sensitivity, 49
 - β -glucan, 131
 - betaine, 82, 257*t*
 - betalain, 117, 263*t*
 - β -momorcharin, 39
 - betel nut, 166, 275*t*
 - Bifidobacterium*, 91, 122, 264*t*
 - biguanide, 11

- bilberry (*Vaccinium myrtillus* L.), 34–38, 243, 249t
 bile acid, 28, 135, 204, 267t–268t, 281t
 bile salt, 129, 265t
 biliary cholesterol, 254t
 bilobalide, 280t
 bioavailability, 273t
 biologic agent, 123
 biotin, 50, 252t
 bisdemethoxycurcumin, 141, 268t
 bisphosphonate, 101, 261t
 bitter melon (*Momordica charantia*), 39–44, 250t
 bitter orange, 135
 black tea, 134, 137–138, 266t
 bleeding
 - aloe, 20
 - bilberry, 34, 249t
 - case study, 242
 - cinnamon, 253t
 - fish oil (ω -3 fatty acid), 181, 183, 277t
 - flaxseed, 69, 255t
 - garlic, 194, 279t
 - ginkgo, 199, 280t
 - holy basil, 87–88, 258t
 - honey, 92
 - pine bark extract, 215, 283t
 - turmeric, 142
 blood glucose, 56, 204, 214, 240. *See also* fasting glucose; glucose; postprandial glucose; *under specific supplement*
 blood loss, 246t
 blood pressure. *See also* hypertension; hypotension
 - banaba, 24–25
 - berberine, 28–31
 - case study, 242–243
 - chia, 45–47, 251t
 - chromium, 52
 - cinnamon, 56–57
 - coenzyme Q10 (CoQ10), 173
 - flaxseed, 68–71
 - garcinia, 189, 278t
 - garlic, 194
 - ginseng, 75–76, 256t
 - gymnema, 83
 - hibiscus, 209
 - pine bark extract, 214, 216
 - psyllium, 265t
 - tea, 135, 138, 266t
 blood thinner, 240, 283t
 blood-thinning, 63
 blood viscosity, 200
 bodybuilding supplement, 4, 7
 body mass index (BMI), 84, 101, 119, 131, 138, 164, 190, 200, 242
 body weight, 119, 150
 boldo, 63
 bone, 229–230, 286t
 bone mineral density, 230
 botanical product, 1, 12. *See also under specific supplement*
 botulism, 92, 259t
 bread, 46
 breast cancer, 107, 230, 262t
 breastfeeding. *See* lactation
 Brewer's yeast, 49, 52
 burn, 96, 279t
 butyrate, 122
- ## C
- caffeic acid, 45, 87, 147, 251t, 258t, 270t
 caffeine, 134–135, 137, 199, 266t
 calcidiol, 229
 calcitriol, 229
 calcium, 45, 96, 101, 229–230, 251t, 260t–261t, 286t
 calcium channel, 180
 calcium channel blocker (CCB), 40, 82, 100, 107, 194, 199, 261t–262t, 278t
 calf pain, 200
Camellia sinensis (tea). *See* tea
 cancer, 39, 62, 134, 141, 171, 230, 232–233, 240
 cancer prevention, 193
Cannabis sativa, 237
 captopril, 209
 carbamazepine, 129
 carbohydrate
 - absorption, 75, 117, 135, 193, 254t, 256t, 263t, 267t, 279t
 - honey, 91
 - hydrolyzing enzyme, 204, 281t
 - malabsorption, 113
 - metabolism, 77, 87, 160, 258t
 - sequestering, 129, 265t
 carbon atom, 180

carcinogen, 7, 20, 49
 carcinogenicity, 246*t*
 cardiac
 autonomic function, 162
 cell membrane stabilization, 180
 death, 182
 disease, 170
 drug, 107
 effect, 92
 ion channel, 180
 medication, 199, 280*t*
 reaction, 4, 28
 toxicity, 259*t*
 transplantation, 172
 cardiovascular death, 172, 183
 cardiovascular disease (CVD), 41, 45–46, 68, 100, 134, 137–138, 170–172, 180–184, 232–233
 cardiovascular event, 194, 232, 243
 cardiovascular mortality, 175, 232
 cardiovascular risk factor, 103, 119, 220
 caryophyllene, 87
 case study, 242–243
 catalase, 152, 272*t*
 cataract, 36, 160
 catechin, 134–135, 147, 214, 266*t*, 270*t*, 283*t*
 catechol-o-methyltransferase enzyme, 135
 caustic esophageal injury, 148, 270*t*
 celecoxib, 199
 cellular thermogenesis, 135
 Center for Drug Evaluation and Research, 7
 central nervous system (CNS) depressant, 28, 75, 248*t*
 central-nervous-system-stimulant effect, 75
 central retinal arteries, 201
 cephalixin, 153, 272*t*
 cerebral insufficiency, 198
 charantin, 39, 250*t*
 chemotherapy, 91, 122, 264*t*
 chemotherapy drug, 40, 107, 161, 166, 262*t*, 273*t*, 275*t*
 chia (*Salvia Hispanica L.*), 45–48, 251*t*
 chicoric acid, 87, 258*t*
 chilblain, 198
 children, 2, 39, 42, 76, 92, 102–103, 240, 250*t*
 China, 50–51
 China Coronary Secondary Prevention Study, 221
 Chinese product, 5–6
 Chinese subject, 58
 chiropractic manipulation, 1
 chloride, 261*t*, 272*t*
 chlorogenic acid, 45, 251*t*
 chloroquine, 208
 chlorpropamide, 39, 117
 choking, 281*t*
 cholecalciferol (Vitamin D3), 229, 286*t*
 cholesterol
 absorption, 28, 181, 281*t*
 aloe, 21–22
 α -lipoic acid, 163
 berberine, 31, 248*t*
 bitter melon, 40
 case study, 243
 chromium, 49–50
 coenzyme Q10 (CoQ10), 174
 fenugreek, 62–63
 flaxseed, 68, 71–72, 255*t*
 garcinia, 190
 garlic, 195
 glucomannan, 204–205
 holy basil, 88
 ivy gourd, 98
 milk thistle, 106, 262*t*
 nopal, 119
 pine bark extract, 217
 psyllium, 130
 red yeast rice, 219, 221–222
 synthesis, 193, 265*t*, 279*t*
 tea, 136–138
 turmeric, 143–144
 vinegar, 150
 zinc, 154–155
 cholestyramine, 153, 230, 272*t*, 286*t*
 choline, 82, 257*t*
 chromium, 26, 34, 49–55, 153, 249*t*, 252*t*, 263*t*
 cinnamaldehyde, 56, 253*t*
 cinnamic acid, 214, 283*t*
Cinnamomum burmanii, 25
 cinnamon (*Cinnamomum cassia*) or (*Cinnamomum zeylanicam*), 2, 6–7, 25, 56–61, 243, 253*t*
 ciprofloxacin, 153, 272*t*
 circulation, 280*t*

- circulatory disorder, 34
 cirrhosis, 107
 citrate, 261*t*
 citric acid, 270*t*
 citrinin, 219
Citrullus colocynthis, 84
 citrus acid, 282*t*
 claudication, 5, 200, 242–243
 cleft palate, 62
 clenbuterol, 6
 clopidogrel, 63, 88, 92, 142
Clostridium species, 264*t*
 clozapine (Clozaril®), 82
 coagulation factor, 45
Coccinia indica, Also Known as *Coccinia cordifolia* and *Coccinia grandis* (ivy gourd). See ivy gourd
 Cochrane Database, 58
 Cochrane Evaluation, 173
 Cochrane Review, 41, 163, 171, 196, 200–201, 209, 226
 Cochrane Systematic Review, 138
 Code of Federal Regulations, 223
 coenzyme Q10 (CoQ10), 25, 170–179, 221, 276*t*
 coffee, 272*t*
 cognitive function, 75
 cold, 112, 152
 colon cancer, 230
 coma, 199
 compactin, 219
 complementary and alternative medicine (CAM), 1–4, 88, 135, 194
 complementary health approaches (CHA), 1
 congestive heart failure, 276*t*
 constipation, 62, 68, 82, 100, 112, 189, 204, 264*t*, 286*t*
 consumer information, 10–11
 Consumer Lab, 10, 239
 Consumer Protection Act, 9
Consumer Reports, 10
 consumer safety, 11
 Consumers Union, 10
 contaminant, 6
 cooking spice, 62
 copper deficiency, 153, 272*t*
Coptis chinensis [Huanglian or French] (berberine). See berberine
 coronary artery disease, 104
 coronary heart disease (CHD), 100, 132, 182, 184, 194, 221
 coronary revascularization, 183–184, 221
 corsolic acid, 24–25, 247*t*
 corticosteroid, 215
 cosmetic, 45
 cost, 3, 8
 Costello, RB, 52–53
 cough, 91, 147, 263*t*, 265*t*
 coumarin, 56, 62–63, 253*t*
 Council for Responsible Nutrition, 126
 Cox-2 inhibitor, 199
 C-peptide, 84, 142, 199–200
 cranberry (*Vaccinium macrocarpum*), 34
 C-reactive protein, 46, 160, 274*t*
 creatine kinase, 220
 creatine phosphokinase, 219, 222
 crepe myrtle, 24
 croup, 147
Curcuma longa Linn (turmeric). See turmeric
 curcumin (diferuloylmethane), 141, 268*t*
 curry powder, 141
 cutaneous reaction, 219
 cyanide glycoside, 68, 255*t*
 cyanidin-3-sambubioside, 208, 282*t*
 cyclocurcumin, 141, 268*t*
 cyclosporine
 fish oil (ω -3 fatty acid), 181, 277*t*
 garlic, 194
 ginkgo, 199, 280*t*
 magnesium, 100, 261*t*
 pine bark extract, 215, 283*t*
 probiotics, 123, 264*t*
 St. John's wort, 225, 285*t*
 CYP 450 1A2, 82, 142, 199, 257*t*, 268*t*
 CYP 450 2B6, 142, 268*t*
 CYP 450 2C9, 82, 107, 199, 225, 248*t*, 257*t*, 268*t*, 285*t*
 CYP 450 2C19, 142, 199, 268*t*
 CYP 450 2D6, 76, 107, 142, 199, 248*t*, 268*t*
 CYP 450 2E1, 142, 194, 268*t*
 CYP 450 3A4
 berberine, 248*t*
 garlic, 194, 279*t*
 ginkgo, 199
 gymnema, 82, 257*t*
 milk thistle, 107

red yeast rice, 221
St. John's wort, 225, 285*t*
turmeric, 142, 268*t*
CYP 450 enzyme, 28, 142, 238
CYP 450 isoenzyme, 199
CYP 450 system, 82
cystatin C, 232
cytochrome P450 (CYP450). *See under*
CYP450
cytokine, 134, 229, 286*t*
cytokine-induced β -cell damage, 266*t*
cytokine-induced inflammation, 160
cytoprotectant, 106

D

dammarane saponin, 82
dammarane-type triterpene glycoside, 75
“dawn phenomenon”, 147
death, 181–184, 250*t*. *See also* mortality
deep-vein thrombosis (DVT), 242
degludec, 242
delphinidin-3-sambubioside, 208, 282*t*
delta-9-tetrahydrocannabinol (THC), 237
delta-9-tetrahydrocannabivarin (THVC),
238
dementia, 198–199
demethoxycurcumin, 141, 268*t*
depression, 4–5, 141, 225–226, 242
dermatitis, 56, 253*t*, 268*t*
dermatological condition, 50, 152
dermatological reaction, 252*t*
detoxification, 147
dextromethorphan, 191
D glucose, 204
diabetes. *See also under specific type; under*
specific supplement
agent, oral, 30, 42, 57, 63, 88, 112
comorbidities. *see under specific*
supplement
corticosteroid-induced, 49
fraud, 11
management, 6, 75
medication, 171, 194, 215. *see also*
insulin
persons with diabetes (PWD), 1–5, 9, 11
statistics, 1
Diabetes Care and Education Specialist, 94
diabetes-induced liver damage, 208

diabetes-related neuropathy, 170
diabetic microangiopathy, 144
diacylglycerol-protein kinase C pathway,
166, 275*t*
diallyldisulfide, 193, 279*t*
dialysis tubing, 259*t*
diaphoresis, 247*t*
diarrhea, 20, 28, 69, 129, 219, 246*t*, 254*t*,
261*t*–263*t*, 283*t*
diastolic blood pressure (DBP)
chia, 46–47
cinnamon, 57
coenzyme Q10 (CoQ10), 173, 175
flaxseed, 70–71
garlic, 194
glucomannan, 205
gymnema, 83
hibiscus, 209–210
nopal, 119
pine bark extract, 216–217
tea, 137–138
zinc, 154, 156

diet, 2
dietary fat, 117, 265*t*
dietary supplement, 1–2, 4, 7–10
Dietary Supplement Health and Education
Act (DSHEA) of 1994, 1–2, 8–10
Dietary Supplement Ingredient Advisory
List, 11
Dietary Supplement Verification Program,
10
diet therapy, 57
diferuloylmethane, 268*t*
digoxin, 100, 148, 225, 230, 246*t*, 261*t*,
285*t*–286*t*
digoxin toxicity, 20, 270*t*
dihydroliipoic acid (DHHLA), 160, 273*t*
diltiazem, 40, 280*t*
dimethyltrisulfide, 193, 279*t*
dipeptidyl peptidase 4 (DPP4) inhibitor, 40
direct oral anticoagulants (DOACs), 40
disaccharidase, 147, 270*t*
distal polyneuropathy, 167
distal symmetric sensorimotor
polyneuropathy (DSPN), 161
diuresis, 282*t*
diuretic, 76, 100, 148, 166, 208, 256*t*, 261*t*,
270*t*, 275*t*
divalproex sodium, 153, 272*t*

dizziness, 247*t*, 276*t*
D mannose, 204
DNA (deoxyribonucleic acid), 152
docosahexanoic acid (DHA), 6, 47, 180,
182, 277*t*
Dong, H., 30–31
dopamine, 227, 285*t*
Doppler flow velocity measurement, 215
dosage, 239
double bond, 180
doxorubicin, 171
doxorubicin-mediated cardiotoxicity, 171,
276*t*
dropsy, 147
drowsiness, 260*t*
drug metabolism, 225
dry eye syndrome, 180
dulaglutide, 242
D-xylose, 129, 265*t*
dyslipidemia, 31, 194

E

economic adulteration, 8
edema, 189
“Effective” rating, 245
eicosanoid, 255*t*
eicosapentanoic acid (EPA), 6, 47, 180,
182–183, 277*t*
elderly population, 10, 240
electron transport chain, 276*t*
ellagitannins, 24, 247*t*
emmenagogue, 39
endocannabinoid system, 122
endothelial dysfunction, 134, 167, 170,
276*t*
endothelial function, 283*t*
endothelial growth factor receptor 2, 275*t*
endothelial production, 214, 283*t*
endothelin 1, 193, 279*t*
endothelium-derived relaxing factor, 170
energy expenditure, 135, 274*t*
energy harvesting, 122
energy supplement, 4
enzyme, 91, 259*t*–260*t*, 267*t*
EPA ethyl ester, 183
Epanova® (Astra-Zeneca), 185
ephedra, 135
epicatechin, 134, 266*t*

epicatechin gallate, 134, 266*t*
Epidiolex®, 237
epigallocatechin gallate (EGCG), 134–135,
266*t*
epithelialization, 91
ergocalciferol (Vitamin D2), 229, 286*t*
“ergogenic aids”, 75
ergogenic properties, 49, 214
erythrocyte malondialdehyde, 201
erythrocyte rigidity, 200
escitalopram (Lexapro®), 4–5, 242
E-selectin, 180, 277*t*
esophageal injury, 148
esophageal obstruction, 204, 281*t*
estimated glomerular filtration rate
(eGFR), 231–232
estrogen, 153, 272*t*, 277*t*
estrogenic effect, 68–69, 76, 107, 255*t*–256*t*,
262*t*
ethanol, 104, 194, 279*t*
etoposide, 40
eugenol, 56, 87, 253*t*, 258*t*
euglycemic, 131
eye infection, 96, 112
ezetimibe, 222

F

fagomine, 112, 263*t*
fasting glucose. *See also* glucose
aloe, 21–22
α-lipoic acid, 162–163
banaba, 25
berberine, 29–31
bitter melon, 40–42
chia, 46
chromium, 49–53
cinnamon, 57–58
coenzyme Q10 (CoQ10), 174–175
delta-9-tetrahydrocannabinarin
(THVC), 238
fenugreek, 63–64
flaxseed, 69
garlic, 195
ginkgo, 200
ginseng, 77–78
glucomannan, 205
gymnema, 83–84
holy basil, 88

- honey, 92–93
 - ivy gourd, 97
 - magnesium, 102–103
 - milk thistle, 107–108
 - mulberry, 113–114
 - probiotic, 123–124
 - psyllium, 131
 - tea, 136–137
 - turmeric, 142–143
 - vinegar, 148–149
 - vitamin D, 231
 - zinc, 153–156
 - fat, 117, 263*t*, 282*t*
 - fatal kernicterus, 28
 - fatty acid, 49–50, 91, 189, 193, 259*t*, 278*t*–279*t*
 - favism, 39, 250*t*
 - FDA (Food & Drug Administration), 7–10, 91, 132, 186, 220, 237, 239, 245
 - “FDA 101: Health Fraud Awareness”, 11
 - fecal bile acid, 129, 255*t*, 265*t*
 - fecal energy loss, 204, 281*t*
 - fecal sterol excretion, 204
 - fenugreek (*Trigonella foenum-graecum* Linn.), 34, 62–67, 254*t*
 - fenugreekine, 62, 254*t*
 - ferritin, 50, 252*t*
 - fertility, 87, 258*t*
 - ferulic acid, 147, 270*t*
 - fetal malformation, 65
 - fetal neurodevelopment, 65
 - fever, 96
 - feverfew, 194, 199
 - fever-reducing properties, 87
 - fiber
 - aloe, 20, 246*t*
 - chia, 45, 251*t*
 - fenugreek, 62
 - flaxseed, 68, 255*t*
 - glucomannan, 204, 281*t*
 - ivy gourd, 96, 260*t*
 - nopal, 117, 263*t*
 - psyllium, 265*t*
 - fibrosis, 106, 109, 262*t*
 - fibrous polysaccharides, 263*t*
 - fish, 36
 - fish oil (ω -3 fatty acid), 45, 68, 171, 180–188, 242, 277*t*–278*t*. *See also* omega-3 fatty acid
 - fishy taste, 277*t*
 - 5,8-kDa component, 91, 259*t*
 - 5-HT1A serotonin receptor, 238
 - flatulence, 56, 62, 129, 193, 204, 265*t*
 - flavone glycoside, 198, 280*t*
 - flavonoid
 - bilberry, 34
 - fenugreek, 62
 - ginkgo, 198
 - hibiscus, 208, 282*t*
 - honey, 91, 259*t*
 - nopal, 117, 263*t*
 - St. John’s wort, 225, 285*t*
 - supplement use, 6
 - flavonolignans, 106
 - flavoring agent, 62
 - FLAX-PAD study, 70
 - flaxseed (*Linum usitatissimum* L.), 47, 68–74, 180, 242, 255*t*
 - flosin B, 24, 247*t*
 - flow-mediated vasodilation, 147, 270*t*
 - flu, 5
 - fluoroquinolone, 24, 101, 247*t*
 - fluoxetine (Prozac®), 4, 191, 199, 226
 - flvoxamine (Luvox®), 82
 - folate absorption, 138
 - folic acid, 26, 135, 266*t*
 - folk medicine, 45
 - food absorption, 281*t*
 - Food and Nutrition Board, 49
 - foot ulcer, 92–93, 100, 259*t*, 283*t*
 - 4-hydroxyisoleucine, 62, 254*t*
 - free fatty acid, 122, 141, 147, 264*t*
 - free fatty acid receptor, 270*t*
 - free-radical scavenger, 170
 - fructosamine, 40, 70, 136
 - fructose, 91, 259*t*
 - furosemide, 255*t*
- ## G
- galacturonic acid, 129, 265*t*
 - Galega officinalis* L. (goat’s rue), 11
 - galic acid, 147, 270*t*
 - gallo catechin gallate, 134, 266*t*
 - gamma aminobutyric acid (GABA), 227, 285*t*
 - garcinia (*Garcinia cambogia*), 4–5, 189–192, 242, 278*t*

- Garcinia cambogia* (garcinia). *See* garcinia
- garlic (*Allium sativum*), 193–197, 199, 243, 279t
- gas, 254t
- gastric emptying, 129, 147, 204, 253t–255t, 265t, 270t, 281t
- gastrointestinal (GI) discomfort, 250t–251t, 279t
- gastrointestinal (GI) disorder, 39
- gastrointestinal (GI) side effect, 161
- gastrointestinal (GI) upset
- cannabidiol (CBD) supplement, 238
 - chia, 45
 - chromium, 252t
 - cinnamon, 56
 - fish oil (ω -3 fatty acid), 277t
 - flaxseed, 68, 255t
 - garcinia, 189, 278t
 - ginkgo, 280t
 - hibiscus, 281t
 - honey, 92
 - ivy gourd, 96, 260t
 - magnesium, 261t
 - mulberry, 263t
 - pine bark extract, 214, 283t
 - probiotics, 264t
 - red yeast rice, 219–220, 222, 284t
 - St. John's wort, 225, 285t
 - tea, 135, 266t
 - turmeric, 268t
 - vinegar, 148, 270t
 - zinc, 272t
- gastrointestinal bleeding, 232
- gastrointestinal inflammatory disorder, 141
- gastroparesis, 148, 270t
- gemfibrozil, 221, 284t
- genital wart, 134
- gestational diabetes mellitus (GDM), 53, 122–124, 152–153
- ghrelin, 135, 147, 259t, 267t, 271t
- ginger, 194, 199
- Ginkgo biloba* L. (ginkgo). *See* ginkgo
- ginkgo (*Ginkgo biloba* L.), 2, 5–6, 34, 194, 198–203, 243, 280t
- ginkgolide, 280t
- ginseng (Asian or Korean [*Panax ginseng* C.A. Meyer] and American [*Panax quinquefolius* L.]), 75–81, 256t
- ginsenoside, 75
- Gissi (Gruppo Italiano per lo Studio della Sopravvivenza nell'Infarto miocardico) study, 181
- glaucoma, 160, 198, 201, 280t
- glibenclamide (glyburide), 41, 88–89, 108, 113
- gliclazide, 58, 123
- glipizide, 117, 199
- glucagon-like peptide- 1 (GLP-1)
- berberine, 28, 248t
 - case study, 242
 - cinnamon, 56, 253t
 - hibiscus, 210
 - probiotics, 122
 - turmeric, 141, 268t
 - vinegar, 147, 270t
- glucokinase activation, 87, 91, 258t–259t
- glucomannan (*Amorphophallus konjac* K. Koch), 191, 204–207, 281t
- gluconate, 272t
- gluconeogenesis, 141, 152, 252t, 268t
- glucoreceptor, 189, 278t
- glucose. *See also* blood glucose; fasting glucose; postprandial glucose
- absorption, 68, 82, 117, 134, 204, 246t, 255t, 257t, 265t
 - aloe, 246t
 - α -lipoic acid, 162–163
 - area under curve (AUC), 36
 - banaba, 247t
 - bilberry, 36
 - case study, 242
 - chromium, 49
 - control, 49
 - disposal, 256t
 - fenugreek, 254t
 - fish oil (ω -3 fatty acid), 181
 - flaxseed, 68–70, 255t
 - garcinia, 189
 - ginkgo, 200
 - ginseng, 75–76, 256t
 - glucomannan, 204
 - gymnema, 82, 84, 257t
 - hibiscus, 208
 - homeostasis, 256t
 - honey, 91, 259t
 - ivy gourd, 260t
 - loading, 200
 - lowering, botanical and nonbotanical

- products, 12. *see also under specific supplement*
- lowering agent, 204, 215
- lowering effect, 91, 247t
- magnesium, 261t
- metabolic pathway, 261t
- metabolism, 263t
- mulberry, 263t
- nopal, 117, 119
- pine bark extract, 215
- probiotics, 124
- production, 260t
- psyllium, 265t
- regulation, 152
- tea, 134, 136
- transport, 247t, 254t, 256t
- uptake, 39, 56, 134, 160, 250t, 253t, 256t–257t, 273t
- uptake inhibition, 34, 249t
- uptake stimulation, 91, 152, 247t
- utilization, 62
- zinc, 152
- glucose-6-phosphatase, 96, 134, 260t, 266t
- glucose-6-phosphate-dehydrogenase (G6PDH), 39, 250t, 279t
- glucose dependent insulinotropic peptide (GIP), 119
- glucose-stimulated insulin secretion, 248t, 276t
- glucose tolerance factor (GTF), 49
- glucose transporter GLUT1 activity, 273t
- glucose transporter GLUT1 transport, 160
- glucose transporter GLUT4 activity, 273t
- glucose transporter GLUT4 mobilization, 147, 270t
- glucose transporter GLUT4 translocation, 28, 39, 56, 112, 248t, 250t, 252t–253t, 263t
- glucose transporter GLUT4 transport, 49, 152, 160, 272t
- Glucosol™, 25
- glucuronidated drug, 262t
- glucuronidation, 107
- glutamate, 227, 285t
- glutathione (GSH) level, 160, 273t
- glutathione peroxidase (GPx), 152, 272t
- glyburide, 41, 88, 199
- glycemic index, 148
- glycemic management, 114
- glycemic value, 154–155, 164
- glycerol-3-phosphate dehydrogenase, 170, 276t
- glycogen synthase activation, 91, 259t
- glycogen synthase kinase-3 β (GSK-3 β), 166
- glycogen synthase kinase-3 b signaling pathway, 112, 275t
- glycogen synthesis, 39, 56, 250t, 253t, 259t
- glycolysis, 141, 147, 152
- glycolytic enzyme activity, 152, 272t
- glycoside, 282t
- glycosides momordin, 39, 254t
- goat's rue, 11
- goldenseal, 28
- Good Manufacturing Practices, 9
- gossypetine, 282t
- Grading of Recommendations Assessment, Development, and Evaluation (GRADE), 175
- grapefruit, 221, 284t
- GRAS (generally recognized as safe), 65
- grayanotoxins, 92
- green tea, 4, 134–135, 137–138, 266t
- guar gum, 131
- gurmarin, 82, 257t
- gut microbiota, 28, 122–123, 246t, 248t
- gymnema (*Gymnema sylvestre* R. Br.), 34, 39, 82–86, 257t
- gymnemasaponin, 82, 257t
- gymnemaside saponin, 82
- Gymnema sylvestre* R. Br. (gymnema). *See* gymnema
- gymnemic acid, 82, 257t

H

- halitosis, 277t
- haloperidol (Haldol®), 107
- Hamilton Depression Scale score, 226
- Harris Poll, 9
- hazard ratio (HR), 172
- HDL cholesterol
 - aloe, 22
 - α -lipoic acid, 163
 - berberine, 31
 - bilberry, 36
 - chromium, 50, 52
 - cinnamon, 59
 - coenzyme Q10 (CoQ10), 174

- fenugreek, 64–65
- flaxseed, 69, 71–72
- garcinia, 190
- garlic, 195
- glucomannan, 205
- hibiscus, 210
- honey, 91
- magnesium, 103
- milk thistle, 108
- mulberry, 113
- nopal, 119
- pine bark extract, 217
- red yeast rice, 221–222
- tea, 137–138
- turmeric, 143
- vinegar, 150
- zinc, 153–156, 272*t*
- headache
 - α-lipoic acid, 273*t*
 - berberine, 248*t*
 - coenzyme Q10 (CoQ10), 276*t*
 - garcinia, 189, 278*t*
 - ginkgo, 280*t*
 - ginseng, 76, 256*t*
 - mulberry, 263*t*
 - pine bark extract, 283*t*
- Health Canada, 245
- health care provider, 5, 11–12, 239–240
- heartburn, 277*t*
- heart disease, 163
- heart failure (HF), 104, 170–172, 194, 233, 276*t*–277*t*
- heart rate, 76, 135, 173, 210, 256*t*, 266*t*
- hemolysis, 50
- hemolytic anemia, 39, 250*t*
- hemorrhoid, 189
- hempbased cannabidiol (CBD)
 - supplement, 237
- hepatic
 - cholesterol, 135, 267*t*
 - cholesterol α hydroxylase, 268*t*
 - cholesterol production, 147
 - cholesterol synthesis, 129
 - disorder, 106
 - dysfunction, 50
 - enzyme, 141, 268*t*
 - function, 97
 - glucogenesis, 262*t*
 - gluconeogenesis, 20, 106, 134, 147, 266*t*
 - glucose output, 252*t*
 - glucose production, 147, 270*t*
 - glucose uptake, 91, 259*t*
 - glycogen synthesis, 189, 278*t*
 - LDL receptor, 135, 267*t*
- hepatic-3-hydroxy-methylglutaryl CoA
 - reductase activity, 56, 253*t*
- hepatic diacyl-glycerol acyl transferase, 181, 277*t*
- hepatic glucose-6-phosphate
 - dehydrogenase, 193
- hepatitis, 20, 246*t*
- hepatotoxic agent, 262*t*
- hepatotoxic effect, 106
- hepatotoxicity, 4, 7, 56, 135, 189, 208, 253*t*, 266*t*, 278*t*
- hepatotoxic supplement, 56
- herb, 1–4, 63. *See also under specific type*
- hexokinase, 87, 258*t*
- hexosamine pathway, 166, 275*t*
- hibiscetin, 282*t*
- hibiscus (*Hibiscus sabdariffa* L.), 208–213, 282*t*
- Hibiscus sabdariffa* L. (hibiscus). *See* hibiscus
- high carbohydrate breakfast (HCB), 118–119
- high soy protein breakfast (HSPB), 118–119
- Hippocrates, 147
- Hispanic population, 2, 22, 211
- histamine blockers (famotidine), 50, 252*t*
- HIV (human immunodeficiency virus), 39, 230, 240, 286*t*
- HMG-CoA reductase, 106, 193, 262*t*, 268*t*, 279*t*, 281*t*, 284*t*
- Hodgkin's lymphoma, 230
- holy basil (*O tenuiflorum* L.; *Formerly known as Ocimum sanctum* L.), 87–90, 258*t*
- homeopathy, 2
- homeostatic model assessment (HOMA), 153
- homeostatic model assessment of insulin resistance (HOMA-IR)
 - coenzyme Q10 (CoQ10), 175
 - flaxseed, 69–70
 - ginseng, 77
 - magnesium, 102–103

- milk thistle, 108
 - probiotics, 123–124
 - psyllium, 131
 - tea, 137
 - turmeric, 142–143
 - zinc, 154
- honey (sometimes known as manuka honey), 91–95, 147, 259*t*
- hormone, 62, 229
- horsetail plant, 166, 275*t*
- Huang, H, 52–53
- huckleberry (*Vaccinium ovatum*), 34
- human microbiome, 122
- hydrocephalus, 62
- hydrochlorothiazide, 209
- hydrocolloidal dietary fiber polysaccharide, 204
- hydrogen, 113
- hydrogen sulfide, 193, 279*t*
- hydroxide, 261*t*
- hydroxy- 3-methyl-glutaryl CoA reductase (HMG-CoA-reductase), 204
- hydroxycitric acid (HCA), 189, 278*t*
- hypercalcemia, 230–231, 286*t*
- hyperforin, 8, 225, 285*t*
- hyperglycemia, 35, 58, 129
- hyperglycemia-induced apoptosis, 166, 275*t*
- hypericin, 8, 225
- Hypericum perforatum* L. (St. John's wort).
See St. John's wort
- hyperlipidemia
 - aloe, 20, 246*t*
 - α -lipoic acid, 273*t*
 - banaba, 24
 - berberine, 29–30, 32, 248*t*
 - case study, 242
 - chromium, 53, 252*t*
 - cinnamon, 253*t*
 - coenzyme Q10 (CoQ10), 170–171, 173, 276*t*
 - fenugreek, 62, 254*t*
 - flaxseed, 68, 255*t*
 - garlic, 193, 279*t*
 - ginseng, 256*t*
 - glucomannan, 204, 281*t*
 - gymnema, 82
 - hibiscus, 208, 282*t*
 - honey, 91, 259*t*
 - Lactobacillus*, 122
 - magnesium, 261*t*
 - milk thistle, 106, 262*t*
 - mulberry, 112, 263*t*
 - nopal, 117, 263*t*
 - pine bark extract, 217, 283*t*
 - probiotics, 264*t*
 - psyllium, 129, 265*t*
 - red yeast rice, 219–220, 222, 284*t*
 - tea, 136–137, 266*t*–267*t*
 - turmeric, 141–142, 268*t*
 - vinegar, 147, 270*t*
 - zinc, 152
- hypermagnesemia, 100, 230, 261*t*, 286*t*
- hypersensitivity, 62, 255*t*
- hypertension. *See also* antihypertensive medication; blood pressure
 - berberine, 29–30, 248*t*
 - bilberry, 34, 249*t*
 - case study, 242
 - chia, 45–46, 251*t*
 - cinnamon, 253*t*
 - coenzyme Q10 (CoQ10), 170–171, 173, 276*t*
 - fish oil (ω -3 fatty acid), 277*t*
 - flaxseed, 68, 255*t*
 - garlic, 193–195, 279*t*
 - ginseng, 256*t*
 - glucomannan, 281*t*
 - hibiscus, 208–210, 282*t*
 - magnesium, 103
 - pine bark extract, 216, 283*t*
 - psyllium, 129, 265*t*
 - tea, 137, 266*t*–267*t*
- hypertensive effect, 75, 277*t*
- hypertensive retinopathy, 249*t*
- hypertriglyceridemia, 180, 277*t*
- hyperzincuria, 152
- hyphema, 199
- hypoglycemia
 - aloe, 20
 - α -lipoic acid, 161
 - banaba, 24
 - berberine, 28
 - bilberry, 34, 249*t*
 - bitter melon, 39, 250*t*
 - case study, 242
 - chromium, 50
 - coma, 250*t*

- fenugreek, 62–63
 - flaxseed, 69
 - garcinia, 189
 - garlic, 194
 - ginseng, 76
 - gymnema, 82
 - gymnema sylvestre, 257*t*
 - hibiscus, 208
 - holy basil, 87–88
 - honey, 91
 - ivy gourd, 96, 260*t*
 - magnesium, 101
 - milk thistle, 107
 - mulberry, 112
 - nopal, 117, 263*t*
 - tea, 135
 - turmeric, 142
 - vinegar, 148, 270*t*
 - hypoglycemic agent, 129, 181, 277*t*
 - hypoglycemic agent, oral, 3, 30–31, 84
 - hypokalemia, 20, 148, 246*t*, 270*t*
 - hypomagnesemia, 100, 102–103, 261*t*
 - hypomania, 199, 280*t*
 - hypotension
 - banaba, 24, 247*t*
 - berberine, 28, 248*t*
 - bilberry, 34, 249*t*
 - case study, 242
 - flaxseed, 69, 255*t*
 - garlic, 194, 279*t*
 - hibiscus, 208
 - magnesium, 100, 261*t*
 - hypotensive effect, 75
 - hypothalamic AMP-activated protein kinase, 160, 274*t*
 - hypothyroidism, 87, 258*t*
 - hypoziemia, 152
- I**
- ibuprofen, 50, 82
 - icosapent ethyl (Vascepa®), 183, 243
 - immune cell activity, 91, 259*t*
 - immune response, 76
 - immune system, 75, 153, 214
 - immunocompromised state, 122, 264*t*
 - immunomodulation, 75, 230
 - immunosuppressive medication, 123, 215, 264*t*, 283*t*
 - impaired fasting glucose (IFG), 77
 - impaired glucose tolerance (IGT), 25, 35–36, 49, 51, 77–78, 114, 123, 200
 - impaired renal function, 24
 - incremental area under the curve (IAUC), 118–119
 - incretin action, 264*t*
 - incretin activity, 122
 - incretin effect, 242
 - Indian cuisine, 87
 - indigestion, 219
 - “Ineffective” rating, 245
 - infant, 28, 63, 76, 230
 - infection, 75, 82, 87, 259*t*, 264*t*
 - inflammation, 122, 229, 264*t*
 - inflammatory cell propagation, 91
 - inflammatory cytokine, 122
 - inflammatory disorder, 34, 68, 89, 180, 214
 - inflammatory eye disorder, 141
 - inflammatory lipopolysaccharide, 122
 - inflammatory marker, 70
 - ingredient, 239–240
 - injection site reaction, 273*t*
 - insect bite, 96
 - insomnia, 76, 135, 256*t*, 266*t*
 - Institute of Medicine, 49
 - “Insufficient Reliable Evidence to Rate” rating, 245
 - insulin
 - action, 49, 100, 253*t*, 261*t*
 - activation, 252*t*
 - activity, 134, 152, 266*t*
 - aloe, 246*t*
 - α-lipoic acid, 161, 273*t*
 - area under curve (AUC), 149, 200
 - banaba, 247*t*
 - berberine, 248*t*
 - bilberry, 249*t*
 - binding, 252*t*
 - bitter melon, 250*t*
 - chromium, 50, 252*t*
 - cinnamon, 56, 253*t*
 - complementary and alternative medicine (CAM), 3
 - fasting, 78
 - fenugreek, 63–64, 254*t*
 - flaxseed, 69, 255*t*
 - garcinia, 278*t*
 - garlic, 193, 279*t*

ginseng, 76–78, 256*t*
 glucomannan, 281*t*
 gymnema, 82–84, 257*t*
 holy basil, 88, 258*t*
 honey, 91
 ivy gourd, 260*t*
 L-aspartate, 107
 L-ornithine, 107
 magnesium, 101, 261*t*
 milk thistle, 107–108, 262*t*
 mulberry, 263*t*
 nopal, 118–119, 263*t*
 pine bark extract, 283*t*
 postprandial response grain product, 36
 probiotics, 124
 production, 272*t*, 279*t*
 psyllium, 265*t*
 receptor, 49, 56, 62, 100, 134, 252*t*, 254*t*,
 261*t*, 266*t*, 273*t*
 receptor β -subunit, 247*t*
 receptor expression, 28, 248*t*
 receptor phosphorylation, 24, 253*t*
 receptor substrate, 134, 160, 266*t*
 release, 257*t*, 259*t*
 secretagogue, 101, 135, 142
 signaling, 122, 253*t*, 261*t*
 signaling cascade, 152, 272*t*
 signal transduction pathway, 134, 266*t*
 stimulation, 265*t*
 tea, 135, 137, 266*t*
 turmeric, 142, 268*t*
 vinegar, 148–149, 270*t*
 insulin-like activity, 96, 247*t*, 260*t*
 insulin resistance
 aloe, 20, 246*t*
 cannabidiol (CBD) supplement, 238
 chromium, 49
 ginkgo, 200
 ginseng, 77
 holy basil, 87, 258*t*
 human microbiome, 122
 magnesium, 100, 103, 261*t*
 milk thistle, 106, 262*t*
 mulberry, 112, 263*t*
 probiotics, 123, 264*t*
 tea, 134, 266*t*
 turmeric, 141
 vitamin D, 229, 286*t*
 zinc, 153
 insulin secretion
 berberine, 28, 31
 bilberry, 34, 249*t*
 fenugreek, 62, 254*t*
 ginkgo, 198, 280*t*
 ginseng, 75, 256*t*
 gymnema, 82
 holy basil, 87, 258*t*
 honey, 259*t*
 mulberry, 112, 263*t*
 tea, 134
 vinegar, 147, 270*t*
 vitamin D, 231
 insulin sensitivity
 banaba, 25
 chromium, 50, 252*t*
 cinnamon, 253*t*
 flaxseed, 70
 garlic, 193, 279*t*
 ginseng, 77
 gymnema, 84
 magnesium, 102
 nopal, 117, 263*t*
 probiotics, 123
 tea, 134
 vitamin D, 231
 zinc, 153
 integrative health, 1
 intent to treat (ITT), 52
 intercellular adhesion molecule (ICAM-1),
 141, 269*t*
 interleukin, 106, 262*t*
 interleukin-1 β , 180, 277*t*
 interleukin-6, 160, 274*t*, 277*t*
 interleukin IL-6, 180
 International Lipid Expert Panel (ILEP),
 220
 international normalized ratio (INR), 63,
 171, 277*t*
 International Probiotics Association, 126
 intestinal cholesterol absorption, 181, 277*t*
 intestinal lumen L-cell, 147
 intestinal obstruction, 204, 281*t*
 intestinal parasite, 189
 intracellular calcium activity, 180, 278*t*
 intracellular lipid accumulation, 208
 intraocular pressure, 36
 iron
 chia, 45, 251*t*

- chromium, 50
 - psyllium, 129, 265*t*
 - tea, 135, 266*t*
 - turmeric, 142, 268*t*
 - zinc, 153, 272*t*
 - iron deficiency anemia, 138
 - irradiation, 91
 - irritable bowel syndrome, 129
 - ischemic reperfusion injury, 160
 - isoniazid, 194, 279*t*
 - isoprenoid tail, 170
 - isoquinoline alkaloid, 28, 248*t*
 - isorhamnetin, 198, 280*t*
 - isosilibin, 262*t*
 - isosilychristine, 262*t*
 - Italian Surveillance System of Natural Health Products, 219
 - ivy gourd (*Coccinia indica*, also known as *Coccinia cordifolia* and *Coccinia grandis*), 96–99, 260*t*
 - Ixba action, 141, 269*t*
- J**
- Janus kinase, 141, 269*t*
 - Japanese product, 5–6
- K**
- kaempferol, 45, 198, 251*t*, 280*t*
 - “karkade”, 208
 - kernicterus, 248*t*
 - Khalesi, S, 71
 - kidney, 214, 229
 - kidney disease, 232
 - kidney function, 97
 - kidney injury molecule (KIM-1), 168
 - kidney stone, 232
 - killer cell activity, 214
 - kinase, 20, 24
 - konjac (glucomannan), 131
 - kratom, 6
- L**
- label, 5–6, 10
 - lactate dehydrogenase, 96, 260*t*
 - lactation
 - aloe, 20
 - berberine, 28
 - bitter melon, 42
 - coenzyme Q10 (CoQ10), 176
 - fenugreek, 62–63
 - garlic, 194
 - ginseng, 76
 - hibiscus, 208
 - honey, 92
 - red yeast rice, 219
 - supplement use, 240
 - lactic acid, 270*t*
 - lactic acidosis, 24, 247*t*
 - Lactobacillus*, 122, 264*t*
 - Lagerstroemia speciosa* L (banaba), 25. See banaba
 - lagerstroemin, 24, 247*t*
 - lamotrigine (Lamictal®), 107
 - Langerhans cell, 84
 - L-arabinose, 129, 265*t*
 - L-arginine, 283*t*
 - laxative, 20
 - LDL cholesterol
 - aloe, 21–22
 - α-lipoic acid, 163
 - berberine, 28–29, 31, 248*t*
 - chromium, 52
 - cinnamon, 57, 59
 - coenzyme Q10 (CoQ10), 173–174
 - fenugreek, 63–64
 - fish oil (ω-3 fatty acid), 181, 183
 - flaxseed, 68–69, 71–72
 - garlic, 195
 - glucomannan, 205
 - hibiscus, 210
 - magnesium, 103
 - milk thistle, 106, 108, 262*t*
 - mulberry, 112–113
 - nopal, 119
 - pine bark extract, 216–217
 - psyllium, 130
 - red yeast rice, 220–222
 - tea, 136–138
 - turmeric, 143–144
 - vinegar, 150
 - zinc, 154–156
 - LDL-C oxidation, 208, 282*t*
 - LDL oxidation, 135, 193, 214, 267*t*–268*t*, 279*t*, 283*t*
 - lead, 7, 268*t*
 - left ventricular ejection fraction (LVEF),

- 172
- levothyroxine, 50, 252*t*
- Liang, Y., 30
- lifestyle modification, 30, 35
- lignan, 68–69, 255*t*
- “Likely Effective” rating, 245
- “Likely Ineffective” rating, 245
- linagliptin, 40
- linamarin, 68
- linoleic acid, 68, 255*t*
- Linum Usitassimum* L. (flaxseed). *See* flaxseed
- linustatin, 68
- lipid
- absorption, 117, 135
 - aloe, 246*t*
 - α -lipoic acid, 162–164
 - banaba, 25
 - berberine, 28, 30
 - bilberry, 36
 - case study, 242
 - chia, 45–46
 - chromium, 49–50, 252*t*
 - cinnamon, 56–58, 253*t*
 - coenzyme Q10 (CoQ10), 173, 175
 - delta-9-tetrahydrocannabivarin (THVC), 238
 - fenugreek, 62, 64, 254*t*
 - fish oil (ω -3 fatty acid), 180–181
 - flaxseed, 68–69, 71–72
 - garcinia, 190
 - garlic, 195
 - ginseng, 75
 - glucomannan, 204, 281*t*
 - gymnema, 83–84
 - hibiscus, 208, 210
 - honey, 92
 - magnesium, 103
 - management, 114
 - milk thistle, 108
 - mulberry, 113
 - nopal, 263*t*
 - oxidation, 189
 - peroxidation, 112, 141, 263*t*, 268*t*
 - pine bark extract, 214, 217
 - psyllium, 129–130, 265*t*
 - red yeast rice, 219–220
 - tea, 138
 - turmeric, 143
 - zinc, 153–155
- lipid-lowering activity, 193
- lipid-lowering agent, 129, 183
- lipogenesis, 147, 181, 189, 271*t*, 277*t*–278*t*
- lipolysis, 147, 271*t*
- lipoprotein lipase activity, 75, 96, 141, 181, 256*t*, 260*t*, 268*t*, 277*t*
- lisinopril, 153, 209, 272*t*
- lithium, 129
- liver
- α -lipoic acid, 160
 - enzyme, 238
 - function enzyme, 41
 - function test, 107, 219, 284*t*
 - injury, 4
 - toxicity, 221, 284*t*
 - transaminase, 222
 - transplantation, 4, 189, 278*t*
- Liver Disease Research Branch of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK), 4
- LiverTox website, 4
- lorcaserin (Belviq®), 7
- losartan, 242
- lovastatin, 219–221
- Lovaza® (GlaxoSmithKline), 185
- lupus, 215
- lysine, 156
- lysosomal enzyme activity, 141, 268*t*
- M**
- macrolide, 194, 221, 284*t*
 - macrolide antibiotic, 238
 - macrophage infiltration, 141
 - macular degeneration, 152, 198, 201
 - macular edema, 163, 215
 - magnesium, 45, 100–105, 153, 155, 251*t*, 261*t*, 272*t*, 286*t*
 - major adverse cardiovascular events (MACE), 172
 - malic acid, 270*t*, 282*t*
 - malondialdehyde (MDA) concentration, 106–107, 109, 262*t*
 - malonyl-CoA, 50, 189, 278*t*
 - mania, 76, 189
 - Manuka honey, 91, 93. *See also* honey
 - maple syrup, 62

- marijuana, 237
- massage therapy, 1
- mastalgia, 76, 256*t*
- matairesinol, 68, 255*t*
- mechanical assist implantation, 172
- medication. *See also under specific name; specific type*
 - drug interaction, 4–5, 21, 28
 - oral, 21, 118
 - oral diabetes agent, 24, 30, 42, 57, 63, 88, 112
 - prescription, 4–5, 7–8, 65, 166, 183, 185–186, 209, 237–239
- medicinal herb, 96
- Mediterranean ancestry, 39
- melatonin, 199
- melon, 39
- membrane stabilization, 170, 180, 276*t*
- men's health supplement, 4
- menstrual disorder, 106, 189
- menstruation, 39
- mental alertness, 134
- mercury, 181
- metabolic syndrome
 - α-lipoic acid, 163
 - berberine, 28, 248*t*
 - bilberry, 34, 249*t*
 - chia, 45, 251*t*
 - cinnamon, 58
 - coenzyme Q10 (CoQ10), 173
 - flaxseed, 68, 255*t*
 - gymnema, 82, 84
 - gymnema sylvestre, 257*t*
 - hibiscus, 209
 - magnesium, 103, 261*t*
 - nopal, 117, 263*t*
 - pine bark extract, 214
 - tea, 137, 266*t*
 - turmeric, 143, 268*t*
 - zinc, 155
- metacarpal nerve, 167
- metallic taste, 272*t*
- Metamucil®, 132
- metatarsal nerve, 167
- metformin
 - aloe, 21
 - banaba, 25
 - benfotiamine, 166, 275*t*
 - berberine, 29
 - bitter melon, 40–41
 - case study, 242
 - fenugreek, 65
 - Galega officinalis* L., 11
 - garlic, 195
 - ginkgo, 200
 - milk thistle, 108
 - nopal, 117
 - probiotics, 122
 - psyllium, 129, 265*t*
- methotrexate, 56, 123, 264*t*
- methyl eugenol, 87
- mevalonate pathway, 170
- mevinolin, 219
- microbial infection, 123
- microbiome dysfunction, 122
- microbiome modulation, 268*t*
- microcirculation, 36
- microvascular complication, 28, 152, 166, 196, 200, 214, 272*t*
- Middle-Eastern ancestry, 39
- migraine headache, 100
- milk thistle (*Silybum marianum*), 32, 106–111, 243, 262*t*
- mind and body practice, 1
- mineral, 1
- mineral salt, 147, 270*t*
- “miracle cure”, 240
- Mirtogenol®, 36
- miscarriage, 135, 254*t*, 266*t*
- mitochondrial ATP production, 170
- mitochondrial dysfunction, 171, 276*t*
- mitogen-activated protein kinase (MAPK), 166, 180, 275*t*, 277*t*
- Momordica charantia* (bitter melon). *See* bitter melon
- momordicin, 39, 250*t*
- momordin, 250*t*
- monacolin, 219–221, 284*t*
- monascorubramine, 284*t*
- Monascus purpureus went* (red yeast rice). *See* red yeast rice
- monoamine oxidase (MAO) inhibitor, 135, 266*t*
- monocyte chemoattractant protein-1, 141, 269*t*
- monocyte infiltration, 180
- monofloral, 91
- monosaccharide, 148

mood change, 76, 256*t*
mood disturbance, 50
mortality, 182, 194, 221, 232
Morus alba Linn. (mulberry). *See* mulberry
Mosheni, M, 173
mosquito repellent, 87
motor nerve conduction velocity (MNCV), 162
mucilage, 204
mucin production, 122
mucopolysaccharide soluble fiber, 117
mucositis, 91
mulberry (*Morus alba* Linn.), 112–116, 263*t*
multifloral, 91
multi-infarct dementia, 198
multiple sclerosis, 215, 230
muscle, 152, 176, 222, 229–230, 286*t*
muscle building supplement, 7
muscle glucose uptake, 147, 270*t*
muscle pain, 248*t*
muscle protein kinase, 20
musculoskeletal disorder, 220
myalgia, 219–220, 242, 284*t*
myocardial ATP production, 170, 276*t*
myocardial infarction (MI), 136, 172–173, 181–184, 194, 221, 232
myopathy, 170, 221, 284*t*
myricetin, 45, 251*t*

N

nadolol, 135, 266*t*
NADPH (nicotinamide adenine dinucleotide phosphate), 135, 267*t*
naphthodianthrone, 225, 285*t*
narcotic, 285*t*
nasal short posterior ciliary, 201
NATHAN I (Neurological Assessment of Thioctic Acid in Neuropathy) trial, 161–162
NATHAN II (Neurological Assessment of Thioctic Acid in Neuropathy) trial, 161
National Academy of Medicine, 230
National Cancer Institute, 7
National Health Interview Survey (NHIS), 1–3
National Institutes of Health (NIH), 8, 238
National Institutes of Health National Center for Complementary and Integrative Health (NCCIH), 1, 6
National Library of Medicine, 4
National Osteoporosis Foundation, 233
National Toxicology Program (NTP), 7
Native American population, 2
Natural Medicines, 2, 12, 223, 237, 239, 243, 245
natural product, 1
Natural Products Association, 223
nausea, 261*t*, 263*t*, 272*t*–273*t*, 277*t*, 286*t*
nefazodone, 221, 284*t*
neolinustatin, 68
neomirtilline, 34, 249*t*
nephrolithiasis, 231
nephropathy
 α -lipoic acid, 160, 273*t*–274*t*
 benfotiamine, 166, 275*t*
 berberine, 28, 248*t*
 fish oil (ω -3 fatty acid), 277*t*
 milk thistle, 106, 262*t*
 turmeric, 141, 268*t*–269*t*
nephrotoxicity, 7
nephrotoxin, 219
nerve conduction velocity (NCV), 162
nervousness, 76, 256*t*
Neuropathy Impairment Score-Lower Limbs (NIS-LL), 161–162
neural tube defect, 138
neuroinflammatory lipid peroxidation, 141, 269*t*
neurologic disorder, 170
neuropathic pain, 6
neuropathy, 100, 141, 166–167, 268*t*–269*t*, 273*t*–276*t*
Neuropathy Impairment Score (NIS), 161–162
Neuropathy Symptom Score, 167
neuroprotective properties, 198
New England Journal of Medicine, 4
New York Heart Association (NYHA), 172–173
niacin, 221, 284*t*
night contrast sensitivity, 35
NIH-funded Drug-Induced Liver Injury Network (DILIN) study, 4
nitric oxide, 193, 214, 279*t*, 283*t*
non-alcoholic fatty liver disease (NAFLD)
 berberine, 28, 248*t*

- coenzyme Q10 (CoQ10), 276t
 fish oil (ω -3 fatty acid), 277t
 flaxseed, 68, 255t
 milk thistle, 262t
 tea, 134, 266t
 turmeric, 141, 268t
 nonalcoholic steatohepatitis (NASH), 106, 262t
 nonbotanical product, 1, 12. *See also under specific supplement*
 nonmainstream practice, 1
 non-nucleoside reverse transcriptase inhibitor, 194
 non-steroidal anti-inflammatory (NSAID), 24, 252t
 nonsulfonylurea secretagogue, 82
 nopal (*Opuntia streptacantha Lemaire*), 2, 117–121, 263t
 norepinephrine, 135, 227, 285t
 Nrf2 (nuclear factor erythroid 2–related factor 2), 160, 273t
 NSF[®] International, 10, 239
 N-terminal pro-Btype natriuretic peptide (NT-proBNP), 172
 nuclear factor-k B (NF-kB), 141, 160, 166, 180, 229, 268t–269t, 274t–275t, 277t, 286t
 nutrition, 1
 Nutrition Facts Label, 239
- O**
- oat bran, 46
 obesity
 aloe, 20, 246t
 α -lipoic acid, 160, 273t–274t
 berberine, 248t
 chia, 45–46, 251t
 chromium, 252t
 cinnamon, 253t
 coenzyme Q10 (CoQ10), 175
 diabetes comorbidities, 4
 fenugreek, 62, 254t
 fish oil (ω -3 fatty acid), 277t
 flaxseed, 69, 255t
 garcinia, 278t
 ginseng, 77
 glucomannan, 204–205, 281t
 gymnema, 85
 hibiscus, 282t
 holy basil, 87, 258t
 honey, 259t
 magnesium, 103
 microbiome dysfunction, 122
 nopal, 117
 probiotics, 122–124, 264t
 psyllium, 129, 265t
 tea, 134–135, 137–138, 266t–267t
 turmeric, 141, 268t–269t
 vinegar, 270t–271t
 zinc, 155
 ocular blood flow, 34, 198, 201, 249t, 280t
 ocular disorder, 201
 odds ratio (OR), 162
 Office of Dietary Supplements (ODS), 8
 oligosaccharide, 91, 259t
 omega-3-carboxylic acid, 184
 omega-3 fatty acid, 6, 232–233, 243, 255t, 276t. *See also* fish oil
 omeprazole, 50
 Omtryg[®] (Trygg Pharma, Inc.), 185
 1,25-dihydroxyvitamin D (1,25[OH]2D), 229
 l-deoxynojirimycin, 112, 263t
 oolong tea, 134–137, 266t
 ophthalmic disorder, 34
 ophthalmoscopy parameter, 35
 opioid withdrawal, 237
Opuntia streptacantha lemaire (nopal). *See* nopal
 oral anticoagulant, 42
 oral contraceptive, 5, 166, 181, 225, 275t, 285t
 oral diabetes agent, 30, 42, 57, 63, 88, 112
 oral glucose tolerance test (OGTT)
 bilberry, 35–36
 bitter melon, 41
 fenugreek, 63
 ginkgo, 200
 ginseng, 77
 honey, 93
 ivy gourd, 97–98
 magnesium, 102
 nopal, 119
 zinc, 154
 oral hypoglycemic drug, 3, 30–31, 84
 oral medication, 21, 24
 organic acid, 147, 208, 270t, 282t
 organic anion-transporting polypeptide

(OATP), 24, 107, 142, 247t, 268t
 ORIGIN (Outcome Reduction with Initial Glargine Intervention) trial, 182
 orlistat, 230, 286t
 oropharyngeal inflammation, 148, 270t
 osteoarthritis, 141, 242
 osteopathic manipulation, 1
 osteoporosis, 229–230, 286t
O tenuiflorum L.; Formerly Known as
Ocimum sanctum L. (holy basil). *See* holy basil
 ovarian cancer, 107, 230
 over-the-counter (OTC) supplement, 220
 overweight, 77, 84, 123–124, 137, 156, 175
 oxidative neural tissue damage, 141
 oxidative stress, 68, 106, 109, 152, 160, 193, 201, 279t
 oxide, 261t
 oxygen consumption, 271t
 oxygen transport, 200
 oxylipin, 68, 255t
 oxyntomodulin, 147, 271t

P

P2Y12 inhibitor, 34, 63
 Pacific Islander population, 2
 pain, 6, 273t
 palatinose (isomaltulose), 91
 palpitation, 247t
Panax ginseng C.A. Meyer (ginseng [Asian or Korean]). *See* ginseng
 panaxoside, 75
Panax quinquefolius L. (ginseng [American]). *See* ginseng
 pancreatic
 antioxidant effect, 259t
 β -cell, 34, 62, 82, 87, 193, 229, 238, 258t, 286t
 cancer, 230
 insulin production, 20
 insulin secretion, 91, 199
 islet cell, 152, 272t
 pancreatitis, 123, 189, 277t–278t
 parenteral nutrition, 49, 104
 Parkinson's disease, 160, 170
 paroxetine (Paxil®), 226
 pathogenic microbe, 264t
 PCBs (polychlorinated biphenyls), 181

p-coumaric acid compound, 87, 258t
 pectin, 96, 260t, 263t
 pentobarbital, 135
 pentobarbitone-induced duration of sleep, 88
 pentosane, 129, 265t
 pentose phosphate pathway, 166
 peptide Y-Y (PYY), 147, 259t, 271t
 peripheral arterial disease (PAD), 70, 198, 200, 280t
 peripheral
 circulation, 214
 circulatory problems, 198
 neuropathy, 160–161, 242–243, 275t
 resistance, 276t
 tissue glucose utilization, 147, 270t
 vascular disease, 5
 vasodilation, 253t
 peroneal MNCV, 162
 peroneal nerve conduction velocity, 167
 peroneal SNCV, 162
 peroxisome proliferator-activated receptor (PPARs), 56, 253t
 peroxisome proliferator-activated receptor α (PPAR- α), 147, 180–181, 271t, 277t
 peroxisome proliferator-activated receptor-g (PPARg), 28, 39, 238, 248t, 250t, 268t
 peroxisome proliferator-activated receptor-g (PPARg) agonist, 106, 141, 262t
 peroxynitrite, 160
 persons with diabetes (PWD), 1–5, 9, 11, 238–240
 Peter, EL, 42
 p-glycoprotein, 39, 42, 107, 225, 250t
 pharmacotherapy, 1
 phenobarbital, 258t, 286t
 phenol, 6
 phenolic acid, 91, 214, 259t, 283t
 phenolic acid derivative, 62
 phenolic compound, 117, 214, 246t, 263t
 phenolic constituent, 20
 phenylketonuria, 129, 265t
 phenytoin (Dilantin®), 92, 153, 199, 259t, 272t, 286t
 phloroglucinol, 225
 phosphatidylcholine, 107, 262t–263t
 phosphatidylinositol- 3-kinase/protein

- kinase B, 112, 263t
- phosphodiesterase-5-inhibitor, 7
- phosphoenolpyruvate, 50
- phosphoenolpyruvate carboxykinase, 134, 266t
- phosphofructokinase, 87, 258t
- phosphofructose, 272t
- phospholipid-protein interaction, 170
- phosphorous, 45, 229, 251t, 286t
- phosphorylation reaction, 152, 261t, 272t
- photosensitivity, 225
- phototoxicity, 225, 285t
- physical activity, 1
- physiologic effect, 180
- Physiotherapy Evidence Database (PEDro) scale, 123–124
- phytochemical, 6, 117, 263t
- phytoestrogen, 68
- phytosterol, 219, 284t
- pine bark extract (*Pinus pinaster Ait*), 36, 214–218, 243, 283t
- Pinus pinaster ait* (pine bark extract). *See* pine bark extract
- pioglitazone, 142, 268t
- piperidine, 268t
- piperine, 144
- Plantago ovata* (psyllium). *See* psyllium
- plant alkaloid, 6
- plaque stabilization, 180
- plasma creatine kinase, 176
- plasma glucose, 101, 136, 216. *See also* blood glucose; glucose
- plasma sialic acid (PSA), 41
- Plasma Thiobarbituric Acid Reactive Substances (TBARS), 152
- platelet activating factor, 68, 280t
- platelet aggregation, 20, 34, 181, 189, 198, 278t, 280t
- platelet inhibition, 75
- pleiotropic effect, 141
- poison ivy, 147
- polyisoprenoid tail, 170, 276t
- polyketide, 219, 284t
- polyneuropathy symptom, 167
- polypeptide, 82
- polypeptide P, 39–40, 250t
- polyphenol
 - banaba, 24
 - bilberry, 34, 249t
 - hibiscus, 208, 282t
 - holy basil, 87, 258t
 - tea, 134, 266t
 - vinegar, 147, 270t
- polyphenolic polymer, 56
- polysaccharide, 129, 204, 265t, 281t
- polysaccharide-D-glucose, 281t
- polysaccharide-D-mannose, 281t
- polyunsaturated fatty acid, 68
- “Possibly Effective” rating, 245
- “Possibly Ineffective” rating, 245
- postprandial endothelial dysfunction, 167
- postprandial glucose. *See also* glucose
 - berberine, 29–31
 - bitter melon, 42
 - chia, 251t
 - cinnamon, 56, 253t
 - fenugreek, 62–64
 - flaxseed, 68, 255t
 - garlic, 195–196
 - ginseng, 75–78
 - glucomannan, 204, 281t
 - gymnema, 83
 - holy basil, 88
 - honey, 92
 - ivy gourd, 97–98
 - mulberry, 113
 - nopal, 118–119
 - psyllium, 129–131, 265t
 - vinegar, 148–149
 - zinc, 155
- potassium, 148
- potassium depleter, 270t
- potassium-sparing diuretic, 100, 261t
- pravastatin, 210
- prebiotic, 91, 204, 259t, 281t
- prediabetes
 - aloe, 21–22, 246t
 - α -lipoic acid, 163
 - banaba, 24–25, 247t
 - bilberry, 34, 249t
 - bitter melon, 39, 42, 250t
 - chromium, 252t
 - cinnamon, 56, 253t
 - fenugreek, 254t
 - fish oil (ω -3 fatty acid), 277t
 - flaxseed, 68, 255t
 - ginseng, 75, 256t
 - magnesium, 100–101, 103

- mulberry, 114
 - nopal, 119
 - probiotic, 124
 - tea, 137
 - turmeric, 142–143
 - vitamin D, 231
 - zinc, 152–154
 - prednisone, 153
 - preeclampsia, 100
 - Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA), 53
 - pregnancy
 - aloe, 20
 - berberine, 28
 - chromium, 49
 - coenzyme Q10 (CoQ10), 176
 - fenugreek, 62
 - flaxseed, 68, 255t
 - garlic, 194
 - ginseng, 76
 - hibiscus, 208
 - honey, 92
 - magnesium, 104
 - probiotic, 123
 - red yeast rice, 219
 - supplement use, 240
 - tea, 135
 - zinc, 155
 - pregnancy-related leg cramp, 100
 - pregnane x receptor, 225
 - prickly pear cactus, 2
 - probiotics (*Lactobacillus species and Others*), 1, 20, 122–128, 264t
 - procyanidin, 283t
 - product integrity, 11
 - product rating, 245
 - proinflammatory cytokine, 141, 269t
 - proinflammatory molecule, 152, 272t
 - proprotein convertase subtilisin/kesin type 2 (PCSK9), 28, 248t
 - prostacyclin synthesis, 180, 278t
 - prostate cancer, 45, 68, 153, 230, 251t, 255t
 - prostate function, 272t
 - protease inhibitor, 40, 194, 221, 226, 279t, 284t–285t
 - protein, 45, 62, 91, 96, 251t, 259t–260t
 - protein carbonyl activity, 141, 268t
 - protein kinase A (PKA), 24
 - protein kinase B (PKB/Akt), 166, 275t
 - protein synthesis, 152
 - proteinuria, 109
 - prothrombotic mediator production, 180, 278t
 - proton pump inhibitor (PPI), 50, 100, 153, 252t, 261t, 272t
 - protopanaxadiol, 256t
 - protopanaxatriol, 256t
 - pruritus, 220, 268t
 - psoriasis, 39
 - psychiatric disorder, 180, 225
 - psychiatric medication, 257t, 265t
 - psychomotor performance, 75
 - psyllium (*Plantago ovata*), 129–133, 265t
 - Pycnogenol®, 214–217
 - pyrophosphatase, 160, 273t
 - pyruvate dehydrogenase, 160, 273t
 - pyruvate kinase, 272t
 - pyruvic acid, 160, 273t
- ## Q
- Qigong, 1
 - QSYMBIO study, 172
 - quercetin, 34, 45, 198, 251t, 280t
- ## R
- radiation treatment, 122, 264t
 - raloxifene, 107, 262t
 - ramipril, 216
 - randomized controlled trials (RCTs)
 - aloe, 21–22
 - α-lipoic acid, 161–163
 - banaba, 25
 - benfotiamine, 167
 - berberine, 29–31
 - bilberry, 35–36
 - bitter melon, 40–42
 - chia, 45–47
 - chromium, 50–53
 - cinnamon, 57–59
 - coenzyme Q10 (CoQ10), 171–176
 - “Effective” rating, 245
 - fenugreek, 63–65
 - fish oil (ω-3 fatty acid), 181–184
 - flaxseed, 69–72
 - garcinia, 189–191
 - garlic, 194–196

- ginkgo, 199–201
 - ginseng, 77–78
 - glucomannan, 205
 - gymnema, 82–86
 - hibiscus, 209–210
 - holy basil, 88–89
 - honey, 92–94
 - ivy gourd, 97–98
 - magnesium, 101–103
 - milk thistle, 107–109
 - mulberry, 112–114
 - nopal, 118–119
 - pine bark extract, 215–217
 - probiotic, 123–125
 - psyllium, 130–132
 - red yeast rice, 221–222
 - St. John's wort, 226–227
 - tea, 135–138
 - turmeric, 142–144
 - vinegar, 148–149
 - vitamin D, 230–233
 - zinc, 153–156
 - rash, 220, 275*t*, 283*t*
 - rate ratios (RR), 182
 - reactive nitrogen species, 273*t*
 - reactive oxygen species, 267*t*, 273*t*, 276*t*
 - record keeping, 240
 - REDUCE-IT (Reduction of Cardiovascular Events with Icosapent Ethyl-Intervention Trial), 183–184
 - red yeast rice (*Monascus Purpureus Went*), 25, 32, 171, 219–224, 276*t*, 284*t*
 - reginin A, 24, 247*t*
 - relaxation technique, 1
 - renal
 - failure, 50
 - function, 41, 45, 100, 232, 261*t*
 - inflammation, 141, 269*t*
 - toxicity, 50, 252*t*, 284*t*
 - R enantiomer, 160, 273*t*
 - renin angiotensin system (RAS) inhibitor, 109
 - repaglinide, 142, 268*t*
 - respiratory infection, 5, 89
 - restlessness, 76, 135, 256*t*
 - resveratrol, 34
 - retina, 214
 - retinal capillary blood flow, 200–201
 - retinal edema, 144, 215
 - retinopathy
 - α -lipoic acid, 160, 273*t*–274*t*
 - benfotiamine, 168, 275*t*
 - bilberry, 34–35, 249*t*
 - case study, 242–243
 - fish oil (ω -3 fatty acid), 277*t*
 - ginkgo, 198, 200, 280*t*
 - magnesium, 100
 - pine bark extract, 214–215, 283*t*
 - turmeric, 141, 268*t*–269*t*
 - retrobulbar blood vessel, 194
 - retrobulbar hemorrhage, 194, 199
 - revascularization event, 182
 - rhabdomyolysis, 219, 221, 284*t*
 - rheumatoid arthritis, 58
 - rhinorrhea, 62
 - rhododendron plant, 92
 - riboflavin, 129
 - rifampin, 286*t*
 - ringworm, 87
 - rivaroxaban, 40
 - RNA (ribonucleic acid), 152
 - rosiglitazone, 29
 - rubropunctamine, 284*t*
- S**
- Saccharomyces boulardii*, 122, 264*t*
 - Salba, 45
 - S-allyl-L-cysteine, 193, 279*t*
 - S-allylmercaptocysteine, 193, 279*t*
 - Salvia hispanica L.* (chia). *See* chia
 - saponin constituent, 20, 62, 246*t*, 254*t*
 - satiety, 147, 204, 271*t*, 281*t*
 - scorpion bite, 87
 - secoisolariciresinol diglucoside (SDG), 68, 255*t*
 - “second meal effect”, 265*t*
 - secretagogue, 200, 268*t*, 270*t*
 - sedation, 28, 285*t*
 - seizure, 39, 198–199, 237, 280*t*
 - seizure medication, 166
 - selective serotonin reuptake inhibitor (SSRI) antidepressant, 191
 - selective serotonin reuptake inhibitors (SSRIs), 4–5, 226–227, 278*t*, 285*t*
 - selenium, 175
 - self-care approach, 2
 - S enantiomer, 160, 273*t*

sensory nerve conduction velocity (SNCV), 162
 serotonergic antidepressant, 189, 285t
 serotonin
 reuptake, 189, 278t
 reuptake inhibition, 225
 syndrome, 4–5, 189, 226, 243, 278t, 285t
 toxicity, 4–5, 242
 sertraline (Zoloft®), 4–5, 226
 serum advanced glycation end product, 41
 serum creatinine, 112–113, 232, 263t
 serum drug concentration, 284t
 7 α -hydroxylase, 68, 255t
 severe hypoglycemia, 39
 severe interstitial nephritis, 50
 sevoflurane, 20, 246t
 sexual dysfunction, 75
 sexual enhancement supplement, 7
 short-chain fatty acid, 122, 147, 204, 246t
 sibutramine, 7
 sildenafil (Viagra®), 7
 silidianin, 262t
Silybum marianum (milk thistle). *See* milk thistle
 silychristine, 262t
 silymarin, 106–109, 262t
 simvastatin, 208, 222
 sirolimus, 107
 skin eruption, 96
 skin rash, 275t
 sleep difficulties, 225, 285t
 smoking, 170
 smoking cessation, 237
 snake bite, 87
 Snellen test, 215
 solar radiation protection, 134
 sorbitol dehydrogenase, 141
 sotolon, 62
 soybean, 190
 spasmolytic activity, 214
 sperm, 87, 258t
 spina bifida, 62
 spinal epidural hematoma, 193–194
 spironolactone, 100, 261t
 sports performance enhancer, 75
 SPRING trial, 123
 stacking, 9
 standardization, 8
 standardized mean difference (SMD), 102, 162–163, 226
 Standards of Medical Care, 238
 star anise, 5–6
 statin
 banaba, 24, 247t
 case study, 243
 coenzyme Q10 (CoQ10), 170–171, 276t
 fish oil (ω -3 fatty acid), 181, 183–184, 277t
 garlic, 194, 279t
 ginkgo, 199, 280t
 hibiscus, 208, 210
 psyllium, 129
 red yeast rice, 219–221
 St. John's wort, 5, 225, 285t
 turmeric, 142, 268t
 statin associated muscle symptoms (SAMS), 176, 229, 276t
 statin-associated myopathy symptoms (SAMS), 170
 statin-induced myalgia, 276t
 statin-induced myopathy, 276t
 statin-related myopathy, 171
Stephania tetrandia, 7
 steroid, 50, 100, 153, 230, 252t, 261t, 272t, 283t, 286t
 steroidal saponin, 62
 steroid use, 49
 sterol regulatory element binding protein (SREBP-1), 49, 147, 252t, 270t, 277t
 sterol regulatory element binding protein (SREBP-1c), 181
 stigmasterol, 82, 257t
 St. John's wort (*Hypericum perforatum* L.), 5, 8, 199, 225–228, 243, 284t–285t
 stomach upset, 147, 247t
 stool volume, 263t
 STRENGTH trial (Statin Residual Risk Reduction with Epanova in High Cardiovascular Risk Patients with Hypertriglyceridemia), 184
Streptococcus thermophilus, 122, 264t
 stress, 75, 87
 stroke, 163, 181–184, 194, 232
 “structure and function” statement, 9
 subarachnoid hemorrhage, 199
 subdural hematoma, 199
 “sugar destroyer”, 82
 “sugar-free” product, 265t

- Suksomboon, N, 51
sulfate, 261*t*, 272*t*
sulfonylurea
 aloe, 20–21, 246*t*
 α -lipoic acid, 273*t*
 banaba, 24, 247*t*
 berberine, 248*t*
 bilberry, 249*t*
 bitter melon, 39, 41, 250*t*
 chromium, 252*t*
 cinnamon, 56, 58, 253*t*
 coenzyme Q10 (CoQ10), 174
 fenugreek, 63, 254*t*
 flaxseed, 255*t*
 garcinia, 278*t*
 garlic, 279*t*
 ginkgo, 199, 280*t*
 ginseng, 76, 256*t*
 glucosaminoglycan, 281*t*
 gymnema, 82–83, 257*t*
 holy basil, 258*t*
 ivy gourd, 97, 260*t*
 magnesium, 102, 261*t*
 milk thistle, 107, 262*t*
 mulberry, 263*t*
 nopal, 118, 263*t*
 pine bark extract, 283*t*
 psyllium, 265*t*
 St. John's wort, 5
 tea, 266*t*
 turmeric, 142
superoxide anion, 160
super-oxide dismutase (SOD), 152, 156, 272*t*
supplement, 4–8, 10–12. *See also under specific type*
surgery, 5, 10, 20, 238, 246*t*
swallowing disorder, 129, 265*t*
sweating, 262*t*
“sweet” taste, 257*t*
sympathetic nervous system (SNS), 135, 267*t*
sympathomimetic, 135, 266*t*
Symptomatic Diabetic Neuropathy (SYDNEY) Study, 161
systolic blood pressure (SBP)
 chia, 46–47
 cinnamon, 57
 coenzyme Q10 (CoQ10), 173, 175
 flaxseed, 70–71
 garlic, 194
 glucosaminoglycan, 205
 gymnema, 83
 hibiscus, 209–210
 magnesium, 103
 nopal, 119
 pine bark extract, 216–217
 tea, 137–138
 zinc, 154, 156
- T**
- tachycardia, 135, 266*t*
tacrolimus, 100, 123, 215, 261*t*
tamoxifen, 107, 262*t*
tannin, 134, 266*t*
tartaric acid, 270*t*
taxifolin, 214, 262*t*, 283*t*
tea (*Camellia sinensis*), 134–140, 266*t*–267*t*
teratogenicity, 62, 219, 254*t*, 256*t*, 284*t*
terpenoid, 198, 280*t*
tetracyclic antidepressant, 226
tetracycline, 101, 153, 272*t*
tetrahydrocannabinol (THC), 238
Thai medicine, 96
theaflavin, 134, 266*t*
thearubigin, 134, 266*t*
theophylline concentration, 63, 254*t*
thermogenesis, 135, 267*t*
thiamine, 275*t*
thiamine deficiency, 166
thiobarbiturate acid reactive substance (TBARS), 141, 268*t*, 272*t*
thioctic acid. *See* α -lipoic acid
three3-hydroxy-3-methyl-glutaryl-CoA reductase (HMG-Co-A-reductase), 49–50, 219, 252*t*
throat obstruction, 204
thrombocytopenia, 50
thromboembolic event, 171
thromboembolism, 176
thromboxane A3, 180, 278*t*
thromboxane synthesis, 193
thyroid dysfunction, 20, 246*t*, 273*t*
thyroid function, 161, 221, 284*t*
thyroid supplement, 284*t*
thyroxine, 87, 161, 258*t*, 273*t*
tinnitus, 198

- “Tips for Older Dietary Supplement Users”, 10
- “Tips for the Savvy Supplement User”, 10
- total symptom score (TSS), 162–163, 167
- toxic hepatitis, 82, 257*t*
- toxicity, 6–7, 226, 284*t*, 286*t*
- tramadol, 191
- transcription factor, 180
- transforming growth factor β (TGF- β), 109
- transforming growth factor β (TGF- β 1), 141, 269*t*
- transient receptor potential of vanilloid type 1 (TRPV1) and 2 (TRPV2) channels, 238
- transketolase activity, 166, 275*t*
- transporter gene activation, 225
- trazodone, 199
- treatment, 3
- Treatment Trialists’ Collaboration, 182
- tremor, 247*t*
- tricyclic antidepressant, 171, 226
- triglyceride
 - aloe, 21–22
 - α -lipoic acid, 162–163
 - berberine, 29, 31
 - chia, 45, 251*t*
 - chromium, 49–50, 52
 - cinnamon, 59, 253*t*
 - coenzyme Q10 (CoQ10), 174–175
 - fenugreek, 63–65
 - fish oil (ω -3 fatty acid), 181, 183–184, 277*t*
 - flaxseed, 69, 71–72
 - garcinia, 190
 - garlic, 195
 - glucomannan, 205
 - gut microbiota, 122
 - honey, 91
 - magnesium, 103
 - milk thistle, 108
 - mulberry, 113
 - nopal, 119
 - production, 181
 - red yeast rice, 221
 - tea, 137–138
 - turmeric, 142–144
 - vinegar, 150
 - zinc, 156
- Trigonella foenum-graecum* Linn. (fenugreek). See fenugreek
- trigonelline, 62
- triterpene, 96, 260*t*
- triterpene saponin, 75, 82
- trivalent chromium, 117, 252*t*
- TSH (thyroid stimulating hormone), 225
- tumor necrosis factor α (TNF α), 106, 141, 160, 180, 262*t*, 268*t*–269*t*, 274*t*, 277*t*
- tumor necrosis factor β (TNF β), 106, 262*t*
- turmeric (*Curcuma longa* Linn), 26, 141–144, 242, 268*t*–269*t*
- (20S)-protopanaxadiol (PPD), 75
- (20S)-protopanaxatriol (PPT), 75
- 25-hydroxyvitamin D (25[OH] D), 229–231, 286*t*
- “2018 Farm Bill”, 237
- type 1 diabetes (T1D)
 - benfotiamine, 166–167
 - bitter melon, 40
 - chromium, 51
 - cinnamon, 56, 58
 - complementary health approaches (CHA), 2
 - fenugreek, 63
 - gymnema, 82–83
 - honey, 92
 - magnesium, 102–103
 - vinegar, 148
 - vitamin D, 230
 - zinc, 154
- type 2 diabetes (T2D)
 - aloe, 20–21
 - banaba, 25
 - benfotiamine, 166–167
 - berberine, 29–31
 - bilberry, 35
 - bitter melon, 40–41
 - cannabidiol (CBD) supplement, 238
 - chia, 46
 - chromium, 51–53
 - cinnamon, 56–58
 - coenzyme Q10 (CoQ10), 174–175
 - fenugreek, 63
 - fish oil (ω -3 fatty acid), 182
 - flaxseed, 69
 - ginkgo, 200
 - ginseng, 76, 78
 - gymnema, 82–84
 - hibiscus, 209–210

holy basil, 88
 honey, 92–93
 ivy gourd, 97
 magnesium, 100–102, 261*t*
 milk thistle, 107–108
 mulberry, 112–113
 nopal, 118
 pine bark extract, 215–216
 probiotics, 123–124
 psyllium, 130–131
 tea, 136–137
 turmeric, 142–143
 vinegar, 148–149
 vitamin D, 230–232
 zinc, 154, 156
 tyrosine, 170
 tyrosine kinase, 24, 49, 252*t*, 261*t*
 tyrosine kinase activity, 100
 tyrosine phosphatase, 24
 tyrosine phosphorylation, 134, 160, 247*t*,
 266*t*, 273*t*

U

ubiquinol, 276*t*
 ubiquinone, 276*t*
 ulcer, 91, 147
 ultraviolet radiation-induced oxidative
 stress, 214
 unsaturated fatty acid, 219, 284*t*
 urinary albumin excretion (UAE), 168, 216
 urinary albumin to creatinine ratio
 (UACR), 109
 urinary incontinence, 112
 urinary tract infection (UTI), 220
 urinary tumor necrosis factor- α (TNF- α),
 109
 urine, 161, 273*t*
 urine calcium:creatinine ratio, 231
 ursolic acid, 87, 258*t*
 U.S. Food & Drug Administration (FDA),
 7–10, 91, 132, 186, 220, 237, 239, 245
 U.S. Pharmacopeia (USP), 10, 239
 US Preventive Services Task Force
 Recommendation Statement, 233
 “USP-verified mark”, 10
 uterine cancer, 107, 262*t*
 uterine contraction, 62, 248*t*, 254*t*

V

Vaccinium myrtillus L. (bilberry). *See*
 bilberry
 varicose vein, 34
 vascular cell adhesion molecule-1 (VCAM-
 1), 180, 277*t*
 vascular endothelial growth factor (VEGF),
 141, 269*t*
 vascular endothelial growth factor receptor
 2 (VEGFR 2), 166
 vascular event, 182, 184
 vascular resistance, 201
 vasculature dysfunction, 201
 vasoconstrictive mediator production, 180,
 278*t*
 vasodilatation, 170
 vasodilation, 180, 214, 276*t*, 283*t*
 vasorelaxation, 34, 208, 249*t*, 282*t*
 veisalgia, 117
 venoarterial response, 144
 venous insufficiency, 34, 214, 249*t*, 283*t*
 verapamil, 40
 Veronese, N, 102–103
 vertigo, 161, 198, 273*t*
 very low density lipoprotein (VLDL)
 cholesterol, 84
 very low density lipoprotein (VLDL)
 secretion, 181, 277*t*
 vibration perception threshold, 167
 vicine, 39, 250*t*
 vinblastine, 40
 vincristine, 40
 vinegar (*Acetic acid*), 147–151, 270*t*–271*t*
 visceral fat, 147, 271*t*
 viscosity, 281*t*
 visual acuity, 34–35, 144, 215
 VITAL (Vitamin D and w-3 Trial) study,
 182–183
 Vital-HF trial, 233
 vitamin, 1–2, 91, 259*t*
 vitamin A, 96, 204, 281*t*
 vitamin B1 (thiamine). *See* benfotiamine
 vitamin B6, 167
 vitamin B12, 167
 vitamin C, 50, 155–156, 160, 252*t*, 273*t*
 vitamin D, 204, 229–235, 281*t*, 286*t*
 Vitamin D and Omega-3 Trial to Prevent
 and Treat DKD (VITAL-DKD), 232

vitamin E, 50, 155, 160, 181, 204, 252*t*,
273*t*, 281*t*
vitamin K, 135, 171, 204, 266*t*, 281*t*
vomit, 250*t*, 261*t*, 263*t*, 272*t*–273*t*, 286*t*
von Willebrand factor, 46

W

warfarin

bilberry, 34
case study, 242–243
coenzyme Q10 (CoQ10), 276*t*
fenugreek, 63
fish oil (ω -3 fatty acid), 277*t*
garlic, 194
ginkgo, 5, 199
ginseng, 76, 256*t*
gymnema, 82, 257*t*
holy basil, 88
honey, 92
St. John's wort, 225, 285*t*
tea, 135, 266*t*
turmeric, 142, 268*t*

weakness, 247*t*, 262*t*, 286*t*

website

ConsumerLab.com, 10
evaluation, 11
“FDA 101: Health Fraud Awareness”, 11
LiverTox, 4
Natural Medicines, 12
“Tips for Older Dietary Supplement
Users”, 10
“Tips for the Savvy Supplement User”,
10
U.S. Food & Drug Administration
(FDA), 10–11

weight loss, 28–29, 93, 156, 164, 238, 257*t*,
263*t*, 286*t*

weight loss supplement

banaba, 24
chromium, 49
garcinia, 4, 189–190
glucomannan, 204
gymnema, 82
hibiscus, 208, 210
ingredient, 7
tea, 138
vinegar, 147

wellness, 3

wheezing, 62

WHO (World Health Organization), 1

whole grain, 36

whortleberry (*Vaccinium arctostaphylos*),
34

withdrawal-like symptom, 225, 285*t*

wound, 91–93

X

Xuezhikang (XZK), 219, 221

Y

yoga, 1

Z

zinc, 50, 87, 152–158, 252*t*, 258*t*, 268*t*, 272*t*

Zinc Influx Transporters (ZIPs), 152