

Index

A

ABA, 47–58, 62
ABI3, 53, 60
Abiosis, 2
Abscisic acid stress ripening (ASR) proteins, 103, 104
Acclimation, 149, 150, 158
Acetyl-CoA carboxylase (ACC), 235, 237
Actin cytoskeleton, 33
 $\Delta 9$ -acyl-CoA desaturase enzyme, 159
Aerial incubation, 206
Aestivation, 2, 204
After-ripening, 48–59
Akinetes, 112
 composition, 7–8
 differentiation, 9–12
 germination, 12–15
 resistance, 20
 structure, 7–8
Ammonia, 194, 198
AMP, 210
AMP-activated protein kinase, 232, 233, 235–238
Amphipathic α -helices, 99, 100
AMPK. *See* AMP-activated protein kinase
Anhydrin, 103, 104
Anhydrobiosis, 91–93, 95, 101
Annual killifish, 206–211, 213–216, 220, 221
Anoxia, 204, 209, 216, 218, 221
Antioxidant defense, 245
Antioxidant enzymes, 157–158
Aplocheilidae, 208
Apolipoprotein, 99
Apterygote arthropod, 149

Aquaporins, 219–220
Arabidopsis thaliana, 45, 93, 94
Arrhenius relationship, 256
Artemia franciscana
 cyst, 166, 168, 169, 173, 176, 179, 181–183
 nauplii, 166, 170, 175–177, 179–182
 oviparously, 166
 ovoviviparously, 166
Artemin, 174
Asexual reproduction, 111–118
ATP, 205, 210, 216, 256, 257, 261, 263, 266, 267
Austrofundulus, 208

B

Bdelloid rotifers, 91–93
 Adineta ricciae, 102
Belgica antarctica, 149
Bioactive gasses
 carbon monoxide (CO), 270
 hydrogen sulfide (H₂S), 270
 nitric oxide (NO), 270
Blastoderm, 206, 220
BRAC1 associated protein-1, 170
Bud dormancy, 69–85

C

Ca²⁺-calmodulin pathway, 196
Caenorhabditis elegans, 166
Calanus finmarchicus, 168
Calcium ionophore A23187, 197
California grunion, 205
Carotenoids, 195
Cell cycle, 31–33, 35–38

- Cellular membranes, 99, 101
 Cell wall, 30, 32, 33, 38
 Chaperone proteins, 61
 Chaperones, 192, 193
 Chitin binding proteins, 170, 173
 Circadian clock, 75–79
 Citrate synthase (CS), 95, 98, 102, 103
 Class A helix motif, 99
 Cold, 48, 50, 60
 acclimation, 78–79
 phospholipids, 158–159
 strategies to survive, 148
 tolerance, 149–153
 Cold preservation, 254, 262, 267, 269, 270, 273
 Conjugation, 35, 37–38
 Cooling (cold preservation, preservation)
 heart, 260, 262, 266, 269, 270, 272
 kidney, 254, 257, 259, 260, 262, 265, 271
 liver, 257, 259–267, 271, 272
 lung, 260, 269
 Q₁₀ effect, 256
 small bowel, 265
 Creatine kinase, 233
 Cryopreservation, 3
 Cryoprotective dehydration
 antioxidant enzymes, 157–158
 apterygote arthropod, 149
 cold tolerance, 149–153
 glycerol, 148
 phospholipids, 158–159
 reactive oxygen species, 157–158
 sub-zero temperatures, 147–148
 terrestrial arthropods, 148–149
 trehalose, 153–157
 Cryptobiosis, 2, 3, 135–137, 140
 Cryptochromes, 75, 194, 198
Cryptopygus antarcticus, 149, 160
Culex pipiens, 168, 173
 Cyanobacteria
 Aphanizomenon ovalisporum, 6, 18
 Chroococcales, 6
 Nostoc, 7–9, 13–17
 Nostocales, 6, 7, 10, 15, 16, 21, 22
 Oscillatoriales, 6
 Cyanophycin, 7, 8, 13, 20
 Cyclic AMP-dependent protein kinase, 234
 Cyprinodontiformes, 207
 Cyst, 121, 123, 125
 Cytochrome P450, 170, 173
- D**
 DAF-12, 176
 DAF-16/FOXO, 176
- Daphnia, 189–195, 197–199
 DAPI staining, 8
 Dauer stage, 117, 125
 Dehydration, 204, 206, 215–220
 Dehydrins, 93, 95, 98–100
 Delayed hatching, 204–207
Dendrobaena octaedra, 149
 2-deoxyglucose, 231
 Desiccation, 148, 149, 151, 153, 156,
 158, 159
 Desiccation tolerance, 91–95
 Diapause, 2
 delayed embryo implantation, 166
 initiation, 166–170, 173, 174, 183
 maintenance, 178–183
 Diapause I, 209–210
 Diapause II, 210, 211
 Diapause III, 210–211
 Diapause termination, 189–199
 Differential scanning calorimetry (DSC),
 141, 150
 Dimeric dihydrodiol dehydrogenase,
 170, 173
 Dispersal, 191
 Dispersed cell phase, 209
 DNA array screening, 242
 DNA methylation, 239
 DNA repair, 137
 Dormancy, 2–4, 43–62, 190–194, 198, 199
 Dormancy cycling, 47, 48, 62
 Dormancy termination, 190
 Dormant forms, 3
- E**
 Ecdysteroid receptor, 174
 Ecological, 190–192, 198, 199
 Ecology, 189–191
 Ecotoxicology, 189, 192
 Egg banks, 191
 Egg envelope, 206, 216–219
 Embryo, 44–46, 49, 51, 53, 54, 56–58
 Embryonic diapauses, 204, 207–213
 Endoplasmic reticulum, 243
 Endosperm weakening, 46, 57–59
 Endospore, 7, 19–21
 Entropy transfer, 98
 Enveloping layer, 220
 Ephemeral ponds, 209
 Epiboly, 208
 ETS, 177
 Evolutionary, 190–192
 Evolutionary biology, 189
 Expressed sequence tag (EST), 153, 155

F

Fatty acid binding proteins (FABPs), 241, 244, 245
 Fatty acids, 158–159
 Ferritin, 124, 125, 174
 Fish, 203–221
 Flowering, 74, 77
Fundulus, 205

G

Gamma aminobutyric acid, 216
 Gene expression
 aet, 17–19
 avaK, 17, 18
 devR, 16, 19
 hetF, 18, 19
 hetR, 16–19
 nbla, 18
 Germination, 29–39, 44–50, 52–59, 62
 Germling, 13–15
 Ghrelin, 232, 238
 Glass formation, 59
 Glass transition temperature, 101
 Glassy state, 101–102
 Gluconeogenesis, 35, 36
 Glucose-6-phosphate isomerase, 170, 173
 Glucose-regulated proteins, 243
 Glutathione S-transferase (GST), 123–125, 156, 158
 Glycerol, 148, 192, 193, 197
 Glycogen, 192
 Glycolysis, 231, 233
 GPCR, 195–197
 G-protein, 195, 197, 198
 Ground squirrels, 228, 230, 232–234, 237–245

H

Haem, 194, 198
 Har-DHMBP-3, 177
 Hatching of resting eggs, 120–121, 124
 Heat shock proteins (Hsps), 3, 48, 60, 61, 96
 Heterocyst differentiation, 16, 18, 19
 Hexokinase, 233, 234
 Hibernation, 2, 3, 227–245, 261, 262
 Hibernators, 228–230, 243–245
 HIF-1, 243
 Histone deacetylase, 239, 242
 Histones, 239, 242
 H₂O₂, 94, 95
 Homeoviscous adaptation (HVA), 159
 Hormone balance, 49–50, 53
 Hormones, 117, 118, 122

Hydrophilins, 93, 95, 103, 104
 Hypothermia, 230, 231, 236, 246, 254, 256–260, 264, 267, 270–273
 Hypothermic perfusion, machine perfusion (HMP)
 cardiac, 262, 266, 268
 donation after cardiac death, 269
 kidney, 254, 257, 259, 260, 262, 265, 271
 liver, 257, 259–267, 271, 272
 Hypoxia, 204, 205, 209, 255–258, 260, 261

I

Insect cryobiology, 148
 Intracellular pH (pHi), 192, 198
 Iodothyronamine, 231, 232
 Ions (ionic, anions, cations), 256–258, 262
 Ischaemia/reperfusion(I/R), 255, 259

K

Killifish, 205, 206, 217, 220, 221

L

Lactate, 205, 210, 216
 Lactate dehydrogenase, 95
 Late embryogenesis abundant (LEA) proteins, 3, 60, 61, 91–104, 123–125
 LEA. *See* Late embryogenesis abundant proteins
 LEA protein, 139
 Leptin, 232, 238
Leuresthes tenuis, 205
 Light, 48, 50, 54, 62
 Longevity, 136–137
 Longevity, 59–61

M

Male-specific genes, 122, 124
 Mammalian target of rapamycin complex 1 (mTORC1), 236
 Manganese superoxide dismutase, 123–124
 Marker gene, 17, 18
Megaphorura arctica, cold tolerance
 freezeable water content, 150–151
 genomics, 151, 153
 native and desiccated state, 150
 supercooling point (SCP), 149–150
 Meiosis, 30, 38, 111–118, 121, 124
 Metabolic depression, 227–232
 Metabolic rate, 192, 227–230, 232, 236, 238, 246
 Metabolic switch, 173
 Metabolism, 192, 205, 210, 216, 221
 microRNA, 241–242

- Migration, 208
 Mitochondria, 100, 103, 255, 257, 258, 263, 266, 267, 269, 271
 Molecular chaperones, 96, 98
 Molecular shield, 98
 Moonlighting, 103
 mRNA, 31, 32, 34, 193
 Mutants, 51–57, 60
 Myxobacteria, 20, 21
- N**
 Na⁺K⁺-ATPase, 255, 256
 Natively unfolded proteins, 94
 Neutralized-like protein, 170, 173
 NF-E2-related factor-2 (Nrf2), 243, 244
 Nitrate, 48, 62
 Non-reducing disaccharides, 92
Nothobranchius, 208, 209, 213
 N33 protein, 170
- O**
 Opsins, 195, 198
 Organ preservation, 253–272
 Osmolytes, 148
 Oxygen (oxygenation), 265, 266
 Oxygen free radicals, 255
- P**
 p8
 apoptosis, 177
 basic helix-loop-helix transcription co-factor, 174
 PEST motif, 175
 Pathway, 38, 39
 Perennials, 69–85
 Perivitelline fluid, 215, 217, 218
 Peroxisome proliferator-activated receptor gamma isoform (PPAR), 243–245
 Pheromone, 37
 Phospholipids, 158–159
 Photoperiod, 70–72, 74–78, 81, 82, 84, 205, 211
 Photosynthetic activity, 14, 19
 Photosystem, 7
 Phytochromes, 194
 Plant hormones, 48, 62
 p38 MAPK, 235
 Polyalanine (polyA) protein, 96, 103
 Polyglutamine (polyQ), 96
 Polyphosphate body, 8
 Polysomes, 241
 POU, 177
 Preservation solutions
 Belzer's KPS (Belzer's kidney preservation solution), 268
 Bretschneider's HTK, 267
 Celsior, 264, 269
 Collins solution (EuroCollins), 264
 Colloids, 266
 Custodiol, 272
 intracellular solutions, 262
 Marshall's solution (Marshall's Hypertonic Citrate Solution), 264
 UW solution (University of Wisconsin Solution), 264
 Progression, 33, 35, 38
 Prostaglandins, 194, 195, 197, 198
 Protein kinases, 232, 233, 235
 Protein stabilization, 95
 Proteome, 46, 51, 52
- Q**
 QM protein/ribosomal protein L10, 170
 Quantitative PCR, 175, 176
 Quantitative trait loci (QTL), 55–56, 60
 Quiescence, 2, 166, 168
- R**
 Ras signaling, 38
 Reactive oxygen species (ROS), 3, 157–158, 195, 196
 Replacement, 92
 Resting egg, 109–126
 Resurrection ecology, 190, 191
 Resurrection plants, 91, 93
 Retinoic acid, 194
 Reversible phosphorylation, 232–233, 241
 Ribosome, 32, 34, 36
 Rivulidae, 208
 RNA, 32, 34
 RNA chaperone, 103
 RNA polymerase II, 239, 240
 ROS. *See* Reactive oxygen species
- S**
Saccharomyces cerevisiae, 29–39
 Salinity, 207, 213, 215
Sarcophaga crassipalpis, 173
 SCP. *See* Supercooling point
 Seeds, 43–62, 110, 121, 123, 125
 Seed coat, 45, 51, 56–57, 60, 61
 Sexual reproduction, 111–118, 121
 Sleeping Beauty model, 136, 137
 Small heat shock proteins, 124
 apoptosis, 167, 169, 177, 181
 ArHsp21, 180–182

- ArHsp22, 169, 178–182
- α -crystallin domains, 178
- I/VXI/V motif, 178
- molecular chaperone, 174, 179
- p26, 178–181
- proteolytic degradation, 181
- WXDPF motifs, 178
- SOD. *See* Superoxide dismutase
- Spore, 6, 7, 12, 20, 21, 110, 123, 125
- Spore walls, 30–31, 33
- Sporulation, 30–31, 34, 39
- Steroid dehydrogenase, 170, 173
- Streptomyces, 20, 21
- Stress, 49, 50, 59–62
- Stress protein, 138, 139
- Stress tolerance, 60–61
- Subtractive hybridization
 - differential gene expression, 173, 177
 - semi-quantitative PCR, 169
- Sub-zero temperatures, 147, 148
- SUMOylation, 239–240
- Supercooling point (SCP), 149–150, 152
- Superoxide dismutase (SOD), 157–158
- T**
- Takeout, 170
- Tardigrades, 91, 92, 133–142, 166
- Temperatures, 78–80, 204, 205, 211, 214–215
- Terrestrial arthropods, 147–149
- Thermogenesis, 238, 243, 245, 246
- Torpor, 227–235, 237–239, 241–246
- Transcription, 229, 231, 232, 235, 236, 238–245
- Transcription factors, 233, 235, 236, 239, 240, 242–245
- Transcriptome, 46, 48, 49, 51, 52, 56, 57, 61
- Translation, 229–232, 235, 236, 240–243
- Trehalase, 34
- Trehalose, 34–35, 139–141, 192, 193
 - biochemical pathway, 154–155
 - functions, 153
 - gene duplication, 155–157
 - synthesis, 153–154
- U**
- Unfolded protein response, 243
- V**
- Vegetative cells, 6–8, 14–22
- Vertebrates, 174
- Vitrification, 92, 139–142
- W**
- Water deprivation, 217
- Water exchange, 215
- White adipose tissue, 237
- Y**
- Yeast, 91, 92