

Index

A

A β , *see* Amyloid β -protein (A β)
ABri peptide, 24, 31, 52, 53
AD, *see* Alzheimer's disease (AD)
ADan peptide, 24, 53
Adaptor protein-4, *see* AP-4
Aggregation, 1, 5–7, 25, 34–37, 46, 53, 77,
80, 81, 83–85, 87–90, 97, 99, 100, 111,
112, 116, 117, 120, 133, 134, 136, 137,
139–142, 144–146, 148, 151, 159, 162,
163, 165, 167, 175–194, 207–216, 235,
236, 252, 253
Aggresome
formation, 78, 84–86, 212, 236,
239–241, 244
clearance, 84–86
Alexander's disease, 24, 53
Alpers disease, 24, 54
Alpha-synuclein, *see* α -Synuclein
Alzheimer's disease (AD), 1, 7, 8, 13, 22, 24,
27, 32–35, 38, 40, 42, 52, 53, 79, 97,
111, 116–119, 121, 125, 133, 134, 140,
144, 148, 160, 176, 179, 207, 213–216,
225, 236, 242–244, 254, 258–260, 262,
265–268
familial, 117, 259
sporadic, 32, 33, 42
ALS, *see* Amyotrophic lateral sclerosis (ALS)
AMPA receptor, 101
Amyloid, 6–13, 27, 32–36, 44–46, 48, 52, 53,
134–136, 139–142, 144, 147, 150, 151,
159–164, 176, 177, 194, 208–210, 213,
214, 253, 254, 257, 259, 261, 263, 265,
267
the structure of, 11, 12
Amyloid β -protein (A β), 27, 32, 33, 254
Amyloid β -protein precursor (APP), 7, 8, 32,
33, 38, 119, 208, 254
Amyloidosis, 7, 22, 34, 134, 258, 265

Amyotrophic lateral sclerosis (ALS), 39, 39,
41, 80, 83, 98–100, 105, 111, 116, 117,
122, 123, 214, 256, 258, 266, 267
Androgen receptor, 23, 31, 46, 47, 49
Antioxidant, 175, 176, 182–188, 192–194
Anti-prion compounds, 136, 149, 150
Anti-Wallerian degeneration, 97, 103, 106
AP-4, 100, 101
Argyrophilic grain disease, 27, 39, 258,
261, 266
Ataxin-1, 23, 31, 46
Ataxin-2, 23, 31, 49, 50
Ataxin-3, 23, 31, 46, 50
Ataxin-7, 31, 51
Atrophen-1, 22, 31, 46–49
Autophagy, 77, 85–89, 97, 100, 105, 106, 112,
114, 115, 183, 189, 244, 252
chaperone-mediated, 178–183
Axonal protection, 97–106
Axonal regeneration, 97, 101–103, 106

B

Baicalein, 185–187
Bovine spongiform encephalopathy, 8, 22,
36, 134

C

CAG repeat, 8, 46, 48, 50
diseases, 8
Cdk5, *see* Cyclin-dependent kinase-5
Cellular prion protein, 120, 133, 140, 141, 146
See also Prion protein (Prp), native (Prpc)
Central nervous system (CNS), 36, 41, 45, 53,
99, 105, 123, 139, 167, 210, 238, 239,
251, 252, 256, 257, 259
Centripetal degeneration, 99
Cerebral amyloid angiopathy, 34, 53, 267
Chaperones, 2, 25

Chaperone-mediated autophagy (CMA), *see* Autophagy, chaperone-mediated

Charged multivesicular body protein 2B, 258

Cockayne syndrome, 24, 54

Collins bodies, 257, 261

Complexin, 161, 168, 212, 234, 242

Corticobasal body, 263

Corticobasal degeneration, 22, 39, 121, 213, 244, 258, 261, 266

Creutzfeldt-Jakob disease, 8, 36, 39, 120, 134, 256, 258, 260, 261, 265

Cross- β structure, 10, 13, 33, 164, 177

Crowding, 5, 6, 44

α B-crystallin, 53, 183, 189–191, 194

Curcumin, 186, 187

Cyclin-dependent kinase-5, 225

D

D² concept, 56

Dementia with Lewy bodies, 22, 27, 38, 40, 45, 179, 207, 261, 268

Dentatorubral-pallidoluysian atrophy (DRPLA), 22, 31, 46–48, 122, 257, 258

Diffuse Lewy body disease (DLBD), 22, 38, 97, 99, 242, 244

Disorder predictors, *see* Predictors of intrinsic disorder

Disorder-to-order transition, 165

DisoPred, 4, 26, 229

DJ-1, 183, 189, 192–194

DNA excision repair protein ERCC-6, 24, 31, 54, 55

Dopamine, 40, 98, 160, 164, 175, 176, 180–183, 211, 214, 216, 255

Dopaminergic neurons, 24, 40, 98, 99, 01, 103, 118–120, 175, 176, 184, 185, 189, 193

Down's syndrome, 27, 33, 38, 42, 213, 267

Dystrophic neurite, 35, 39, 43, 119, 263

E

Electron spin resonance (ESR), 164

Endoplasmic reticulum (ER), 50, 111–125, 135, 136, 239

associated degradation (ERAD), 112–114, 116

stress, 111–125

stress in neurodegenerative disorders, 116, 125

stress induced cell death, 116, 124, 125

ERAD, *see* Endoplasmic reticulum (ER), associated degradation (ERAD)

Extracellular signal-regulated protein kinase 2 (ERK2), 235

F

Familial British dementia (FBD), 24, 38, 52, 53, 257, 261, 265, 267

Familial Danish dementia (FDD), 24, 53, 257, 261, 265

Fatal familial insomnia, 22, 36, 39, 120, 258

Ferritin, 257, 265, 267

Fibril, 11–13, 25, 52, 53, 134, 140, 142, 150, 151, 159, 160, 162–164, 180, 188–190, 213, 244

FK506-binding proteins, 215

Flavonoids, 185

Fragile X tremor-ataxia syndrome, 258

Friedreich ataxia, 258

Frontotemporal dementia, 35, 38, 39, 80, 83, 97, 111, 116, 121, 213, 252

Frontotemporal lobar degeneration (FTLD), 214, 252, 258, 261, 262, 266, 268

with Pick bodies, *see* Pick's disease

G

Geldanamycin, 183, 189

Gerstmann-Sträussler-Scheinker disease, 22, 36, 37, 120, 134, 142, 144, 145, 258, 265, 267

Glial cytoplasmic inclusion (GCI), 39, 42, 43, 207, 210, 212, 214, 243, 266

Glial fibrillary acidic protein (GFAP), 24, 31, 53, 54

GlobPlot, 26, 49

Glutathione, 183, 185, 192, 193

Glyceraldehyde-3-phosphate dehydrogenase (GAPDH), 212, 234–236

H

HD, *see* Huntington's disease (HD)

Heat shock proteins, 53, 112, 124, 189–191, 193

α -Helix, 4, 8, 34, 37, 44, 50, 133, 138, 140–143, 145–151, 168, 227, 228, 230, 232, 235, 245

Hemorrhage with amyloidosis-Dutch type (HCHWA-D), 34

Hippocampus, 32, 33, 35, 42, 45, 98, 117, 118, 121, 212, 243

CA1 region of, 105

Histone, 51, 208, 215, 216

Hsp27, 53, 189–191

Hsp70, 112, 115, 120, 183, 189–191, 193, 194

Hsp90, 183, 190, 191

Huntingtin, 1, 7, 8, 31, 46–48, 85, 97, 98, 105, 225, 242, 257, 259

Huntingtin yeast-two hybrid protein K (HYPK), 48

Huntington's disease (HD), 1, 7, 22, 24, 46–48, 84, 85, 97, 98, 105, 111, 116, 122, 134, 225, 236, 242, 243, 257, 258
 6-Hydroxydopamine (6-OHDA), 101, 105, 119, 120

I

Immunohistochemistry, 35, 118, 124, 189, 236, 242, 243, 253, 257, 262, 265

Inclusion

biogenesis, 82, 87
 clearance, 77, 78, 82, 85, 86
 cytoplasmic, 39, 42, 43, 84, 207, 208, 210, 212–214, 236, 239, 243, 261, 263, 266
 neuronal intermediate filament, 258
 nuclear, 210, 263, 266
 Papp-Lantos, 43, 261, 263, 266

Inclusion bodies, 38, 53, 77, 80, 82–85, 87, 100, 214, 239, 253, 256, 257, 261, 262

α -Internexin, 256, 259, 262, 265, 267

Intrinsically disordered protein (IDP), 1–7, 10, 22, 25–29, 32, 43–45, 48, 49, 56
 amino acid composition, 5

Intrinsically disordered region (IDR), 25–27, 51, 56

Intrinsically unstructured protein (IUP), 1, 5, 25, 227, 245

IDP, *see* Intrinsically disordered protein (IDP)

IDR, *see* Intrinsically disordered region (IDR)

IUP, *see* Intrinsically unstructured protein (IUP)

IUPred, 5, 26, 228, 229

K

K63 ubiquitination, 83, 84, 86–88

Kennedy's disease, 23, 46, 47

Kuru, 8, 22, 36, 39, 120, 258–260

L

Leucine-rich repeat Ig-containing protein, *see* LINGO-1

Leucine-rich repeat kinase 2 (LRRK2), 215

Leukoencephalopathy with vanishing white matter, 123

Lewy body (LB), 22, 27, 28, 38–45, 80, 82, 83, 97, 99, 119, 120, 160, 161, 175, 176, 179, 182, 190–192, 207–210, 212–216, 235, 236, 239, 240, 242–244, 253, 255, 257, 261, 263, 266, 268

Lewy neurites (LNs), 28–42, 45, 209, 210, 215, 243, 263, 266

LINGO-1, 101–103

Lysosome, 85, 88, 115, 135, 236

M

Metal binding properties, 142

Methionine sulfoxide reductase A (MsrA), 175, 183

N-methyl-4-phenyl-1,2,3,6-tetrahydropyridine, *see* MPTP

Microtubule

stabilizing drugs, 106

Microtubule-associated protein (MAP), 8, 115, 216, 245

Microtubule-associated protein tau, *see* Tau

Misfolding, 1, 6, 8, 10, 11, 24, 25, 77, 79, 97–106, 112, 123, 133–135, 140, 143, 146, 148, 150, 151, 189

Misfolding diseases, 1, 8, 11, 24

Mitochondrial DNA polymerase γ , 24, 31, 54

Molten globule, 2, 23, 25, 49, 136

Motor neuron disease, 27, 239, 258, 266

MPTP, 98, 101, 179, 215

MSA, *see* Multiple system atrophy (MSA)

MsrA, *see* Methionine sulfoxide reductase A (MsrA)

Multiple sclerosis, 117, 123, 239

Multiple system atrophy (MSA), 22, 27, 28, 39, 42, 43, 179, 191, 207–210, 212–216, 242–244, 255, 257, 258, 261, 266

Myelin basic protein, 212, 234, 235, 238, 241

Myotonic dystrophy, 27, 258, 267

N

Natively unfolded protein, 46, 53, 175, 176, 210, 255

Neurodegenerative diseases, 1, 7, 13, 21, 22, 27–29, 32, 34, 36, 50, 56, 77–80, 82, 85, 97–100, 103–106, 111, 116, 117, 122, 124, 125, 136, 186, 188, 208, 213, 251–253, 257, 258, 262, 264, 265, 268
 classification of, 251–253, 262, 264

Neurodegenerative disorders, 7, 21, 24, 25, 28, 35, 37, 38, 40–43, 46, 47, 49, 53, 79, 81, 85, 99, 111, 113, 116, 117, 120, 121, 123–125, 134, 165, 175, 207, 209, 213, 214, 216, 236, 244, 245, 252, 253, 256–259

Neurodegeneration, 7, 21, 31, 32, 37, 43, 46, 52, 56, 80, 81, 85, 97, 98, 100, 101, 105, 106, 111, 112, 115, 120, 121, 124, 125, 135, 136, 139, 140, 181, 189, 193, 194, 207, 208, 244, 251, 263, 268

Neurodegeneration with brain iron

accumulation type 1 (NBIA1), 22, 39, 43, 207, 267

- Neurofibrillary tangle (NFT), 27, 33–35, 52, 53, 79, 117–119, 121, 213, 214, 216, 244, 257, 258, 260, 262, 263, 265, 266
- Neurofilament, 122, 256, 265, 267
- Neuron, 21, 24, 27, 31, 33, 35, 37–40, 42, 43, 46, 47, 49, 55, 79, 81, 85, 99–101, 103, 104, 115–122, 124, 125, 140, 148, 160, 161, 175, 176, 184, 185, 187, 189, 192–194, 207–209, 212–216, 226, 242, 244, 251–253, 255–257, 262
- Neuroserpin, 257–259, 261, 265, 267
- Neurotoxic lesions, 103
- Non-amyloid- β component (NAC), 13, 27, 45, 46, 160, 162, 176, 178
- O**
- Oligodendrocyte, 43, 102, 121, 123, 124, 209, 211–213, 216, 234, 235, 238–244, 263
- Oxidative stress, 122, 123, 175, 176, 179–181, 183, 184
- P**
- p25 α , *see* Tubulin polymerization promoting protein/p25
- p62, 84, 86–88, 100, 257
- Paclitaxel, 106, 233
- Paired helical filament (PHF), 33, 35, 262
- Pale body, 263
- Paramagnetic relaxation enhancement, 162, 163
- Parkin, 80, 82, 83, 87, 89, 90, 114, 119, 214
- Parkinson's disease (PD), 1, 7, 8, 22, 24, 27, 38–43, 45, 46, 80–85, 89, 97–99, 101, 103, 105, 111, 116–120, 124, 159–168, 175, 176, 179, 180, 184–187, 191, 192, 194, 207–210, 212, 214–216, 225, 235, 236, 242–244, 255, 258, 261, 266, 267
- familial, 160
- Drosophila* model, 208
- PD, *see* Parkinson's disease (PD)
- Perinuclear granules, 263
- Phospholipase D, 161, 165
- Physiological prions, 1, 8
- Pick body, 258, 260, 262, 263, 266
- Pick's disease, 22, 39, 121, 244, 262
- Polyglutamine diseases, *see* Polyglutamine repeat diseases
- Polyglutamine repeat diseases, 50, 105, 117, 122
- PolyQ diseases, *see* Polyglutamine repeat diseases
- Polyubiquitination, 83
- K63-linked, 82, 84, 86–89
- PONDR®, 4, 24, 26, 32, 49, 227, 229, 232
- Predictors of intrinsic disorder, 26
- Pre-molten globule, 25, 34, 36
- Pretangle, 118, 243, 244, 262, 263, 266
- Prion diseases, 1, 7, 8, 22, 24, 28, 36, 37, 39, 111, 116, 117, 120, 121, 133–137, 139, 140, 145, 148, 150, 151, 253, 255, 258, 259, 261, 265
- Prion protein (Prp), 1, 2, 12, 13, 22, 31, 36, 37, 120, 133–151, 255
- metal ion binding, 143
- native (Prpc), 37, 133, 135–146, 148–151, 155
- scrapie (Prpsc), 28, 117, 120, 121, 133, 135–141, 144, 150, 255, 259, 261
- structure, 138
- Progressive supranuclear palsy, 22, 38, 121, 213, 244, 258, 260, 262, 266
- Proteasome, 3, 77–83, 85–88, 90, 98, 112–116, 135, 136, 178, 183, 214, 233, 236, 239, 240, 257
- Protein aggregation, 6, 25, 37, 77, 80, 84, 89, 90, 97, 99, 117, 133, 134, 146, 151, 216, 236
- Protein Data Bank (PDB), 2, 28, 29, 32
- Protein deposits, 80, 119, 253, 257, 261, 267
- extracellular, 8, 259, 260, 262, 265
- intracellular, 253, 259, 260, 262, 265
- morphological types of, 259
- Protein misfolding, 1, 8, 24, 77, 79, 97–106, 123, 134, 135, 148, 150, 151, 189
- Protein quality control, 77, 90, 111, 112, 114–116, 118, 119, 122, 124, 125
- Proteinopathies, 21, 24, 214, 257, 258, 261–263
- Proteolysis, limited, 13, 22, 23, 48, 50, 231
- Proteolytic stress, 77, 82, 85, 88, 240
- Protofibril, 164, 175, 177–183, 186, 188, 189, 193, 194, 210
- R**
- Rapamycin, 105
- Reactive oxygen species (ROS), 116, 122, 176, 182–185, 187, 188, 192, 194, 252
- Residual dipolar coupling, 4, 163
- Residual secondary structure, 159, 161, 162
- S**
- Scrapie, 8, 22, 36, 120, 133, 134, 137, 138, 146, 151, 255
- Scrapie prion isoform, *see* Prion protein (Prp), scrapie (Prpsc)
- β -Sheet, 6, 12, 13, 34, 37, 50, 52, 56, 138, 140–142, 145, 147, 150, 162, 175, 177, 178, 183, 186, 188, 213, 227, 228

- Small nuclear ribonucleoprotein particles (snRNPs), 55, 56
- Solid state NMR, 12, 13, 164
- Spinobulbar muscular atrophy, 122, 258
- Spinal muscular atrophy (SMA), 24, 55, 56
- Spinocerebellar ataxia (SCA), 23, 46, 50, 51, 81, 122, 257, 258
- SPT3-TAF9-ADA-GCN5 acetyltransferase (STAGA), 51
- Stabilization centers, 228, 229, 232
- β -Strand, 4, 8, 12, 13, 133, 134, 138, 163, 164, 232
- Substantia nigra, 24, 40–43, 103, 118–120, 160, 161, 175, 176, 181, 184, 194, 209, 242, 261
- Superoxide dismutase, 83, 98, 122, 267
- Survival of motor neurons protein, 55
- Synaptic vesicle, 160, 161, 164, 165, 167, 168, 176, 210, 214, 216, 242, 243
- Synphilin-1, 83, 214
- Synucleins, 45, 46, 159–161, 163
- α -Synuclein, 1, 2, 5–8, 10, 11, 13, 22, 27, 28, 31, 37–46, 83, 85–87, 89, 99, 105, 117–120, 175–194, 207–216, 225, 234–236, 242–244, 254, 255, 257, 259, 261–263, 265–267
- aggregation, 216, 236
- amyloid fibril form, 159
- binding to lipid membranes, 159
- inclusions, 39, 43, 191, 257
- induced cell death, 120, 185, 194
- fibrillization, 175, 177, 178, 180, 181, 183, 185, 186, 189, 190, 192–194
- post-translational modifications, 179
- β -Synuclein, 22, 31, 45, 46, 159, 160, 254
- γ -Synuclein, 22, 31, 45, 46, 159, 160, 254
- Synucleinopathy disorders, *see* Synucleinopathies
- Synucleinopathies, 22, 37, 39, 43, 45, 176, 179, 186, 190–192, 194, 207–216, 225, 235, 243, 244, 258, 263
- α -Synucleinopathy, *see* Synucleinopathies
- T**
- TAR-DNA-binding protein-43, 214, 256, 258, 259, 261–263, 265–267
- TARP, 101
- TATA-box-binding protein (TBP), 31, 47, 51, 52
- Tau
- hyperphosphorylated, 35, 121, 213, 243, 254, 260, 261, 265, 266
- Tauopathies, 22, 34, 35, 39, 97, 106, 117, 121, 213, 244, 258, 262, 263, 265, 266
- TDP-43, *see* TAR-DNA-binding protein-43
- TFE, *see* Trifluoroethanol (TFE)
- Thioflavin T fluorescence, 11, 177, 192
- TorsinA, 182, 189, 191, 192, 216
- Transmembrane AMPA receptor regulatory protein, *see* TARP
- TPPP/p25, *see* Tubulin polymerization promoting protein/p25
- Transmissible spongiform encephalopathy (TSE), 5, 36, 39, 120, 134–138
- therapy, 136, 137
- Trifluoroethanol (TFE), 141, 146, 148, 151, 227, 232, 235
- Trinucleotide repeat, 28, 256, 258, 265
- Tuberin (Tsc2), 105
- Tuberous sclerosis, 105
- Tubulin polymerization promoting protein/p25, 208, 211–213, 225–250, 257, 266
- in brain, 241
- interacting partners of, 212
- occurrence of, 236, 241, 243
- U**
- Ubc13, 78, 84, 86, 89
- Ubiquitin
- activating (E1) enzymes, 78, 79
- conjugating (E2), 78, 79, 114
- ligating (E3) enzymes, 78, 79
- immunoreactive inclusions, 262, 266
- modifications, 77, 81–84, 90
- carboxyterminal hydrolase L1, 105
- Ubiquitin-binding protein 62/sequestosome-1, 86, 257
- Ubiquitin-proteasome pathway (UPP), *see* Ubiquitin-proteasome system (UPS)
- Ubiquitin-proteasome system (UPS), 77, 79–81, 86, 112–114, 120, 122, 178, 179, 181–183, 189, 240, 257
- Ubiquitination
- non-proteolytic, 82
- Unfolded protein response, 111, 112, 115
- UPS, *see* Ubiquitin-proteasome system (UPS)
- V**
- Vanishing white matter disorders, 117, 123
- W**
- Wallerian degeneration, 97, 103, 104, 106, 122
- slow (Wlds), 104, 105
- X**
- X-linked inhibitor of apoptosis protein (XIAP), 98, 99