

Index

A

Accumulation of vanadium, 36, 37, 51, 56, 57, 60, 65, 66, 73–89
Accumulator of vanadium, 45
Adenylate kinase, 165
Akt, 187, 188, 190, 191, 195–202
Algae, 74, 75, 97–100, 106, 128
Alkane carboxylation, 42
Alkane functionalization, 42
Aluminium halide, 127, 139
Amanita fungi, 35–45
Amavadin, 35–45
Amino acids, 38, 40, 41, 43–45, 58, 60, 61, 64, 88, 109, 112, 116, 117, 166, 219
Aneuploidy, 217–219
Anti-bromination, 135
Antipredatory strategy, 73, 88
Antiproliferative, 178
Antitumorigenic potential, 163
Apoptosis, 150, 152, 167, 168, 172, 174, 178, 188, 190, 191, 199, 220, 221
Aquatic systems, 74
Ascidia ahodori, 53
Ascidia gemmata, 52, 53, 55, 57
Ascidian, 35, 51–66, 84, 87, 88
AsNramp, 64, 65
Asymmetric catalysis, 42
Atomic absorption spectrometry, 52

B

Bad transcription factors, 190, 191
Berry pseudorotation, 9
Bim, 190, 191
Biological role, 6, 43–45, 74, 87
2,2-Bipyridine, 53
Bivalves, 74, 75, 80

Bone, 145–157, 164, 174–176, 217
Bone cells, 150–154, 157
Bone diseases, 157
Branchial crowns, 82–89
Bromination, 102, 105, 106, 127–139
Bromohydrin, 130
Bromonium, 105, 106, 127–129, 135, 139
Brønsted acid, 129–133, 139

C

cAMP. *See* Cyclic adenosine monophosphate (cAMP)
Cancer bioassay, 210, 214
Capped octahedron, 13, 16
Capped trigonal prism, 13, 16, 18
Carboxylation of alkanes, 42
Carboxylations, 42
Carcinogen interception, 177
Cardiovascular diseases (CVD), 192, 193, 198, 201
Caspase 3, 190
Catalase, 44, 45, 172, 220
Catalysis, 42, 112, 114, 115, 118
Catalyst, 26, 42, 44, 51, 102, 128, 131–133, 136, 139, 210
Catalytic bromination, 127–139
Catalyzed oxidation, 14, 41
Caveolae, 199–201
Cell signalling, 220, 221
Cellular immunity, 176
Cephalopods, 74–76, 80
Cetaceans, 74, 75, 78, 79, 81
Chemical defences, 87, 88
Chemoprevention, 172, 178
Chemopreventive role, 171, 172
Chirality, 40

Choline esterase, 165
 Chromosomal aberrations, 156, 170, 172, 217
 Clastogenic, 217
 Colon cancer, 171, 172
 Common symptoms, 212
 Coordination numbers, 3, 5–18, 39, 40, 113
 Coordination polyhedra, 4
 Crustaceans, 74–76, 80
 CVD. *See* Cardiovascular diseases (CVD)
 Cyclic adenosine monophosphate (cAMP), 166
 Cyclic voltammetry, 40, 41
 Cytosolic tyrosine protein kinase, 153, 154
 Cytotoxic actions, 152
 Cytotoxicity, 155–157, 174
 Cytotoxic effects, 152–153

D

Dibromide, 130, 131, 134–136, 138
 Dioxovanadium (V) complexes, 25, 26
 Disulfide bonds, 55, 61–63
 DNA alkylation, 177
 DNA strand-breaks, 216
 Dodecahedral structure, 18
 DTT, 55, 60, 62
 Dynein, 165

E

Echinoderms, 74, 75, 77, 80
 Electrocatalytic, 40, 41, 43
 Electrocatalytic behavior, 40, 43
 Electrocatalytic oxidation, 41, 43
 Electrocatalytic oxidation of thiols, 41, 43
 Electron transfer cascade, 55, 63, 65, 66, 84
 Electron-transfer mediator, 43, 45
 Enantioselective, 38, 106, 110, 119, 133
 eNOS, 195–202
 Environmental sources, 210, 309
 Epithelial hyperplasia, 214
 ERKs. *See* Extracellular regulated kinases (ERKs)
 Estrogen, 192–194, 196–201
 Extracellular regulated kinases–1,2, 153
 Extracellular regulated kinases (ERKs)
 cascade phosphorylation, 156
 pathway, 152, 153, 156, 157
 pathway activation, 157
 phosphorylation, 152, 153

F

Fas ligand, 190, 191
 Fenton-like reaction, 218, 220

Fish, 74, 75, 77, 78, 81, 87, 88, 152, 164
 Forkhead transcription factors, 190, 191

G

Genomic instability, 218
 Genotoxic, 155–157, 171, 215–222
 Genotoxic actions, 156
 Genotoxicity, 155–157, 216–222
 Genotoxic potential, 157, 215–218
 Glutathione (GSH), 55, 62, 63, 65, 66, 84, 156, 167
 Glutathione-S-transferase (GST), 56, 167, 169, 170, 176
 Glycogen synthase kinase–3 (GSK–3), 154
 Gram-scale reaction, 132
 GSH. *See* Glutathione (GSH)
 GSH/GSSG ratio, 156
 GSK–3. *See* Glycogen synthase kinase–3 (GSK–3)
 GSSG, 63
 GST. *See* Glutathione-S-transferase (GST)

H

Haloperoxidases, 7, 25, 44, 74, 95–119, 128
 Hard tissues, 147, 148, 150, 157
 Health standards, 210, 211
 Heart, 79, 81, 176, 188–202
 Heptacoordination, 13, 21
 Hexacoordinate octahedral, 4, 11
 H₃HIDA. *See* *N*-hydroxyiminodiacetic acid (H₃HIDA)
 H₃HIDPA. *See* *N*-hydroxyimino–2,2'-dipropionic acid (H₃HIDPA)
 HIDA³⁻, 40, 41
 HIDPA³⁻, 40, 41
 H-K-ATPase, 165
 Hydrogen peroxide, 25, 41, 95, 98–100, 102, 103, 106–111, 115, 119, 127, 128, 139, 155
 Hydroxy-DOPA, 55
 Hydroxylation, 42
 Hyperaccumulation, 73–89
 Hyperplastic nodules, 171
 Hypertrophy, 188, 192–195, 197–201

I

Inflammatory cytokines, 219
 Insulinomimetic, 155, 166
 Intracellular mechanisms, 150
 Intracellular signaling pathways, 146
 Intracellular transduction pathways, 153

- IP₃, 166
Ischemia, 188–191, 199, 202
Isolation and characterization, 36, 37
- L**
Ligand-free, 133, 139
Lung cancer, 214–215, 220–222
Lung particle overload, 215
- M**
Marine organisms, 74–82, 86, 88
Mechanism of action, 153–154, 157, 218
Mediators, 40, 219
Menopause, 192, 193, 198, 200, 201
MET. *See* Mitochondrial electron transport (MET)
Metal accumulation, 43
Michaelis-Menten, 107
Michaelis-Menten type of mechanism, 41, 43
Mitochondrial electron transport (MET), 220
Model complexes of amavadin, 38
Models, 25, 26, 36–39, 42, 44, 58, 110, 116, 117, 146, 167, 171, 177, 192–194, 198
Mode of action (MOA), 220
Molecular oxygen, 128–139
Monobromide, 133, 134, 136, 138, 139
Mono-oxovanadium (V) complexes, 24
Multitargeted vanadium complex, 173
Myocardial injury, 188, 190
Myocardial ischemia, 189–191
Myosine ATPase, 165
- N**
NADPH, 55, 56, 58, 63, 65, 66, 84, 220, 222
Na-K-ATPase, 165
N-alkylated *N*-hydroxy amino acids, 38
Narrow threshold, 178
Neoplasia, 171
N-hydroxyiminodiacetic acid (H₃HIDA), 18, 38, 39
N-hydroxyimino–2,2'-dipropionic acid (H₃HIDPA), 17, 37–39
Nitrogenases, 128
Non-oxo vanadium (IV) complex, 12, 39
Nramp/DCT, 64, 65
- O**
Occupational exposure, 210, 212
Octa-coordinate, 39
Octacoordination, 17
Oophorectomy, 192, 200
Osteoblast cell lines, 150–152, 156
Osteoblastic cells, 147, 153, 155
Osteoblast-like cells, 150, 151, 153
Osteoblast phenotype, 150, 152
Osteoblasts, 147, 148, 150–153, 155, 156
Osteoclasts, 147, 148, 153
Osteogenesis, 146, 147, 151–155, 157
Osteogenic actions, 152, 153
Osteogenic mechanism, 157
Osteogenic properties, 152, 157
Osteoid, 147, 148, 154
Osteosarcoma cells, 174, 176
Ovariectomy, 194, 196–198, 200, 201
Oxidation, 4, 7, 10–12, 14, 19–23, 25, 37, 39–43, 45, 53–56, 58, 63, 73, 84, 96, 97, 99–111, 115, 119, 127–129, 132, 136, 139, 146, 155, 157, 164–167, 176, 188, 203, 216
Oxidation of some biological thiols, 43
Oxidation potentials, 40
Oxidation states, 3, 4, 7, 10, 11, 19–22, 25, 37, 39–41, 43, 53–56, 58, 73, 84, 96, 100, 150, 155, 157, 164, 165, 188
Oxidative bromination, 128, 129, 132–139
Oxidative damage, 44, 216, 218–220
Oxidative mechanism, 153
Oxovanadium (IV), 152
Oxygenation, 25, 42, 177
- P**
Pentacoordination, 7
Pentagonal bipyramid, 4, 13, 14, 16
Pentagonal pyramid, 13
Peroxidases, 43–45, 96, 103, 105, 110–112
Peroxidative halogenation of alkanes and benzene, 42
Peroxidative oxidations, 42
Peroxidative oxygenation, 42
Peroxovanadium compounds, 155, 167, 169
Phallusia mammillata, 53, 54
Phlebobranchia, 52, 53
Phosphatidyl inositol–3 kinase (PI3K), 153
Phosphoenzyme ion-transport ATPase, 165
Phosphofructokinase, 165
PI3K-MEK-dependent pathway, 153
PKB. *See* Protein kinase B (PKB)
Polyaminocarboxylates ligands, 38
Polychaetes, 73–89
Postmenopausal women, 192–194, 198–200, 202
Pourbaix diagram, 19
Protein kinase B (PKB), 188

Protein tyrosine phosphatases, 153, 166, 188
 Protonation of the oxo ligand, 23
 p53 tumour-suppressor gene, 221
 Pulmonary function, 212
 Pulmonary lesions, 213

R

Raman spectroscopy, 58
 Reactive oxygen species (ROS), 156, 174, 218–222
 Redox, 4, 10, 12, 14, 19–26, 40–43, 55, 56, 62, 63, 65, 66, 96, 106, 129, 139, 220
 Redox behaviors, 4, 12, 19–26, 40–42
 Respiratory tract irritation, 210–214
 ROS. *See* Reactive oxygen species (ROS)

S

Sabellidae, 82
 Signal cascade, 155
 Signet ring cells, 53, 54, 57, 84
 Square pyramid, 4, 7–11, 22, 24
 Stability constant, 38, 43
 Stolidobranchia, 52, 53
 Structure, 4–7, 9–18, 38–40, 60, 61, 83, 86, 95–119, 149, 188, 222
 Structure of amavadine, 38–40
 Subcellular distribution, 83, 86
 Sulfate ions, 58–59, 66
 Synchrotron radiation, 53
 Synthetic approaches, 37–38
 Synthetic models for haloperoxidases, 25

T

Tetrahedral complex, 5
 Thermal neutron activation analysis, 52–53
 Thiol–disulfide exchange reactions, 62, 63, 65, 66
 Thiolic compounds, 40, 41
 Thiols, 41, 43–45, 55, 63
 Toxic effects, 155, 189
 Toxicity, 43, 155–157, 165, 169, 177, 178, 189, 209–222
 Toxicology, 165, 209, 220
 Trigonal bipyramid, 4, 7–11, 112, 117
 Trigonal monopyramidal, 7

Trigonal prism, 4, 11, 13, 16, 18
 Tubulin, 219, 220
 Tubulin polymerisation, 219
 Tumor incidence, 167
 Tumour promotion, 220

U

Urochordata, 52

V

Vanabins, 55, 56, 59–66, 74, 84
 Vanadate, 5, 6, 74, 96, 101, 106, 107, 109–119, 146, 148, 149, 155, 164–166, 171, 177, 178, 188, 189, 210, 212, 213, 218, 219, 221, 222
 Vanadate toxicity, 155
 Vanadium
 bromoperoxidase, 98, 102, 103, 105–108, 110–112, 114, 128, 139
 catalyst, 26, 128, 136, 139
 compounds, 11, 14, 19, 35–45, 51, 128, 146, 148–157, 167, 169, 177, 178, 187–202, 209, 210, 212–218
 deficiency, 164
 derivatives, 146, 150, 152–154, 157
 vanadium (-I), 20
 vanadium (III), 4, 12–14, 16, 17, 21–23
 vanadium (IV), 9, 11–14, 17, 18, 21–26, 38–41, 43, 150, 152–156, 174, 188
 vanadium (V), 5, 12–14, 17, 21, 22, 39–41, 152, 155
 vanadium (V) complexes, 12–14, 18, 22, 24–26, 41
 V(II) complex, 20
 V(III) complexes, 21
 V(IV) complexes, 22–24, 39, 41
 Vanadocytes, 53–60, 62, 64, 65, 84
 Vanadyl (IV) cation, 151, 152
 Vanadyl sulphate, 155, 157, 164, 210
 VBP–129, 64

X

X-ray crystal structure, 39