

Index

A

Abacavir, 215, 257, 258
Absorption glycosides, 362
Acarbose, 35
Acceptor
Acetate, 50
Acetobromoglucose, 39, 89
Acetolysis, 355
Acetonide, 53, 89
Acid hydrolysis, polysaccharides, 356
Acidic hydrolysis, 355–356
Acyclic nucleosides, 261–265
Acyclovir, 262, 263
Adenosine deaminase (ADA), 225
Adenosine triphosphate, 170
 α -Agelaspinines, 128
Agglutinin, 318
Alactosphingolipid, 337
Alditols, 8
Aldohexoses, 1, 3, 294, 372, 373
Aldolases, 24
Aldol condensation, 24, 30, 33, 296
Aldopentoses, 373
Aldoses, 1
Alkynylbenzoates protocol, 198–199
Aloin, 281
Altromycin B, 281
Amadori rearrangement, 10–11
Aminosugars, 30–33
Anomeric effect, 39, 315, 377, 391
Anomeric carbon, 37
Antigens
 Globo H, 333, 344
 KH-1, 333, 334, 336
 Lewis, 333
 MBr1, 333, 334

Anti-AIDS 2'3'-dideoxy nucleosides, 223
Anti-AIDS ddC, 224
Antisense, 206, 207
Antitumor C-nucleoside, 241
Antiviral 2'3'-fluoro dideoxyadenosine
 FddA, 233
Apple reaction, 116
Aristermomycin, 256
Armed-disarmed method, 117–121
Arthrobacilin A, 149
Asn-GlcNAc glycosidic, 315
Aurodox, 281
6-Azapseudouridine, 243
Azasugars, 29
Azido diol nucleoside, 227
Azoic glycosides, 365
AZT, 219

B

Barbier-type coupling, 298
Barton decarboxylation method, 252
Barton deoxygenation, 226, 229
Benedict test, 7–8
Benzoyl, 50
Benzyl, 52
Benzylidene, 53
Bi and Yj ions, 411
Bicyclic furano pyrimidine, 240
Biosynthesis, 12–14
Bleomycin, 89
Boronate, 54
Brigl epoxide
 NMR spectrum, 121
 preparation, 124
Bromoacetylation, 224

C

Cadeguomycin, 185
 Calcitonine, 321
 Calicheamicin, 98
 Capuramycin, 169, 234, 235, 237
 Carbapyanoside-Saccharides, 35–37
 Carbocyclic *C*-nucleosides, 259–261
 Carbocyclic nucleosides, 246–261
 Carbocyclic pyrimidine nucleoside, 260
 Carbohydrate-binding proteins, 316, 319
 Carbohydrates, 14–29, 315
 Carbohydrates mimetics, 29–37
 Carbonate, 53
 Carbovir, 215, 218, 253, 257–259
 Carminic acid, 281
 Castanospermine, 29
 C-C purines, 221
 C-Glycosides
 electrophilic glycosyl donors, 286–290
 free radical approach, 300
 Mitsunobu reaction, 295
 monosaccharide, 290
 nucleophilic sugars, 295–298
 Ramberg–Bäcklund reaction, 299–300
 C-Glycosyl amino acids, 20–24
 Cellobiose, 356, 358, 379, 393, 394
 Cellulase, 359
 Chair conformation, 1, 3, 370, 391–394, 396
 Chemoenzymatic and enzymatic synthesis,
 158–161
 Chemoenzymatic
 approach, 225
 synthesis, 321, 322
 Chloropurine nucleoside, 188
 Chromophores, 83
C-nucleoside malayamycin A, 248
C-nucleoside pseudouridine, 241
C-nucleosides, 237–246
 Concanavalin A, 320
 Cross-metathesis, 23, 284, 298, 342
 6-*C* substituted pyrimidines, 221
 Cucumerins, 281
 Cyclobutane carbocyclic nucleosides, 251–252
 α -Cyclodextrin, 154
 Cyclopentane carbocyclic nucleosides,
 252–253
 Cyclopropane carbocyclic nucleosides, 251
 Cytidine, 170, 190, 224

D

Davol–Lowy reaction, 188–190
 7-Deazapurine analogs, 223
 Deazapurines, 183, 222

Deoxynojirimycin, 30
 2'-Deoxynucleosides, 226
 3'-Deoxyguanoside, 232
 3'-Deoxynucleoside, 232
 Derivatization methods, 410
 D-galactose, 15
 D-glyceraldehyde, 1
 DHPG, 265
 2',3'-Dideoxyguanosine, 228
 1,3-Dihydroxyacetone, 2
 Diels-Alder, 290
 1,3-Dihydroxyacetone, 2
 Disarmed sugars, 118
 Dlycoresin tricolorin, 394
 Domo-Costello
 fragmentation, 413–414
 nomenclature, 413
 types, 411
 Donor, 24–26, 39–47, 49, 83, 87, 89, 92, 95–97,
 99, 100, 103, 106–110, 113–120, 123,
 125, 128, 129, 131, 133–135, 138–144,
 146, 148, 153, 154, 157, 161, 195, 196,
 198, 199, 202, 203, 228, 235, 282,
 286–290, 295–298, 300, 304, 331, 333,
 334, 391
 Dynemicin A, 98

E

Electrophilic sugars, 286
 Electrospray ionization, 405
 Eleutherobin, 102
 Ene diol rearrangement, 9
 Enolic glycosides, 357
 Enzymatic
 approach, 135–142
 hydrolysis, 359–366
 synthesis, 332–333
 Epimers, 9
 Epirubicine, 93
 4',5'-Epoxy nucleosides, 234
 Ethynyl-2-fluoro-2'-deoxyadenosine, 194
 Exo-glycals, 300

F

Fast atom bombardment (FAB), 405
 Fehling test, 7–8
 Fischer reaction, 84–86
 Fischer, F., 1
 Fischer–Helferich reaction, 185–188
 Fischer projections, 2, 3, 5, 6
 Fluorescent *O*-Glycosides, 361
 Fluorine glycosyl donor, 39, 128

- Fluorine reaction, 127–130
Fluorescein, 361
Fluorometer, 362
Formycin, 245
Fragmentation pathways, 408
Free radical approach, 300
Furfural, 11–12
Fused Heterocyclic Nucleosides, 236–237
Fucose, 30, 36, 51, 85, 86, 142, 311, 312, 316, 381, 407
Furfural, 11–13
Fusion reaction, 95–97
- G**
Ganglioside, 98
Gentobiose, 89
 β -1,3-Glucanases, 361
 β -Glucanases, 359
Glucosamine N-acetyl, 311
 β -Glucosidases, 359
 β -Glucuronidase, 360
Glycal reaction, 121–127
Glycals, 46
 NMR spectrum, 39
 preparation, 46
Glycans, 312–315, 321, 332, 382
Glyceraldehyde, 1, 5, 13–15, 24, 194
Glycoconjugates
 carbohydrate-binding proteins, 316
 classification, 312–314
 glycoproteins and glycolipids, 311
 lectins combine, 317
 recognition sites, 314
Glycolysis, 14, 15
Glycopeptide synthesis, 319–324
Glycopeptoids, 342
Glycoprotein syntheses, 324–333
Glycosidase, 360–361
Glycoside ceramides, 334
Glycoside sulfates and phosphates, 340
Glycosides
 alpha, 102
 cis, 87, 91, 115
 FAB, 407–413
 hydrolysis of, 355, 357, 359–361, 364
 reactivity, 37–38
 trans, 95
Glycosidic bond, 37
Glycosidic bond formation, 268–272
Glycosphingolipid and gangliosides, 333–342
Glycosyl amino acids, 20–23
Glycosyl donors, 39–46, 89, 92, 98, 107, 128
Glycosylations, 115–117, 325
Glycosyltransferases, 135
Guanosine, 186, 225
Guanylation reaction, 331–332
- H**
Hard sphere exoanomeric effect, 377
Haworth structure, 1
Heck type reactions, 291
Helfferich reaction, 92–95
Herbicidin, 281
Hexamethyldisilazane (HMDS), 191
Hikizimycin, 169
Histochemical *O*-Glycosides, 362–366
HOBt solid phase synthesis, 204–205
Hydrolysis, 357
5-Hydroxymethylfurfural, 12
Hypermodified base queuine, 235
- I**
Imidate formation, 97
Imidate reaction, 97–107
 NMR spectrum, 39
Iminosugars, 29–30
Iodine glycosyl donor, 40
Indiscriminate glycosylation, 325
Indole *O*-glycoside, 84
Iodine reaction, 130–133
Ionic liquids, 12, 90, 113, 114, 116
- J**
Jalapinic acid, 99, 407
- K**
Kanamycin A, 93
Karplus, 370–372, 377, 384–386
Ketoses, 1
Kifunensine, 29
Kiliani–Fischer synthesis, 9–10
Koenigs–Knorr reaction, 81, 86–92
- L**
Lactosamine, 140
Lamaribiose, 89
Lansbury aspartylation, 325–331
Lasalocid A, 281
Leaving groups, 38–39
Lectins, 316
Lectins and affinity ligands, 317
Lewis X, 100

- L-Fucose, 85
 Lipase, 57, 64, 174, 177–179, 246, 250, 251
 Lithium glycal, 296
 Lodenosine, 228
 Lubocavir, 251
 Luganol *O*-glycoside, 133
- M**
 Macromolecular assemblies, 317
 Malayamycin A, 246, 248
 Mannose, 5, 9, 10, 15, 115, 142, 311, 312, 316, 317, 319, 358, 373, 374
 Mannostatin, 29
 Methoxybenzyl, 52
 Methyltubercidine, 183
 Methyl- β -D-xylopyranoside, 406
 Michael reaction, 81–84, 183–185
 Microbial/enzymatic approach, 199–201
 Miglitol, 35
 Mitsunobu reaction, 196–197
 Modified nucleosides, 169
 Molecular dynamics (MD), 314
 Monosaccharides, 1, 2, 15, 24
 definition, 1
 distribution, 5
 reactions, 2
- N**
 Naringenin, 281, 283, 306
 N-acetylneuraminic acid, 25
 Nectricine, 29
 Neplanocin, 257, 258
 Neuraminic acids, 18
 N- α -Fmoc-amino acid glycosides, 321
 N-glycosides
 chemotherapeutic agents, 215
 C-5 substituted pyrimidines, 218–219
 C-6 substituted pyrimidines, 219–220
 3'-Deoxynucleosides, 228
 2'-3'-Dideoxysugars, 222–226
 drugs, 215
 Mitsunobu reaction, 196–197
 modified N-nucleosides, 216
 nucleoside formation, 170–171
 nucleosides, 169
 palladium mediated reaction, 197–198
 palladium mediated transformations, 218
 phosphonate method, 205–206
 protecting groups, 171–183
 purine formation, 220–222
 ribofuranoside protecting groups, 174–183
 RNA–DNA hybrid, 215
 silyl agents, 190
 viral replication process, 215
 Nicotinic acid adenine dinucleotide, 170
 Nikkomycin B, 169
 Nojirimycin/*N*-isothionucleoside, 270
 Nojirimycin, 30, 31
 NMR. *See* Nuclear magnetic resonance (NMR)
N-thioxonucleosides, 271
 Nuclear magnetic resonance, glycosides
 ALTONA, 371
 anomeric configuration, 370
 α -anomer resonance, 369
 bidimensional homonuclear techniques, 382
 C,H dipolar couplings, 374
 chemical shifts and J_{HH} coupling constants, disaccharides, 378–379
 coupling constant, β - and α -pseudouridine, 386
 dipolar interactions, 377, 382
 2D selective TOCSY-DQFCOSY experiment, 382
 experimental ^1H - ^1H and ^{13}C - ^1H spin–spin couplings constants, 381
 furanoside ring, 386
 α -galactose, 369
 glycoproteins, 382
 glycosidic bond, 377
 glycosylation, 374
 hexopyranosyl halides, 372
 Karplus equation, 370
 Karplus relationship, 377
 lactose disaccharide, 380
 N-glycosides, 384–386
 oligosaccharides, 380
 pyranoside rings, 369
 ring protons, 370
 Saupe order matrix elements (S_{ij}), 377
 Shigella dysenteriae type 1, 382
 structural elucidation, 369
 Nuclear overhauser effects (NOE), 373, 381
 Nucleoside antibiotics, 169
 Nucleosides, 169
 Nucleosides, X-ray Diffraction, 394–402
- O**
 Octosyl acid A, 169
O-glycosides, 81
 Oligonucleotide synthesis, 201–210
 Oligonucleotides, 206
 Oligosaccharides and glycoconjugates, 311, 316, 317
 Osazones, 8

Ostatin Brilliant Red-hydroxyethylcellulose (OBR-HEC), 361
Oxidations, 2–7

P

Palladium catalysis, 197
Palladium-coupling methodologies, 253
Palladium mediated reactions, 291–295
palladium-mediated substitutions, 219
Palladium type reactions, 291
Palytoxin, 281
Phenolic glycosides, 357
Phenylazonaphthol glycoside, 364
Phenylazo naphthol, 406
Phosphate reaction, 134
Phosphodiester bond, 207
Phosphonate, 202
Phosphoramidite method, 202–204
Phosphorimidazolides method, 206
Pivaloyl, 51
p-Nitrophenol, 360, 362
Polyhalogenated quinoline C-nucleosides, 245
Polyoxin J, 169
Pool strategy, 134–135
Porcine pancreas lipase (PPL), 177
Prochiral cyclopentene diacetate, 250
Protecting groups, 46–55, 171
Pseudouridine, 243
Puckering parameters, 392, 394
Purine, 223
Pyramicine, 238
Pyrazine riboside, 244
Pyrazomycin, 237
Pyroc, 321

Q

Queuine, 172, 234, 235
Queuosine, 169
Quitinase

R

Racemic cyclopentene, 250
Rafinose, 93
Ramberg-Bäcklund reaction, 21, 299–300
Rearrangements
 enediol, 9
 Pummerer, 271
 Ramberg-Bäcklund, 21
 sigmatropic, 149, 150, 290
Remazol Brilliant Blue-xylan (RBB-X), 361
Residual dipolar coupling, 374

Resorufin, 361
Retention and inversion hydrolysis
 mechanism, 364
Rhodiooctanoside, 140, 141
Ruff degradation, 10

S

Samarium, 298–299
Sangivamicine, 183
Saponarin, 281, 282
Scoparin, 281
Selectins, 100
Selective deprotections, 63–71
Selective protections, 55–63
Selenoglycosides, 148
Showdomycin, 245
Sialic acids, 108
Sialyllactose, 318
Sialyl Lewis, 100, 127, 319, 382
Silyl coupling reaction, 190–195
Silyl enols, 290
Silyl reaction, 133–134
Silyl protecting groups, 208, 210, 304
Sinefungin, 169
Solid phase approach, 142
Spongistatin, 281
Stereoselective synthesis, 271
Stereoselectivity, 170
Steroidal glycoside, 88
 β -Substituted alcohol glycosides, 357–359
4'-Substituted nucleosides, 232
Sucrose, 12, 93, 136, 356, 393
Sugar amino acids, 18
Sulfotransferases, 139
Sulfur mediated reaction, 195–196
Sulfur reaction, 107–115
Swainsonine, 29

T

Tamm-Horsfall glycoprotein, 410
Tebbe reagent, 302
Tert-butyldimethylsilyl (TBS), 54
Tert-butyldiphenylsilyl (TBDPS), 55
Tether approach, 304
Theophylline, 186
Thietane nucleoside, 271
Thioglycosides, 46, 107
Thiomonosaccharides, 35
Thionucleosides, 265–272
Thioribofuranosyl derivatives, 267
Thiosugars, 33
Thomsen-Friedenreich (T antigen), 312

- Thuringiensin, 169
Tiazofurin, 241, 244
Tollens reaction, 7
Toluyll, 175
Toyocamicine, 183
Trans rule, 186
Transfer nuclear overhauser effect (trNOE), 382
Transglycosidic reaction, 228
Transglycosylation, 139, 323
Triciribine, 236
Tricolorin, 98, 394
Trityl, 51
Tsuji-Trost approach, 255
Tubercidine, 183–185
Tunicamycin antibiotic, 238
Tunicamycin V, 169
Tunicamycins, 239
- U**
Umbelliferone, 360
Umbelliferyl β -D-glucopyranoside, 83
Umpolung reactivity, 295
- V**
Varicella Zoster Virus (VZV), 236
Vineomicinone B2, 291
Vorbrüggen, 191–193, 227, 236
- W**
Wang resin, 144
Wittig ilide, 290
Wittig-type reaction, 221, 302
Wye base, 169
- X**
X-ray diffraction, O-Glycosides
 disaccharide phenylmethyl-*O*-
 (2,3-di-*O*-acetyl-4,6-*O*-
 benzylidene- β -D-glucopyranosyl), 393
 furanoside moiety, 393
 glycoresin tricolorin, 394
 N-glycosides, 400–401
 octa-*O*-acetyl- β -D-cellobiose, 393
Xylose, 5, 11–13, 30, 116, 306, 311, 373