1 redox reaction: 941

1 oxidation: 1003

1 reduction: 987

2 intramolecular phosphate transfer: 1

1 dehydrogenation: 20

6 dehydration: 10

1 oxidative decarboxylation: 33

4 decarboxylation: 120

1 reductive carboxylation: 5

2 rearrangement: 1

1 oxidative acylation: 1

1 reductive deacylation: 1

1 transhydrogenation: 1

1 oxidative cyclization: 5

1 sulfoxidation: 5

1 oxidative dehalogenation: 1

1 peroxidation: 2

1 hydroxylation: 48

1 iodination: 1

1 oxygenation: 5

1 halogenation: 4

1 peroxygenation: 1

1 epoxidation: 5

1 monooxygenation: 2

1 dioxygenation: 6

5 side-chain migration: 1

4 ring cleavage: 1

4/6 C-C-bond cleavage: 7

4/6 C-P bond cleavage: 2

1 O-O heterolytic cleavage: 1

4 extradiol cleavage: 1

4 Deamination: 28

1 oxidative deamination: 25

3 hydrolysis: 1112

1 C-H bond cleavage: 2

2 demethylation: 8

1 oxidative demethylation: 6

1 dehalogenation: 8

6 N-oxidation: 2

1 Bayer-Villiger reaction: 5

1 oxygen ring insertion reaction: 1

6 cyclization: 37

4 O-dealkylation: 2

6 desulfation: 1

2 reduction of azo, nitro, N-oxide groups: 1

4 N-dealkylation: 1

4 S-dealkylation: 1

2 deacylation: 5

4 C-C bond cleavage: 4

4 elimination: 147

1 desulfonation: 1

1 omega-oxidation: 1

4 C-N bond cleavage: 5

2 O-demethylation: 1

2 S-demethylation: 1

2 N-demethylation: 1

2 dealkylation: 1

4 decyanation: 1

2 methyl group transfer: 124

2 Phosphorylation: 27

1 cannizzaro reaction: 1

1 dismutation: 4

1 cross-dismutation: 1

1 reductive deamination: 2

1 deiodination: 1

2 dechlorination: 2

6 carboxylation: 19

1 reductive amination: 5

2 amination: 19

2 transamidation: 4

1 reductive amination redox reaction: 1

2 transamination: 8

4 condensation: 64

1 reductive condensation: 2

6 co-denitrification: 1

2 denitrificaton: 1

? More: 29

2 coenzyme A transfer: 16

2 transhydroxylation: 1

2 transfer of methyl group: 8

2 S-methylation: 2

2 reductive methylation: 3

2 alkyl group transfer: 2

2 methylation: 3

2 methoxycarbonylation: 2

2 O-methylation: 2

2 methylene group transfer: 1

2 para-O-methylation: 1

2 N-methylation: 1

2 hydroxymethyl group transfer: 4

2 formyl group transfer: 3

2 formimino group transfer: 2

2 carboxyl group transfer: 1

2 carbamoyl group transfer: 5

2 transfer of carbamoyl phosphate: 2

2 amidine group transfer: 2

2 transamidination: 1

2 molybdate transfer: 1

2 keto group transfer: 2

2 aldehyde group transfer: 3

2 C-C bond formation: 3

2 Acyl group transfer: 162

2 sinapoyl group transfer: 1

5 intramolecular cyclization: 1

3 Claisen condensation: 12

2 glycosyl group transfer: 21

2 Acylation: 6

2 transfer of acyl group: 2

2 malonylation: 1

3 aldol condensation: 13

4 enolization: 4

2 acetylation: 6

2 C-6/C-1 Claisen-type cyclization: 1

2 transfer of acetyl group: 1

2 transesterification: 7

4 esterification: 32

3 thioester hydrolysis: 1

2 thiolytic cleavage: 1

2 addition: 25

2 amide bond formation: 2

2 aminoacyl group transfer: 14

2 peptidyl group transfer: 1

2 gamma-glutamylcysteinyl transfer: 1

2 transthioesterification: 2

2 arginylation: 1

2 transacetylation: 3

2 C-S bond cleavage: 3

2 transfer of phosphate: 2

2 phosphate transfer: 1

2 hexosyl group transfer: 188

2 transfructosylation: 1

2 transfer of glycosyl group: 8

2 transglycosylation: 18

2 transfer of hexosyl group: 1

2 phospho group transfer: 206

2 hexosyl group transferase: 1

2 transfer of alpha-N-acetylglucosamine: 2

2 Glucuronyl group transfer: 1

2 galactosyl group transfer: 1

2 glucosyl group transfer: 1

2 fructosyl group transfer: 2

2 pentosyl group transfer: 36

2 amino group transfer: 71

2 transfer of 3-dephospho-CoA: 1

2 substituted phospho group transfer: 24

2 alkenyl group transfer: 17

2 Friedel-Crafts alkylation: 3

2 aryl group transfer: 2

2 aminopropyl group transfer: 3

2 adenosyl group transfer: 4

2 enolpyruvate group transfer: 1

2 pyrimidyl group transfer: 1

2 aminocarboxypropyl group transfer: 2

2 ether formation: 1

2 hydroxymethylpyrimidine group transfer: 1

2 3-amino-3-carboxypropyl group transfer: 1

2 nucleophilic substitution: 3

2 aminobutyl group transfer: 3

2 C-O bond cleavage: 4

2 gamma-replacement: 2

2 sulfate group removal: 1

2 aminopropanoyl-group transfer: 3

5 condensing reaction: 1

2 polyprenyl-group transfer: 1

2 sulfhydrylation: 1

2 C-N bond formation: 6

6 cyclopropanation: 1

2 carboxyvinyl group transfer: 1

2 SN2 substitution: 1

2 substitution: 1

2 oximino group transfer: 1

2 nitrogenous group transfer: 1

2 phospho-group transfer: 16

5 isomerization: 85

2 phopho group transfer: 4

2 diphosphate transfer: 5

2 nucleotidyl group transfer: 56

4 polymerization: 2

2 adenylylation: 2

2 deadenylylation: 1

2 uridylylation: 1

2 adenylyl group transfer: 1

2 transfer of phosphoribosyl-dephospho-CoA: 1

2 P-O bond cleavage: 14

2 adenylation: 2

2 nucleosidyl group transfer: 1

2 transphosphatidylation: 2

2 sulfur atom transfer: 7

2 sulfur transfer: 1

2 sulfate group transfer: 29

2 transfer of CoA: 1

2 sulfo ethyl group transfer: 1

2 Selenium transfer: 1

3 carboxylic ester hydrolysis: 6

4 Knoevenagel condensation: 1

3 ester hydrolysis: 5

6 DNA-dependent ATPase activity: 1

3/4 **deadenylation**: 1

3 phosphoric ester hydrolysis: 6

3 **endonucleolytic cleavage of supercoiled plasma DNA to linear DNA**: 1

3 phosphorous acid anhydride hydrolysis: 25

3/4**P-C bond cleavage**: 1

**1 desulfination**: 1

3 O-glycosyl bond hydrolysis: 4

3 hydrolysis of O-glycosyl bonds: 1

3 hydrolysis of O-glycosyl bond: 3

4/6 **synthesis of thioether**: 1

3 thioether hydrolysis: 1

3 ether hydrolysis: 2

3 carboxylic acid amide hydrolysis: 22

6 Aminoacylation: 22

6 polymerization of dipeptide amides: 1

6 dipeptidyl ligase activity: 1

2 transpeptidation: 2

4 Henry: 1

3/4 **cleavage of C-N-linkage**: 15

6 formation of peptide bond: 3

3 ester bond hydrolysis: 1

2 aminolysis: 1

2 acyl transfer: 2

2 transfer of amide group: 1

3 N-deacetylation: 1

3 deacetylation: 2

6 formylation: 3

3 deformylation: 1

**2 formation of cyclic amides**: 2

3 amidine hydrolysis: 19

4/6**internal C-N condensation**: 1

3 hydrolytic deamination: 1

3 nitrile hydrolysis: 1

2 group transfer: 26

1 intramolecular oxidoreduction: 38

2 retro-Friedel-Crafts acylation: 2

3 C-halide hydrolysis: 4

**carboligation**: 4

4 addition of H2O: 2

4 gamma-carboxylation: 1

**cyanohydrin formation**: 3

4 Henry reaction: 2

2 transcyanation: 1

4 aldol addition: 4

4 retro aldol-condensation: 1

4 reversal of an aldol condensation: 6

**Cleavage of a C-O bond**: 1

3/4 **cleavage of 3-hydroxy acid**: 2

4 beta-elimination: 9

**replacement**: 2

5 racemization: 21

4 alpha,beta-elimination: 3

4 hydration: 5

4 carbon-nitrogen lyase reaction: 1

4 elimination of CO2: 1

**Morgan Elson reaction**: 1

2 beta-replacement: 3

4 double-bond hydration: 1

4 **C-O bond cleavage by elimination of water: 16**

**C-O bond formation: 1**

**C-S bond formation: 1**

2 Knorr reaction: 1

5 intramolecular oxido-reduction: 1

4 elimination of H2O: 3

4 syn-elimination: 1

**elimination of an alcohol from a polysaccharide: 2**

**C-O-bond cleavage**: 1

**D-fructosyl-D-fructofuranosyl group transfer**: 1

**elimination of sulfate**: 1

5 intramolecular redox reaction: 1

**triphosphate elimination**: 1

3 cleavage of triphosphate bond: 1

**4 elimination, C-O bond cleavage**: 1

3 diphosphate lysis: 1

5 internal cyclization: 2

**4 elimination of diphosphate**: 2

4 1,4-trans elimination: 1

4 lyase rather than hydrolase reaction: 1

3 endonuclease reaction: 1

3 exonuclease reaction: 1

4 Double-bond formation: 1

**4 elimination of NH3**: 4

2 amidation: 1

4 amidine-lyase reaction: 1

**cleavage of C-O-linkage**: 1

4 Pictete-Spengler reaction: 1

**dopamine-secologanine condensation**: 1

4 alpha,gamma-elimination: 1

**C-S-bond cleavage**: 1

4 elimination of H2S or RSH: 1

4 elimination of H2Se: 1

**cleavage of C-Se bond**: 1

4 elimination of SO2: 1

**1/4 oxidative elimination of NH3**: 1

4 elimination of chloride: 1

**covalent attachment of heme**: 1

4 carbon-halide lyase reaction: 3

**formation of diphosphate**: 1

3 endoribonuclease reaction: 2

2 transphosphorylation: 1

5 racemization of amino acids: 1

5 epimerization: 28

5 cis-trans-isomerization: 6

5 cis-trans isomerization: 2

**5 rotation**: 1

5 Amadori rearrangement: 1

5 aldose-ketose-isomerization: 1

5 tautomerization: 1

5 intramolecular oxidation: 1

4 Michael addition: 1

5 intramolecular transfer reaction: 2

5 intramolecular transglucosylation: 1

5 glycosyl bond isomerization: 1

4 elimination/addition: 9

4 1,2-elimination: 1

4 4,5-elimination: 1

**intramolecular lyase reaction: 2**

**intramolecular lyase:** 2

**2 transmembrane transport**: 43

**Acid-thiol ligation**: 26

6 aminacylation: 1

**forming of carbon sulfur bonds**: 4

**thioester formation**: 2

**formation of thioester**: 2

4 thiolation: 1

3 Acid amide hydrolysis: 8

6 Ligation: 4

2 Acid amide formation: 4

6 peptide synthase reaction: 4

4 Diels-Alder cycloaddition: 1

2 amide group transfer: 3

2 carboxylic acid amide formation: 18

2 carboxamide formation: 17

6 peptide bond ligation: 1

2 carboxylic acid amide formation: 1

6 peptide bond formation: 1

2 carboxylic acid-amide formation: 1

**heteroatomic ring closure**: 2

**carboxylic acid formation**: 1

3 hydroloysis of phosphoric ester: 2

3 ATP hydrolysis: 1

3 hydrolysis of phosphoric ester: 1

**transmembrane export**: 1