

# INDEX II

## SUBJECT INDEX

Numbers in boldface type refer to pages on which the subject is illustrated or especially described.

### A

- "3.4 Å repeat" **m** 298  
 "34 Å repeat" 298  
 Abiotic acid, 264  
 Abscisic acid (ABA), 951  
 Abscisin II, *see* abscisic acid  
 Absorption chromatography, 1030  
*Acer saccharina*, 101  
 Acetals, 80  
 Acetate replacement factor, *see* pyruvate oxidation factor, 367  
 Acetic acid, 42,43  
 Acetone, 18  
 Acetyl number, 275  
 Acetylcholinesterase, 352  
 Aceylsalicylic acid, 896  
 Acid number, 275  
 Acidic amino acids, 139  
 Acidity of a solution, 38  
 Acidosis 41, 50  
 Acinar, 857  
 Acini, *see* acinar, 857  
 Aconitase, 489, 494  
 Acrolein test, 275  
 Acrolein, 275  
 Acromegaly, 875  
 Acropetal movement (of auxins) Actin, 212  
 Actinomycin, 753  
 Activation energy (of enzymes), 373, 374  
 Activation of Amino acids, 723  
 Activation of fatty acid, 569  
 Active site, 379, 381  
 Actyl-COA, 596  
 Acylation, 222  
 Adaptor hypothesis, 721  
 Addison's disease, 853  
 Adenine, 285, 942, 947  
 Adenosine 3', 5' -cyclic monophosphate (cAMP), 291  
 Adermin, 997  
 Adernal decortication, 853  
 Adrenal cortex, 850  
 Adrenal cortical hormones, 851  
 Adrenal demedullation, 887  
 Adrenal medulla, 850  
 Adrenal medullary hormones, 885  
 Adrenal virilism, 853  
 Adrenalectomy, 843  
 Adrenalin, *see* epinephrine, 843  
 Adrenals, 858  
     zona fasciculata, 851  
     zona glomerulosa, 851  
     zona reticularis, 851  
 Adult rickets, *see* osteomalacia  
 Agar-agar, 127  
 Agricultural biochemistry  
*Ahnfeltia*, 127  
 Alanine cycle, 648  
 Alanine, 137, 141  
     β-alanine, 145  
 Alanine, 731  
 Albinism, 668  
 Albuminoids *see* scleroproteins  
 Albumins, 206,  
 Albuminose 208, 209  
 Alcoholic fermentation, 460, 477  
 Alcohol dehydrogenase , 477  
 Alcoholic fermentation, 334, 460, 477  
 Aldohydrazone, 98  
 Aldol cleavage , 464, 467  
 Aldolase, 463  
 Aldosterone, 843, 851  
 Aldoxime,  
 Alitame, 105  
 Alkalinity of a solution, 38  
 Alkalinity of solution, 38  
 Alkalosis, 41  
     metabolic, 50  
     respiratory, 50  
 Alkalosis, 50  
 Alkaptonuria, 668  
 Allosteric enzymes, 397  
     concerted model, 189  
     sequential model, 188  
 Allosteric site, 397  
 Alphabetical nomenclature, 961  
 Alpha-Lipoic acid **1017**  
 Alternate bearing, 188, 189  
 Amandine, 207  
 Amber, 817  
 Ambretolide, **248**  
 American Physiological Society, 206  
 American Society of Biological Chemists, 14  
 Amino acid amides, 139  
 Amino acids  
     determination of amino acid sequence of, 148  
     N-and C-terminals of, 147

## 1214 FUNDAMENTALS OF BIOCHEMISTRY

- naming of, 148
- representation of, 148
- stereochemistry of, 149
- biological roles of, 150
- $\alpha$ -aminoadipate, 145
- $\gamma$ -aminobenzoic acid (PABA), 390
- g-aminobutyrate, 146
- Amino acid buffer system, 50
- Amino Acid catabolism, 654
- Amino acids, 133, 523, 678
  - classification of 139
  - distribution (in proteins) of, 135
  - location (in proteins) of, 135
  - electrochemical properties of, 136
  - physical properties of, 135, 137
  - specific rotation of, 134
  - structure of, 133
- Amino group metabolism, 642
- Aminoacyl-tRNA, 728
- Aminobenzoic acid, 1017
- Aminotransferase, 644
- Ammonia, 18
- Ammonium ion, 42, 43
- Amphipathic compound, 29
- Amphipathic compounds, 248
- Amphoteric nature (of amino acids), 136
- Amphoteric nature (of proteins), 216
- Amygdalin, 91
- Amylase, 110
- Amylases, 115, 347
- Amylopectin, 115, 116, 117
- Amylose, 115, 116
- Amytal, 553
- Anabolic steroids, 416
- Ananas sativus*, 101
- Ancient hunger signal, 905
- Androgens, 908
- Androst-4-ene 3, 17 dione, 848
- Androst-4-ene, 3, 11, 17 trione, 848
- Androstane, 848
- Androsterone, 843, 901, 908
- Anemia, 1004
- Aneurin, *see* thiamine
- Angiotensinogen, 857, 897
- Angiotensins, 897
- Angiotonin, *see* angiotensinogen, 857, 897
- Angström, 9
- Animal fats, 246, 247, 269
- Animal proteins, 204
- Animal skeleton proteins, 207
- Animal starch' *see* glycogen
- Anions, 218
- Anisomycin, 753
- $\alpha$  amanitin, 753
- Antiallopecia factor, 1016
- Antiscorbutic factor, **1009**
- Annealing (of DNA), 305
- Anomers, 84
- Anorexia, 1016
- Anserine, 144
- Anterior pituitary like (APL) factor, *see* human chorionic gonadotropin
- Anthranilate synthase, 700
- Anti blacktongue factor, 995
- Anti raehlic factor, 972
- Antibodies, 899
- Antidiuretic action, 874
- Antidiuretic hormone, 874
- Antiegy white injury factor, 999
- Antihomorrhagic factors, 979
- Anti-intection vitamin, 970
- Antimycin, A553, 554
- Antioxidants, 274
- Antixerophthalmifactor, 966
- Apoenzyme, 350
- Aqua, 18
- Arachidonic acid, 889
- Archidonate, 895
- Arterenol, *see* norepinephrine,
- Arginase, 358
- Arginine, 144, 170, 353
- Arginine, 731
- Aromatic aminoacids, 353
- Arrangement of codons, 810
- Artificial sweeteners, 104
- Ascending chromatography, 1031
- Ascheimic effect, 871
- Asparagine, 143, 170, 731
- Aspartame, 105
- Aspartate transcarbamoylase, 398
- Aspartic acid, 144, 170
- Aspartic acid, 27, 731, 822
- Asprin, 896
- Asymmetric carbon atom, 75
- Atherosclerosis, 634
- Atom, 55
- Atomic mass unit (AMU), 57
- Atomic number, 1036
- Atomic radius,
- Atomic weight, 57
- Atravtylate, 553
- Attributes of ageing, 872
- Autocatalysis, 387
- Autoxidation, 274
- Auxin, 836, 916, 917, 929
- Avitaminoses, 965
- Axial ratio, 205
- Axioms, of living matter, 11
- Azelaic acid, **274**
- Azide, 554
- 3-azidodeoxythymidine (AZT), 289

## B

Ball and stick model, 537, 557  
 Barfoed's reagent, 94  
 Base pairing hypothesis, 7  
 Basedow's disease, 884  
 Basic amino acids, 139  
 Batyl alcohol, 248  
 b-bend, *see hairpin bend*,  
 Beauty Without Cruelty (BWC), 345  
 Beer's Law, 1039  
 Beer, Lambert Law, 1039  
 Benedict's reagent,  
 Benzene, 19  
 Beriberi, 6, 959, **991**  
 Bhabha atomic Research Centre (BARC), 346  
 Bial's orcinol test, 96  
 Bicarbonate buffer system, 49  
 'Big neck' *see* goiter,  
 Bile acids, 261  
 Biocarbonate ion, 42  
 2,3-bisphosphoglycerate (BPG), **185**, 186, 390  
 2,3-bisphosphoglycerate mutase, **390**  
 Biochemical energetics, *see* bioenergetics  
 Biochemical literature, 14  
   journals, 14  
   literature, 14  
   amphipathic, 27  
 Biochemist, 14  
 Biocytin, **1001**  
 Bioenergetics, 434  
 Bioflavonoids, 1019  
 Biological buffer solutions, 48  
 Biological buffer systems, 48  
   amino-acid buffer system, 50  
   bicarbonate buffer system, 49  
   hemoglobin buffer system, 51  
   phosphate buffer system, 51  
   protein buffer system, 50  
 Biological catalysts, *see* enzymes, 333  
 Biological chemistry, 3  
 Biological roles of enzymes, 344  
 Biological roles of proteins, 198  
 Biomolecules, 11, 25  
 Biosynthesis of amino acids, **675**  
 Biosynthesis of fatty acids, 595  
 Biosynthesis of Leucine, 697  
 Biosynthesis of lipids, **594**  
 Biosynthesis of lipids, 594  
 Biosynthesis of proteins, 718  
 Biosynthesis of some fatty acid in mammals, 607  
 Biosynthesis of unsaturated fatty acid, 608  
 Biosynthesis, 585  
 Biosynthetic roles, 511  
 Biotin carboxylase, 598

Bisubstrate enzyme reactions, 393  
 Biuret reagent, 225  
 Biuret test, 225  
 Biuret, 225  
 Black tongue, 997  
 Blender, 1028  
 Blood proteins,  
 Bohr effect, 184  
 Bond angle, 63  
 Bond Angle, 63  
 Bond distance, *see* bond length  
 Bond energy, 24  
 Bond energy, 24, 65, 69  
 Bond length, 63  
 Bond length, 63, 69  
 Bond strength, 65  
 Bond strength, 65, 155  
 Bone Resorption, 877  
 Bongkrekate, 553  
 Bovine spongiform encephalopathy *see* mad cow  
   disease  
 Bradykinin, 898  
 British Physiological society,  
 Brønsted-Lowry acid, 41  
 Brønsted-Lowry base, 41  
 Bronstedt Lowry, 41  
 Buffers, 44  
 Buffers, 44  
 Butane, 19  
 Butanol, 19  
 Butyl hydroxy anisole, 274

## C

Calcitonin (CT), *see* thyrocalcitonin, 884  
 Calcium homostatics, 877  
 Calculatory or Pressor action, 873  
 Calines, 950  
   caulocaline, 950  
   phyllocaline, 950  
   rhizocaline, 950  
*Calotropis*, 247  
*Campylaephora*, 127  
*Canavalia ensiformis*, 338  
 Capillary force, 1034  
 Carbamoyl phosphate, 653  
 Carbohydrates, 458, 459, 511  
 Carbohydrates, 73, 458, 459, 511  
 $\alpha$ -carbon, **134**  
 $\gamma$ -carboxyglutamate, **145**  
 Carboxypeptidase B, 177  
 Carboxypeptidase Y, 177  
 Carboxypeptidase, A 175, **177**  
 Carnitine, **1018**  
 Carnosine, 144  
 Carotenes, 266

## 1216 FUNDAMENTALS OF BIOCHEMISTRY

- $\alpha$ -carotene, 266
- $\beta$ -carotene, 266
- $\gamma$ -carotene, 266
- Carotenoids, 265
- Carotenosis, 970
- Carotin, *see* carotene
- Casein, 213
- Castration, 847
- Catabolism, 488
- Catalase, 341
- Catalytic nature (of enzymes); **350**
- Catalytic triad, 367
- Cataract, 346
- Cations, 218
- Celiac disease, 976
- Cell surface Receptor, 798
- Cellobiose, 110, 112
- Cellulases, 120
- Cellulose acetate, 122
- Cellulose nitrate, 253
- Cellulose, 119, 121, 129
- Central dogma reverse, 722
- Cephalins, 250
- Ceramide,
- Cerebrone *see* phrenosin,
- Cerebronic acid, 238
- Ceruloplasmin, 207
- Cetyl alcohol, **232**
- Cetyl palmitate, 248
- Cevitamin, 1029
- Chain isomers,
- Chaperones, 786
- Chaperonins, 191
- Chargaff's equivalence rules, 298
- Chaulmoogric acid, **240**
- Cheilosis, 993
- Chemical Biology, 3
- Chemical bonding, 58
  - electrovalent, 58
  - coordinate, 58
  - covalent, 58, 60
- Chemical constants, 275
- Chemical coupling hypothesis, 542
- Chemical Physiology, 3
- Chemicals bonds involved in protein structure
  - primary bond, 130, 155
  - secondary bonds, 130
- Chenodeoxycholic acid, **261**
- Chimyl alcohol, **248**
- Chinese restaurant syndrome (CRS), 220
- Chitin, 122, 129
- Chitinases, 122
- Cholecystokinin (CCK), 843, 879
- Chloestanol, 260
- Chloramphenicol, 753
- Chloroform, 19
- Chloroplast, 701
- Cholecystokinin, 879
- Cholesterol, 242, 257, 258, 277
- Cholic acid,
- Choline, **1015**
- Chondrillasterol, 260
- Chondroitin sulfate A, 124, 126
- Chondroitin sulfate B, *see* dermatan sulfate
- Chondroitin sulfate C, 124, 126
- Chondroitin, 125
- Choromycetin, 755
- Chromatin material, 757
- Chromatography, **1030**, 1031
- Chromoproteins, 208
- Chymotrypsin, 149, **363**
- Chymotrypsinogen, 363
- CI bond, 62
- Ciliate protozoa, 828
- Citrate synthase reaction, 507
- Citric acid cycle (CAC), 6, 482, 483, 488, 500, 572
- Citrin, 1019
- Clathrin, 798
- Cleland diagrams, 394
  - ordered sequential mechanism, **395**
  - ping pong mechanism, **396**
  - random sequential mechanism, **396**
  - Theorell-Chance mechanism, **396**
- Clinical Biochemistry, -3, 4
- Clockwork gland, 887
- Cloverleaf model of tRNA, **321**
- Coagulated proteins, 209
- Coagulation (of proteins), 216
- Cobamide coenzyme *see* deoxyadenosyl cobalamine
- Coding ratio, 812
- Codon recognition, 741
- Codon, 812
- Coenzyme B<sub>12</sub>, **1007**
- Coenzyme levels, 506
- Coenzyme Q, **982, 983**
- Collagen triple helix,
- Collagen triple helix, 166, 168
- Collagens, 167, 169, 206
- Collip's hormone, 877
- Commaless (for genetic code), 816
- Common types of hydrogen bond, 26
- Complementarity, 302
- Compound lipids, 244
- Computer graphics, 557
- Configuration, 84
  - erythro, 84
  - threo, 84

- Conformation, 78, 88  
 Conjugate acid-base pair,  
 Concentrate feedback control, 706  
 Contractile proteins, 212  
 Conversion of meralonate into activated  
 Chylomicrons, 630  
 Convulsions, 999  
 Coordinate bond, 65  
 Coordinate Complex, 67  
 Copolymers method, 819  
 Coprostanol, 260  
 Copulins, 901  
 Core glycosylation, 776  
 Corneal vascularization, 993  
 Corpus luteal hormones, **854**  
 Corpus luteum, 854  
 Corticosteroid-binding globulin (CBG),-843, 854,  
 908  
 Corticosterone, **852**  
 Corticotropic effect, 871  
 Corticotropin, 909  
 Cortisol, 843, 851, 852, 908  
 Cortisone, 843, 852, 908  
 Covalent bond, 62  
 Covalent modification, 487  
 Covalent modification, 487  
 Craniotabes, 975  
 Creatine, 146  
 Cretinism, 882  
 2-thiouracil, 882  
 Crick adaptor hypothesis, 747  
 Crick strand, 299  
 Crotonyl-ACP, 604  
 Cryptorchidism, 849  
 Cryptogram, 810  
 Cryptone, **264**  
 Cubic crystals of sodium chloride, 59  
 Cumulative feedback control, 706  
 Cushing's syndrome, 853  
 Cyanides, 554  
 Cyclohexamide, 753, 755  
 Cyclopentanoperhydrophenanthrene, 255  
 Cystein, 731  
 Cysteine, 143  
 Cystine, 143, 151  
 Cytochrome, 535, **538**, 540  
 Cytochromes C, 205  
 Cytochromes, 535  
 Cytokinins,  
 Cytosine, 284  
 Citrate synthase, 489
- D**
- Dahlia sp.*, 118  
 Dansyl chloride, 222  
 Dative bond, 65  
*Daucus carota*, 101  
 Debye, 63  
 Defense proteins, 199, 212  
 Degeneracy of genetic code , 815  
 Dehydration, 18, 462, 493  
 Dehydrocholate reductase, 658  
 Dehydroepiandrosterone (DHEA), 843, 848  
 $\alpha\beta$  dehydrogenation of acyl COA,572  
 Dihydroxyacetone phosphate, 468  
 Denaturation (of proteins), 216, 217  
     irreversible type, 217  
     reversible type, 217  
 Denaturation and renaturation of DNA helix, 304  
 11-deoxycorticosterone (DOC), 848, 851  
 11-deoxycortisol, 851  
 Deoxyribonucleic acid (DNA), 282, 292  
     AT type, 297  
     GC type, 297  
 Deoxyribonucleosides, 288, 290, 293  
 Deoxyribonucleotides, 289  
 Deoxyribose, 290  
 Diphtheria toxin, 755  
 Derived lipids, 244  
 Derived proteins, 209  
     primary derived proteins, 209  
     secondary derived proteins, 209  
 Dermatan sulfate, 209  
 Descending chromatography, **1032**  
 Descriptive Biochemistry, 4  
 Designation D, 972  
 Desmolases, *see* lyases,  
 Desmosine, 170  
 Dextrins, 116  
 Diabetes insipidus, 874  
 Diabetes mellitus, 862  
 Diabetogenic effect, 872  
 Diastereoisomers, 79  
 Dibetogenic effect, 871  
 Dicarboxylic acids, 93, 353  
 Dicoumarol, 553,556  
 Dietary factor, 960  
 Diethylstilbesterol, 848  
 Differential centrifugation, **1029**  
*Digitalis purpurea*, 262  
 Digitoxigenin,262  
 Digitoxin, 262  
 Diglycerides, 145  
 5, 6-dihydrouracil,  
 9, 10-dihydroxystearic acid,

## 1218 FUNDAMENTALS OF BIOCHEMISTRY

- Diisopropylphosphofluoridate (DIPF),  
 Diketohydrindylidenediketohydrindamine,  
 6-dimethyladenine (DiMeA), 286  
 2-dimethylguanine (2-DiMeG), 286  
 Diosgenin  
 Dipolar ions, *see* zwitterions  
 Dipole moment, 63  
 Disaccharides, 75  
 Digitonin, 91  
 Dissociation constant, 44  
 Dissymmetry ratio, 297  
 Disulfide bond, 151, 860  
 Diterpenes, 263, 264  
 DL mixture, *see* racemic mixture  
 DNA absorbance spectra, 304  
 DNA melting serves, 304  
 DNA molecule  
   dimensions of, 806  
   length of, 306  
   molecular weight of, 306  
   shape of, 306  
   size of, 306  
 DNA polynucleotide chain, 298  
   antiparallelity of, 300, 361  
   base complementarity of, 300, 301  
   plectonemecity of, 300, 301  
 DNA rings, *see* plasmids  
 DNAs with unusual structures  
   bent DNA, 312  
   H-DNA,  
     palindromic DNA, 312  
 DNB amino acid, 222  
 Docublet code, 811  
 Doctrine of signatures, 4  
 Doctrine of vitalism, 4  
 Donex I, 1035  
*Drosera*, 334  
 Duicrinin, 843, 880  
 Dwarfism, 874  
   frohlich type, 874  
   lorain type, 875  
 Dowex-50, 1035  
 Dynamic Biochemistry, 4  
 Dymorphins, 897
- E**
- Edema, 18  
 Edestin, 207  
 Effectors, 835  
 Ehlers-Danlos syndrome, 168  
 Ehrlich test, 226, 227  
 Eicosanoids, 610  
 Eicosanoid Hormone, 889  
 Elastins, 169, 206  
 Electric dipoles, 29  
 Electron or ionic bond, 67  
 Electron transport 483, 522, 538, 539  
 Electron affinity, 61  
 Electronegativity, 61,  
 Electrophile, 41  
 Electrophoresis, 1040  
 Electrostatic bonds, *see* ionic bond  
 Electrovalency, 60  
 Elastin, 212  
 Elongation (of polypeptide chain), 724  
 Embden-Meyerhof-Parnas (EMP), 6  
   pathway, 6  
 Emergency glands, 886  
 Emergency hormones, 886  
 Emulsification, 271  
 Enantiomorphs, 78  
 Endemic goiter, 882  
 Endocrinology, 842, 843  
 Endoenzymes, 334  
 Endopeptidase, 353, 870  
 Endorphins, 897  
 Ene diol form, 97  
 1, 2-enediol, 97  
 2, 3-enediol, 97  
 3, 4-enediol, 97  
 Energy charge, 486  
 Energy yield, 475, 502  
 Enolase, 463  
 Enolization, 97  
 Enterogastrone, 843, 880  
 Enterokinase, 387  
 Enterokrinin, 843, 880  
 Envelope carrier hypothesis, 787  
 Enzyme levels, 506  
 Enzyme reaction rates, 382  
 Enzyme, 333, 462, 886  
   complex protein enzymes, 350  
   simple protein enzymes, 350  
 Enzyme, 462  
 Enzymic proteins, 210  
 Enzymology, 337  
 Epinephrine, 886, 90  
 Epiphysis, *see* pineal gland  
 Epithelioid cells, 881  
 Ergosterol, 260  
 Enkephalins, 897  
 Erythromycin, 753, 755  
 Erythropoietin, 888  
*Escherichia coli*, 133, 306, 422, 727  
 Esterification, 92, 220  
 $\beta$ -estradiol, 843, 844  
 Estrane, 845  
 Estriol, 848, 845  
 Estrogens, 844, 845

## SUBJECT INDEX 1219

- Estrone, 848, 845  
 Ethanol, 19  
 Ethanolamine, 250  
 Etherification, 92  
 Ethylene (ETH), 946, 447  
*Eucheuma*, 127  
 Euglobulins, 206  
*Euglena viridis*, 836  
 Eukaryotic Protein transport, 796  
 Exoenzymes, 334  
 Expansion freezing, 20
- F**
- Farnesol, **264**  
 Fat Soluble vitamins, 984  
 Father of Agricultural Chemistry, 5  
 Father of Microbiology, 7  
 Father of Modern Biochemistry, 4  
 Father of Modern Enzymology, 7  
 Fat-soluble vitamins, 962  
 Fatty acid oxidation in peroxisomes, 588  
 Fatty acid oxidation, 570  
 Fatty acid synthase complex, 600, 601  
 Fatty acids, 232  
     cyclic, 239  
     hydroxy, 238  
     saturated, 233  
     unsaturated, 235  
 'Fatty liver', 1016  
 FDP aldolase, *see* aldolase  
 Feedback inhibition, 387, 428  
 Fehling's reagent, 94  
 Ferment, 6, 458  
 Fermentation, 6, 458, 475  
 Ferritin, 212  
 Fibroin, 206  
 Fibrous proteins, 205, 214  
 Filtrate factor, 994  
 First-order kinetics, 382  
 Fischer's lock and key model, 380  
 Flavin adenine dinucleotide (FAD), 424  
 Flavoproteins, 208  
 1-fluoro-2, 4-dinitrobenzene (FDNB), 222  
 Folin's test, 226, 227  
 Folinic acid, 1001  
 Follicle-stimulating hormone (FSH), 843, 868, 881  
 Follitropin, 869  
 Formation of mevalonate from acetyl-CoA-625  
 Formic acid, 43  
 Formula of glucose, **83**  
 Linear form, 83  
 Formulation of monosaccharides, 82  
*Forsythia*, 106  
 Fosfat, 890  
 Frameshift mutation, 825
- Free boundry electrophoresis, 1041  
 Free radicals, 1012  
 Frieman test, 871  
 Fructosan, 119  
 Fructose, 458  
 Fructose, 458  
 6-D-fructosidase, *see* invertase, 447  
 Fusidic acid, 755  
 Fumarase, 489  
 Fumarate hydratase, 499  
 Functional group isomers, 77  
 Furan, 84  
 Furanose form, 83  
 Furfural, 96
- G**
- Galactopoietic effect, 872  
 Gangliosides, 253  
 Gastrin, 879  
 Gastrointestinal tract (GIT), 879  
 Gatrin, 843, 879  
 Gaucher's disease, 252  
 Geiger-Müller Counter or G-M tube, **1038**  
 Gelatin, 168  
 Gelidium, 127  
 Gene, 810  
 Genetic code in mitochondria, 827  
 Genetic code, 733, 809, 810, 812, 815  
 Geometric isomerism, 270  
 Geometrical isomers, 77  
 Geraniol, 264  
*Gibberella fujikuroi*, *see* *Fusarium moniliforme*,  
     936, 935  
 Gibberellins, 916, 935  
 Gigantism, 875  
*Gigartina*, 127  
 Galactopoietic effect, 871  
 Gliadin, 207  
 Globin, 205, 214  
 Globular proteins, 205, 214  
 Globulins, 206  
     euglobulins, 206  
     pseudoglobulins, 206  
 Globulose, 210  
 Glossitis, **993**  
 Glucagon, 843, 909  
 Glucan maltohydrolase, 118  
 Glucitol, 96  
 Glucocerebrosidase, *see* glucosyl ceramide  
     hydrolase  
 Glucocorticoids, 843, 851, 852  
 Glucokinase, 465  
 Glucosan, 117  
 Glucose, 27, 459, 461, 559  
 Glumate dehydrogenase, 647



## 1220 FUNDAMENTALS OF BIOCHEMISTRY

- Glutamate dehydrogenase, 509  
 Glutamic acid, 144, 170, 390, 731  
 Glutaminase, 648  
 Glutamine synthetase, 685  
 Glutamine, 143, 170  
 Glutamine, 731  
 Glutathione (GSH), 148  
 Glutelins, 207  
 Glycocol, *see* glycine,  
 Glyceraldehyde, 3-phosphate dehydrogenase, 469,  
 470  
 Glycerol, 27, 272  
 Glycerophospholipid, 615  
 Glyceryl ethers, 248  
 Glycine, 27, 142, 159, 657, 658  
 Glycocholic acid, 262  
 Glycogen, 118, 121, 129  
 Glycogen-like polysaccharide, 118  
 Glycol dehydrogenase, 344  
 Glycolipids, 252  
 Glycolysis, 458, 459, 460  
 Glycolytic enzyme, 462  
 Glycoproteins, 208  
 Glycosides, 91  
 Glycosphingosides, *see* glycolipids  
 Glycyl-L-alanyl-L-serine, 148  
 Glyoxylic acid test, *see* Hopkins-Cole test  
 Goiter, 883  
     endemic, 883  
     exophthalmic, 883  
     simple, 883  
 Goitrogens, 882  
 Gonadotrophic hormones (GTH), *see*  
     gonadotropins  
 Gonadotropins, 843, 909  
*Gracilaria*, 127  
 Gramicidin A, 553, 557  
 Glycolysis 458, 459, 460  
 Gramicidin S, 762  
 Grave's disease, 884  
 Gravitational force, 1034  
 Ground state, 372  
 Growth factors, 150  
 Growth hormone, 871  
 Growth inhibitors, 930  
 Growth-stimulating substance (GSS), 841  
 GTP-GDP cycle, 784, 785  
 Guanine, 285  
 Guanosine 3', 5'-cyclic monophosphate (cGMP),  
 291
- H**
- Hairpin bend, 165  
 Halogenation, 273  
 Hassebalch equation, 46  
 Harden-Young ester, *see* fructose- 1,6-diphosphate  
 Haworth perspective formula, 86, 102  
 Heat shock proteins, 787  
*Helianthus tuberosus*, 118  
 Helix (of proteins), 160  
      $\alpha$ -helix, 160  
      $\beta$ -helix, 164  
      $\gamma$ -helix, 165  
 Hemiacetals, 82  
 Hemicelluloses, 123  
 Hemiketals, 82  
 Hemithioacetal, *see* thiohemiacetal  
 Hemocyanin, 208  
 Hemoerythrin, 208  
 Hemoglobin buffer system, 51  
 Hemoglobin, 172, 180, 181, 208  
     hemoglobin A, 180  
     hemoglobin A<sub>2</sub>, 180  
     hemoglobin F, 185  
 Henderson-Hasselbalch equation, 46  
 Heparin, 126  
 Hepatoflavin, 992  
 Hepatocrinin, 843, 880  
 Hesperidin, 1019  
 Heterocyclic amino acids, 139  
 Heterolipids, *see* compound lipids  
 Heteropolysaccharides, 114, 123  
 Heteroproteins, 207  
 Hexane, 69, 70  
 Hexokinase IV, *see* glucokinase  
 Hexokinase, 464, 340  
 Hexuronic acid, 1009  
 HG-factor, *see* hyperglycemic factor  
 High solvent power, 19  
 Histidine, 144, 170, 181, 340, 731, 820  
 Histones, 206  
 Holoenzyme, 349  
 Holoproteins, 206  
 Homeostasis, 837, 838  
 Homocysteine, 142  
 Homogenate, 1029  
 Homogenization, 1028  
 Homoglycans, *see* homopolysaccharide  
 Homiotherms, 271  
 Homolipids, *see* simple lipids  
 Homorrhage, 982  
 Homorrhagic factors, 979  
 Homopolysaccharides, 114, 115  
 Hopkin's-Cole test, 226, 227  
 Hormones, 835  
     general, 835  
     local, 835  
 Household sugar, *see* sucrose  
 Human chorionic gonadotropin (HCG), 871  
*Hyalophora cecropia*, 840



- Hyaluronic acid, 124, 125  
 Hyaluronidases, 125  
 Hydantoic acid, 224  
 Hydantoin, 224  
 Hydnocarpic acid, 239, 240  
*Hydra*, 838  
 Hydrindantin, 223  
 Hydrofluoric acid, 19  
 Hydrogen bond, 68  
 5-hydroxymethyl furfural, 96  
 5-hydroxymethylcytosine, 285  
 Hydrogen bond, 68, 152  
   directionality of, 68  
 Hydrogen bonding, 303  
   between water molecules, 22, 24  
   between water and solute molecules, 25  
 Hydrogen sulfide, 555  
 Hydrogenation, 273  
 Hydrolases, 341  
 Hydrolases, 341  
 Hydrolysis, (of fats), 102, 108, 271, 511  
 HYdrolysis, (of proteins), 219  
 Hydrolysis, 511  
 Hydrolytic rancidity, 273  
 Hydronium ion, 24  
 Hydrophobic bonds, or interactions, 29, 69, 154  
 Hydrophobic or nonpolar interactions, 69  
 Hydroxide ion, 24  
 Hydroxy amino acids, 139  
 Hydroxyl ion, 24  
 Hydroxylamine, 99  
 Hydroxylysin, 145  
 Hydroxyproline, 145  
 'Hydrates of carbon' 74  
 18-hydroxy-11-deoxycorticosterone, 845, 851  
 18-hydroxycorticosterone, 851  
 Hyperadrenocorticism,  
 Hyperchromicity (of DNA),  
 Hyperglycemic (HG) factor, 862, 865  
 Hyperglycemic agent,  
 Hyperglycemic factor, 865  
 Hyperparathyroidism, 878  
 Hyperpituitarism, 875  
 Hyperthyroidism (thyrotoxicosis), 882  
 Hyperthyroidism, 883  
 Hypervitaminosis A, 970  
 Hypervitaminosis D, 974  
*Hypnea*, 127  
 Hypoadrenocorticism, 853  
 Hypoglycemic agents, 864, 865  
 Hypoparathyroidism, 874, 878  
 Hypophysectomy, 876  
 Hypopituitarism, 874, 875, 882  
 Hypothesis, 13, 569  
 Hypoxanthine, 286
- I**
- Iatrochemistry, 4  
 Imino acids, 142  
 Immobilized enzyme, 347  
 Immunoglobulins, 212  
 Inborn errors of amino acid metabolism, 665  
 Increase in osteolastic activity, 877  
 Infraproteins, *see* metaproteins  
 Inositol, 1016  
 Insoluble RNA, *see* ribosomal RNA  
 Insulin, 152, 212, 843, 909  
 Interferon (IF), 198  
    $\alpha$ -interferon, 198  
    $\beta$ -interferon, 198  
    $\gamma$ -interferon, 198  
 Intermedins, *see* melanocyte, 909  
   stimulating hormones, 909  
 Intermolecular bonding, 69  
 Internal salts *see* zwitterions  
 International Union of Biochemistry (IUB), 349  
 Interstitial cell-stimulating hormone  
   (ICSH), *see* luteinizing hormone  
 Intracellular enzymes, *see* endoenzymes, 334  
 Intramolecular dehydration, 219  
 Inulin, 118, 129  
 Inversion of sucrose, 103  
 Invert sugar, 102  
 Invertase, 103  
 Invertebrate hormones, 838  
   hormones from annelida, 839  
   hormones from arthropoda, 839  
   hormones from coelenterata, 838  
   hormones from echinodermata, 841  
   hormones from mollusca, 841  
 Iodine value, 275  
 Iodoacetamide, 393  
 Iodothyroglobulin, *see* thyroglobulin,  
 Ion binding capacity, 218  
 Ion exchange chromatography, 1035, **1036**  
 Ion pair, 367  
 Ion product of water, 37  
 Ionic bonds, 67, 154  
 Ionization potential, 57  
 Ionophoresis, *see* zone electrophoresis, 1043  
 Irreversible enzyme inhibition, 392  
 Islet tissue, *see* islets of Langerhans  
 Islets of Langerhans, 857  
 Isoacceptor tRNAs, 320  
 Isoamylose, *see* amylopectin, 170  
 Isocitrate dehydrogenase, 509  
 Isocitrate lyase, 509  
 Isodesmosine, 218  
 Isoelectric point (pI), 219  
 Isoelectric precipitation, 219

## 1222 FUNDAMENTALS OF BIOCHEMISTRY

Isoenzymes, 343  
 Isoleucine, 662, 731  
 Isomaltose, 141  
 Isomer, 77  
 Isomerases, 342  
 Isomerism, 77  
 Isomerization, 462  
 Isoniazid, *see* isonicotinic acid hydrazide  
 6N-isopentenyladenine (6-IPA), 286  
 Isoprene rule, **263**  
 Isotels, *see* vitamins  
 Isotopes, 57  
 Isotopic chromatography, 1036  
 Isozymes, *see* isoenzymes, 343

**J**

Juniperic acid, 248  
 Juvenile hormone (JH), *see* status quo hormone

**K**

Kallidin, 899  
 Kornberg cycle, 514  
 Keratin of wool, 152  
 Keratin, 163, 169, 206  
 Keratomalacia, 969  
 Keratosulfate, 124, 126  
 Kerbs bicycle-652  
 Ketoacyl-ACP 604  
 Ketogenesis, 584  
 Ketogenic effect, 872  
 Ketosis, 507  
 Kiliani cyanohydrin synthesis, 78, 97  
 Kinase, 898  
 Kinetic behaviour of allosteric enzymes, 399  
     concerted model, **399**  
     simple sequential model, **399**  
 Kinins, 898  
 Knoop's  $\beta$  oxidation Pathway, 570  
 Koettstorfer number, *see* iodine number  
 Koshland induced fit model, **381**  
 Krebs cycle, *see* citric acid cycle  
 Krebs-Kornberg cycle, *see* glyoxylate cycle  
 KWOK's disease, 220  
 Kwashiorkor, 18

**L**

La vie sans l' air, 6  
 Lactalbumin, 213  
 Lactase, 107  
 Lactate dehydrogenase, 476  
 Lactoglobulin, 213  
 Lactic dehydrogenase (LDH), 476  
     heart LDH, 343  
     muscle LDH, 240

Lactobacillic acid, **240**  
 Lactoflavin, *see* riboflavin  
 Lactogenic hormone (LH), *see* luteotropin,  
 Lactosazone, 98  
 Lactose intolerance, 108  
 Lactose synthetase, 354  
 Lactose, 106, 107, 112  
 Lamberts Law, 1039  
 Lanosterol, 260  
 Larval hormone, *see* status quo hormone  
 Lavandulol, 260  
 Low hatchability, 979  
 Laws of thermodynamics, 5  
 L-azetidine-2-carboxylic acid, 146  
 L-citrullin, 145  
 LDLs, 631  
 LeBel-van't Hoff rule, 78  
 Lecithin, 249  
 Legume oligosaccharides, 75  
 Legumelline, 206  
 Legumine, 207  
 Leprosy, 239  
 Leucine, 141  
 Leucosine, 206  
 Leukotriene, 893  
 Leukotrienes, 893, 896  
 Levan, *see* fructosan  
 Levorotatory, 219  
 Levulinic acid, **96**  
 Ligases, 342  
 Lignin, 121  
 Lignoceric acid, **253**  
 Limonene, **264**  
 Lineweaver-Burk equation, **376**, **377**  
 Lipids, (general structure), 230  
 Lipids, 511  
 Lipochromes, *see* carotenoids  
 Lipoic acid, **1017**  
 Lipoids, *see* lipids, 231  
 Lipoproteins, 208, 209  
 Lipoxygenase, 896  
 Liver *Lactobacillus casei* factor, 1002  
 L-L- $\alpha$ - $\epsilon$ , diaminopimelae, **195**  
 Lobry de Bruyn-Alberda van  
     Ekenstein transformation, 96, 97  
 Low-calory fat, 276  
 Lutein, **268**  
 Luteinizing hormone (LH), 843  
 Luteotrophic hormone (LTH), *see* luteotropin, 868.  
 Luteotropin, 843  
 Lyases, 342  
 Lycopene, **266**  
*Lymnaea stagnalis*, 841  
 Lysine, 144, 170, 206, 353, 820  
 Lysoccephalins, 250

Lysolecithins, 249  
Lysozyme, 348, 360

## M

Macromolecules, 9  
Maillard's reaction, *see* Browning reaction  
Malic dehydrogenase (MDH), 344  
Malic enzyme, 514  
Malt sugar, *see* maltose  
Maltase, 107  
Maltosazone, 99  
Maltose, 108, 112  
Mammotrophic hormone (MH), *see* luteotropin  
Mannitol, 96  
Mannose, 95  
Maple syrupurine disease, 670  
"Manifestation of nature's impatience", 333  
*Maranta arundinacea*, 115  
Muscular twitchings, 878  
Mass number, 1036  
Mass spectrometer, 1037  
Master gland, *see* hypophysis  
Malate dehydrogenase, 489  
Maturation-inducing substance (MIS), 841, 868  
Maximal rate, 379  
Mechanism-based inactivators, *see* suicide inhibitors  
Mechanistic models, 829  
Medical chemistry, *see* iatrochemistry  
Melanocyte-stimulating hormones (MSH), 872, 843  
     $\alpha$ -MSH, 843  
     $\beta$ -MSH, 843  
Melanotropins, *see* melanocyte-stimulating hormones  
Melting temperature ( $T_m$ ), 270  
1-methylguanane (1-MeG), 286  
Menthol, 264  
Mercerized cotton, 122  
Messenger RNA, 734  
Metabolic concepts, **407**  
Metabolic water, 17, 50  
Metabolic water, 589  
Metalloproteins, 207  
Metaproteins, 209  
Methionine, 142  
Methionine, 662, 814, 947  
Methionine, 814  
Methylcytosine (MC), 285  
6-N-methylaine, **145**  
Methylmalonate pathway, 579  
6-methionine, (6-MeA),  
Micelles, 29  
Michaelis constant ( $K_m$ ), 376, 378  
Michaelis-Menten equation, 376

Micromolecules, 9  
Milk sugar, *see* lactose  
Milk-let-down ejection factor, 873  
Millieu interieur, 836  
Mineralocorticoids, 843, 831, 852  
Mirror repeat, 313  
'Miracle hormone', 888  
Mitochondrial respiratory chain, 572  
Modified nitrogenous base, 285  
    modified purines, 286  
    modified pyrimidines, 285  
Modifiers of enzyme activity-inorganic modifiers, 384  
    organic modifiers, 387  
Modulator, 397  
Molecular activity, *see* turnover number  
Molecular Biochemistry, 4  
Molisch test, 96  
Monellin, 105  
Monocarboxylic acids, 93  
Monoglycerides, 271  
Mononucleotides, 282  
Monosaccharides, 82  
Monosodium glutamate, 220  
Monoterpenoid, 264  
    fatty acids, (MUFA's), 276  
Monoterpenes, 264  
Motile proteins, *see* contractile proteins  
Moulting hormone, *see* ecdyson  
Moulting, *see* ecdysis,  
Moult-inhibiting hormone, 840  
Moult-promoting hormone, 841  
Mucopolysaccharides, 124  
Mucoproteins, 208  
Multirotation, *see* mutarotation  
Muramidase, *see* lysozyme  
Muscle sugar, *see* inositol, 1016  
Muscular dystrophy, 979  
Muscular twitchings, *see* tetany  
Mutarotases, 86  
Mutarotation, 81, 86  
Mycosterol, 296  
Myoglobinm, 171  
Myohematin, *see* cytochromes  
Myosan, 209  
Myosin, 209  
Myrcene, 264  
Myricyl alcohol, **232**  
Myricyl palmitate, 248  
Myristoylation at the N-terminus, 796  
Myxedema, 882

## N

NAD linker, 532

## 1224 FUNDAMENTALS OF BIOCHEMISTRY

- Negative modifiers (of enzymes), *see* enzyme inhibitors
- Neotenin, *see* status quo hormone, 839
- Nepenthes*, 334
- Nereis diversicolor*, 839
- Neurofibromatosis, 878
- Neurohormones, 868
- Neurohumors, 868
- Neurohypophyseal hormone, 897
- Neurohypophysis, *see* pars nervosa, 873
- Neutral pH, 37
- Neutrophils, 894
- Newberg's ester, *see* fructose 6-phosphate
- Niacin, *see* nicotinic acid, 410
- Niacinamide, 995
- Niacinamide, *see* nicotinamide
- Nicotinamide adenine dinucleotide (NDA), 532, 588
- Nicotinamide adenine nucleotide, 532, 533
- Niemann-Pick disease, 251
- Nigericin, 558
- Ninhydrin, *see* triketohydrindenehydrate
- Nitrate reductase, 684
- Nitrogen complex, 682
- 'Nitrous acid' method, 221
- Nitrogen cycle, 680
- Nitrogen excretion, 649
- Nitrogenous bases, 284
- Nitroprusside test, 226, 227
- Nonambiguity, 816
- Noncovalent interactions, 32, 67
- Nonoverlapping, 816
- Nonpolar bonds, 60, 69, 154
- Nonprotein amino acids, 145
- Nonreducing sugars, 94, 95
- Nonstandard protein amino acids, 144
- Noradrenalin, *see* norepinephrine, 843
- Norepinephrine, 886
- Norepinephrine, 908
- Normal amino acids, *see* standard amino acid
- Nucleic acid, 280
  - primary structure, 293
  - tertiary structure, 293
- Nucleophilic attack, 55
- Nucleophilic attack, 55
- Nucleoproteins, 209
- Nucleoside analogues, 289
- Nucleosides, 287, 288
- Nucleotides, 280, 290, 291
- Nutrient materials, 836
- Nutrient polysaccharide, 115
- Nutrient proteins, 212
- O**
- Obesity, 875
- Ochre, 817
- Octopus*, 841
- Ocytocin, 152, 843, 873, 909
- Oleic acid,
  - Oleodipalmitin, 246
  - Oleopalmitostearin, 246
- Oligomycin, 553
- Oligonucleotide, 294
- Oligosaccharides, 100
- Opal, 817
- Ophitapeptides, 897
- Optical activity (of proteins), 219
- Optical isomerism, 81
- Optical isomers, 77,
- Orcyl-alanine, 146
- Organic modifiers, 387
- Orinase, *see* tobutamide
  - L-ornithine,
- Oryzenin,
- Osazone, 981
- Osteitis fibrosa cystica, 879
- Osteogenesis imperfecta, 168, 879
- Osteomalacia, 976
- Ostrasterol, 260
- Oubain, 262
- Ovalbumin,
- Overlapping of genes, 828
- Ovoflavin, *see* riboflavin, 992
- Ovoglobulin,
- Oxidation (of fats), 273
- Oxidation of amino acids, 93, 641
- Oxidation of fatty acids, 567
  - $\alpha$  oxidation of fatty acids, 581
  - $\omega$  oxidation of fatty acids, 582
  - $\beta$  oxidation pathway, 571, 572
- Oxidation of odd-chain fattyacids, 578
- Oxidation of unsaturated fattyacids, 576
- Oxidation-reduction potential, 411, 558, 524, 482, 522, 523
- Oxidative phosphorylation, 274, 482, 522, 523, 524, 558
- Oxidative rancidity, 340
- Oxidoreductases, 274
- Oximes, 991
- 2-OXO-acid carboxylase, *see* pyruvate deoxycarboxylase
- 2-oxoglutarate, *see*  $\alpha$ -ketoglutarate

- Oxygen-dissociation curve, 183  
 Oxynervonic acid, 253  
 Oxytocin, *see* oxytocin
- P**
- Pace setter, 882  
 Palindrome, 313  
 Palmitolation, 797  
 Pancreatotropic effect, 871  
 Pancreozymin (PZ), 843, 880  
 Pancreozymin, 910  
 Panhypopituitarism, 875  
 Papain, 344  
 Paper, 1031  
 Paracrine, 887  
 Parathormone (PTH), 843  
 Parathyroids, 877
  - accessory, 877
  - external, 877
  - internal, 877
 Parathormone, 910  
 Parenteral, 864  
 Parotin, 843, 880  
 Pars distalis, 866  
 Pars intermedia, 872  
 Pars nervosa, 843  
 Partition chromatography, 1030  
 Partition force, 1034  
 Pasteurization, 335  
 Pauly test, 226, 227  
 Payoff phase, 461  
 Pectin, 122, 129  
 Pelargonic acid,  
 Pellagra, 6, 996  
 Pelvis, 975  
 Pentasaccharide,  
 PEP carboxykinase, 513  
 Pepsin, 345, 351  
 Peptide bond, 146, 147, 156, 158, 844  
 Peptide chain, 147, 148, 844  
 Peptides, 146
  - dipeptide, 147
  - macropeptides, 147
  - oligopeptide, 147
  - polypeptide, 147
  - tripeptide, 147
 Peptones, 210  
 Pernicious anemia, 1008  
 pH and buffers, 36  
 pH scale, 37  
 Phenanthrene, 255  
 Phenolic derivatives, *see* amino acid derivatives  
 Phenyl isocyanate, 224  
 Phenyl isothiocyanate, 224  
 Phenyl thiohydantion, 251, 252  
 Phenylalanine hydroxylase, 658  
 Phenylalanine, 27, 142  
 Phenyllactate, 669  
 Phenylpyruvate, 669  
 Pheochromocytoma, 887  
 Pheromone factor, 903  
 Pheromones, 899  
 Phosgene, 225  
 Phosphalipase, 889  
 Phosphate buffer system, 49  
 Phosphatidal choline, 249  
 Phosphatidal ethanolamine, 250  
 Phosphatidal serine, 250  
 Phosphatidate, 614  
 Phosphatids, *see* phospholipids  
 Phosphatidyl choline, *see* lecithins  
 Phosphatidyl ethanolamine, 250  
 Phosphatidyl inositols, *see* phosphoinositides  
 Phosphatidyl serine, 250  
 Phosphatidylcholine, 27  
 Phosphatidylcholine, 619  
 Phosphocreatine, 709  
 Phosphodiesterase, 904  
 Phosphofructokinase, 463, 466  
 Phosphoglucoisomerase, 463  
 Phosphoglyceracetals, *see* plasmalogens  
 Phosphoglyceral-dehydrogenase, 470, 471  
 Phosphoglyceraldehyde dehydrogenase, *see*  
 glyceraldehyde 3-phosphate dehydrogenase  
 Phosphoglycerate kinase, 463, 471  
 Phosphoglycerate mutase, 463, 472  
 Phosphoglycerides, 249, 549  
 Phosphoinositides, 251  
 Phospholipase, 894  
 Phospholipids, 248  
 Phosphoryl shift, 462  
 Phosphoproteins, 208  
 Phosphopyruvate kinase, *see* enolase  
 Phosphoric acid, 42  
 Phosphorolysis of thioester, 470  
 Phosphoryl transfer, 462  
 Phosphorylation of glucose, 464  
 Phosphorylation potential, 486  
 Phosphosphingosides, 251, 252  
 Phosphotriose isomerase, 463  
 Phrynoderma, 969  
 Phytin, 1016  
 Phytol, 265  
 Phytonadione, *see* phyloquinone  
 Picogram, 306  
 Piericidin A, 554  
 Pineal hormone, *see* melatonin, 844  
 Pitocin, *see* oxytocin, 843  
 Pitressin, *see* vasopressin, 843

## 1226 FUNDAMENTALS OF BIOCHEMISTRY

- Pituitary diabetes, 872  
 Pituitary-like effect, 871  
 Pituitary myxedema, 875  
 Pituitary, *see* hypophysis, 844  
 Plant fats, 247  
 Plant proteins, 204, 205  
 Plasma lipoproteins, 629  
 Plasma proteins,  
 Plasmalogens, 250  
 PLP or PALP, 646  
 Pneumococcus type III, 124  
 Poikilotherms 271  
 Polar animals, 967  
 Polar bond, 62  
 Polar or ionic bond, 59  
 Polar bond, 59  
 Polarity of water, 22  
 Polarity, 817  
 Polenske number, 275  
 Polynucleotide, 292  
 Polyribosome, 735  
 Polypeptides, 210  
 Polysaccharides, 75, 100, 114  
 Polyubiquitin system, 803  
 Polyunsaturated fatty acids, (PUFAs), 276, 277  
 Porphyrins, 512  
 Porphyropsin, 972  
*Porthetria dispar*, 901  
 Positive modifiers (of enzymes), *see* enzyme  
   activators,  
 Potter- Elvehjem homogenizer, 1028  
 Prefix *pro-*, 234  
 Pregnancy hormone, *see* progesterone  
 Preparatory phase, 460  
 Priapal, 902  
 Primary amino acids, *see* standard amino acids  
 Prions, 193  
 Progesterone, 848, 853, 908  
 Progestins, *see* corpus luteal hormones, 857  
 Prohormones, 857  
 Proinsulin, 857, 860  
 Prolactin (PL), *see* luteotropin  
 Prolamines, 207  
 Proline, 141, 159  
 Proline, 820  
 Pro-oxidants, 275  
 Proparathormone, 857  
 Propionic acid, 42, 43  
 Prostacyclin, 892, 893  
 Prostaglandins (PG), 889, 894, 906  
 Prostanoid acid, 890  
 Prosthetic group of aminotransferases, 645  
 Protamines, 106, 349  
 Proteans, 209  
 Protein assembly, 746  
 Protein configuration, 155  
   primary structure, 155, 156  
   secondary structure, 155, 160, 195  
   tertiary structure, 155, 171, 197  
   quaternary structure, 156, 179  
 Protein degradation, 800  
 Protein kinase, 905  
 Protein targeting and degradation, 773  
 Protein transport, 789, 791, 792, 793, 794  
 Protein, 132, 511  
 Proteinase, 147  
 Proteolytic enzymes, 220  
 Proteolytic trimming, 752  
 Proteoses, 210  
 Prothoracic gland hormone (PGH), *see* ecdysone  
 Prothymus, 899  
 Protogen, *see* pyruvate oxidation factor  
 Pseudo-paralysis, 1013  
 Pseudoglobulins, 206  
 Pseudouracil,  
 Pseudouridine (Ψ U), 288, 289  
 Puberty, 847  
 Pupation hormone, *see* ecdysone  
 Purine (s), 284, 512  
 Puromycin, 753, 756  
 Pyran, 84  
 Pyranose form, 83  
 Pyridine nucleotides, 531  
 Pyrimidine(s), 284  
 Pyrophosphokinase, 680  
 Pyruvate carboxylases, 477, 485  
 Pyruvate dehydrogenase complex, 483, 484  
 Pyruvate dehydrogenase, 483, 484  
 Pyruvate kinase, 463, 474  
 Pyruvate oxidation, 481, 1017  
 Pyruvic acid, 42  
 Pyruvate decarboxylase, 477
- Q**
- Quabain, 262  
 Queen substance, 901
- R**
- Racemic mixture, 81  
 Racemization, 81  
 Rachitic dwarfism, 976  
 Rachitic rosary, 975

- Radioactive isotopes, 1037  
 Radioactive sample, 1038  
 Rancidity, *see* rancidification  
 Random coil, 165  
 Receptor mediated endocytosis, 799  
 Recklinghausen's disease, *see* osteitis fibrosa cystica  
 Redox reactions, *see* oxidation-reduction reactions  
 Reducing sugars, 94, 95  
 Reduction of the carbonyl group, 603  
 Refolding (of proteins), *see* renaturation  
 Regulatory enzyme, 397  
   homotropic, 397  
   heterotropic, 397  
 Reichert-Meissl number, 275  
 Relaxin, 848, 856, 908  
 Renal hormone, 888  
 Renal reabsorption, 877  
 Renaturation (of proteins), 216  
 Rennet, *see* rennin  
 Rennin, 345  
 Resolution front, 1033  
 Resonance, 157, 449  
 Respiratory chain phosphorylation, *see* oxidative phosphorylation  
 Respiratory control, 506  
 Retinoic acid, 968  
 Reversible enzyme inhibition, 388  
   competitive inhibition, 389  
   noncompetitive inhibition, 392  
   uncompetitive inhibition, 392  
 Rhodopsin, 971  
 Ribonuclease (RNase), 175, 176  
 Ribonucleic acid (RNA), 282, 314  
 Ribonucleosides, 288, 290  
 Ribonucleotides, 289  
 Ribosome, 724, 758, 726  
 Ricin, 212  
 Rickets, 6, 959, **975**  
 Rifamycin, 753  
 Rod vision, 971  
 Rotenone, 553, 554  
 Rule of n, *see* Le Bel-van't H of rule  
 Rutamycin, 555
- S**
- SH Group, 470  
 Saccharase, *see* invertase  
 Saccharic acid, *see* glucaric acid  
 Saccharin, 104  
 Sakaguchi test, 226, 227  
 Salicylic acid, 896  
 Sanger's reagent, *see* 1-fluoro-2, dinitrobenzene  
 Saponification number, 275  
 Saponification, 272  
 'Salting-in' effect, 218  
 Sarin, 393  
 Saw-tooth rule, 270  
 Schweitzer's reagent, 119  
 Scintillation counting, 1038  
 Scurvy, 1013  
 Scurvy, 6  
 Secondary sex characters, 847  
   in females, 847  
   in males, 850  
 Seco-steroids, **974**  
 Secretin, 835, 843, 879, 910  
 Secretory gland, 877  
 Serotonin, 887  
 Scleroproteins, 207  
 Semipolar bond, *see* coordinate bond  
 Semipolar, 65  
 Sequential feedback control, 705  
 Serine, 143, 170, 250, 814  
 Sex hormones, 842  
   primary, 869  
   secondary, 870  
 Shine-Dalgarno sequence, 739  
 Siderophilin, 207  
 Signal hypothesis, 776  
 Silk fibroin, 152, 164  
 Simple lipids, 244, 245  
 Simple proteins, *see* holoproteins  
 Sine quo non, 962  
 Singlet code, 811  
 Sitosterol, 260  
 Sodium RNA, *see* transfer RNA  
 'Social' hormones, *see* pheromones  
 Somatotrophic hormone (SH), *see* somatotropin, 843  
 Somatotropin (STH), 871, 909  
 Specificity of enzyme action, 352  
   absolute specificity, 352  
   geometrical specificity, 352  
   group specificity, 352  
   optical specificity, 352  
 Spectrophotometry, 1039  
 Spectrophotometer, 1039  
 Sephadex, 1035,  
 Sphincter of thought, 887  
 Sphinganine, *see* dihydrosphingosine



## 1228 FUNDAMENTALS OF BIOCHEMISTRY

- 4-sphingine, *see* sphingosine  
 Sphingomyelins, *see* phosphosphingosides  
 Spinal column, 975  
 Spinasterols, 260  
 Sporocytophaga myxococcoides, 123  
 Squalamine, 242  
 Standard Oxidation-Reduction Potential, 528, 529  
 Standard oxidation-reduction potential, *see*  
 standard redox potential  
 Standard redox potential, 528, 529  
 Starch, 115, 121  
 Start signals, 759  
 Sterane, *see* cyclopentanoperhydrophenanthrene  
 Stereoisomers, 77  
 Sterility, 979  
 Steroids, 255, 844  
 Sterols, 256  
 Stigmasterol, 260, 983  
 Stochastic mod, 829  
 Storage proteins, 212  
 Streptomycin, 753  
 Strong acid, 41  
 Structural polysaccharides, 115  
 Structural proteins, 212  
 Structure of an atom, 55  
 Substrate analogue inhibition, *see* competitive  
 inhibition  
 Substrate sites, *see* catalytic sites, 379  
 Sucaryl sodium, 105  
 Succinate dehydrogenase, 489, 498  
 Succinic acid dehydrogenase (SDH), 388, 389  
 Succinic thiokinase, *see* succinyl CoA synthase  
 sucrose, 338  
 Succinyl-CoA synthetase, 489  
 Sucrose, 101, 112, 129  
 Suffix,  
 – an 117  
 – ase, 337  
 – dine, 288  
 – sine, 288  
 Suicide inhibitors, 393  
 Sulfatides, 254  
 Sulfolipids, 254  
 Sulfonylaminoglucose, *see* D-glucosamine-N-  
 sulfate  
 Sullivan test, 226, 227  
 ‘Sunshine vitamin’, 972  
 Superhelix, 166  
 Supernatant, 1029  
 Suprarenal glands, *see* adrenals  
 Surface tension (of fats), 271  
 Svedberg’s rule, 215  
 Sweeteners, 104  
 Synthesis of cholesteryl ester, 629  
 Synthetases, *see* ligases
- T**
- Taraxacum officinale*, 118  
 Targets, 835  
 Tautomerism, 286  
 enol or lactim form, 286, 287  
 keto or lactum form, 286, 287  
 Tay-Sachs disease, 254  
 Template model, *see* Fischer’s lock and key model  
 Terminal glycosylation, 781  
 Terpenes, 263  
 Terra, 18  
 Testosterone, 848, 845, 848  
 3, 5, 5-tetraiodothyronine (T<sub>4</sub>), 843  
 Tetrahydrofolic acid, **1003**  
 Tetracyclines, 754  
 Tetranucleotide hypothesis, 298  
 Theelin, *see* estrone  
 Theelol, *see* estriol  
 Theory, 13  
 Thermolability (of enzymes), 335  
 Thin layer chromatography, **1035**  
 Thiolysis, 574  
 Thiourea, 882  
 Thorax, 975  
 Threonine, 143, 170, 387  
 Thrombin, 354  
 Thrombokinase, *see* thromboplastin  
 Thromboxanes, 892  
 Thymectomy, 899  
 Thymine, 284, 892  
 Thyrocalcitonin (TCT), 884, 885  
 Thyroid inhibitors, *see* goitrogens  
 Thyroid stimulating hormone (TSH), *see*  
 thyrotropin, 843  
 Thyroidal hormones, 907  
 Thyrotoxic exophthalmos, 884  
 Thyrotropin, 909  
 Thyroxine, *see* tetraiodothyronine  
 Thyroxine, Tu, 910  
 Tissue hormone, 887  
 Tissue hormones, *see* parahormones  
 Tissue slices, 1028  
 TIT or T3, 910  
 Titration, 43, 138

Tobacco mosaic virus (TMV), 11, 179  
 $\alpha$ -tocopherol, 978  
 Tolinase, *see* tolazamide  
 Toxic proteins, 212  
 Transcarboxylase, 598  
 Transfer RNA, 728  
 Transferases, 341  
 Transferrin, *see* siderophilin  
 Translation (of proteins), 812  
 Transport proteins, 212  
 Traumatin, *see* traumatic acid  
 Trehalose, 11, 112  
 Triacylglycerols, 42  
 Triacylglycerols, *see* triglycerides  
 5, 7, 8 -trimethyl tocol, *see*  $\alpha$ -tocopherol  
 Trousseau's sign, 878  
*Trichonhympha*, 120  
 Tridecane, 901  
 Triglycerides, 231, 245  
 Triketohydrindenehydrate, 222  
 Triiodothyronine (T<sub>3</sub>), 843  
 Triosephosphate isomerase, 468  
 Trioses, 468  
 Triplet Code, 811  
 Tropic hormones, *see* tropins  
 Tropical sprue, 1004  
 Tropins, 868  
 Tropocollagen, 168  
 Tropoelastin, 169, 170  
 Trypsin, 368  
 Tryptophan, 142, 170, 658, 814  
 Tubulin, 212  
 Turnover number (of enzymes),  
 Tyrosine, 143, 170  
 Tyrosine, 702, 814

## U

Ubiquitin, 802  
 Ubiquinone, 534  
 Ultracentrifuge, 1043  
 Ultracentrifugation, 1043, 1044  
 Uniquely high heat capacity, 20  
 Uniquely high surface tension, 20  
 Universality, (of genetic code) 816  
 Unorganized ferments, 337  
 Uracil, 284  
 Urea cycle, 650, 651, 653

## V

Valine, 141, 814  
 Valinomycin, 553, 556  
 Van der Waals contact distance, 30  
 Van der Waals contact radius, 30  
 Van der Waals interactions, 30  
 Van Slyke reaction, 221  
 Vander wall's Interactions, 30  
 Van der Walls force, 32  
 Variants of double helical DNA  
   A-DNA, 300  
   B-DNA, 308  
   C-DNA, 310  
   D-DNA, 310  
   Z-DNA, 308  
 Vasopression, 843, **813**, 909  
 Vegetable 'gums', 127  
 Very low-density lipoproteins, 631  
 Villikinin, 843  
   amino acid desivatives, 843  
   peptide hormones, 843  
   steroid hormones, 843  
 Vitamers, 1020  
 Vitamin A, 966  
 Vitamin A<sub>2</sub>, 968  
 Vitamin B complex,  
   B<sub>1</sub>, 989, 990  
   B<sub>2</sub>, 992  
   B<sub>3</sub>, 994  
   B<sub>5</sub>, 995, 996  
   B<sub>6</sub>, 997, 998  
   B<sub>7</sub>, 999  
   B<sub>9</sub>, 1001, 1002, 1003  
   B<sub>12</sub>, 1004, 1005, 1006  
 Vitamin C, 1009, 1010  
 Vitamin D, 972, 973  
 Vitamin D<sub>2</sub>, 972, 973  
 Vitamin D<sub>3</sub>, 972, 973  
 Vitamin D<sub>4</sub>, 974  
 Vitamin D<sub>4</sub>, 974  
 Vitamin G, 995  
 Vitamine E, 977  
 Vitamine K, 979, 980  
 Vitamin theory, 961

## W

Water, 16  
   physical properties of, 19

**1230 FUNDAMENTALS OF BIOCHEMISTRY**

Water balance, 17  
Water molecule, 21  
    structure of, 21  
    dipolar nature of, 225  
Water-soluble vitamins, 963  
Watson-crick model, 298, 299, 300  
Waxes, 247  
Weak acid, 41  
    ionization of, 42  
    pKa of, 43  
    titration of, 43

**X**

Xanthine, 286  
Xanthophylls, 268

Xanthoproteic test, 226  
*Xenopus levis*, 804  
Xerosis, 969  
X-ray diffraction, 171  
Xylan, 123

**Y**

Yellow enzyme, 992  
Yast factor, **994**

**Z**

Zein, 215  
Zero-order kinetics, 383  
Zone eletrophoresis, 1043  
Zwitterion, 136, 218  
Zymogen activation, 385