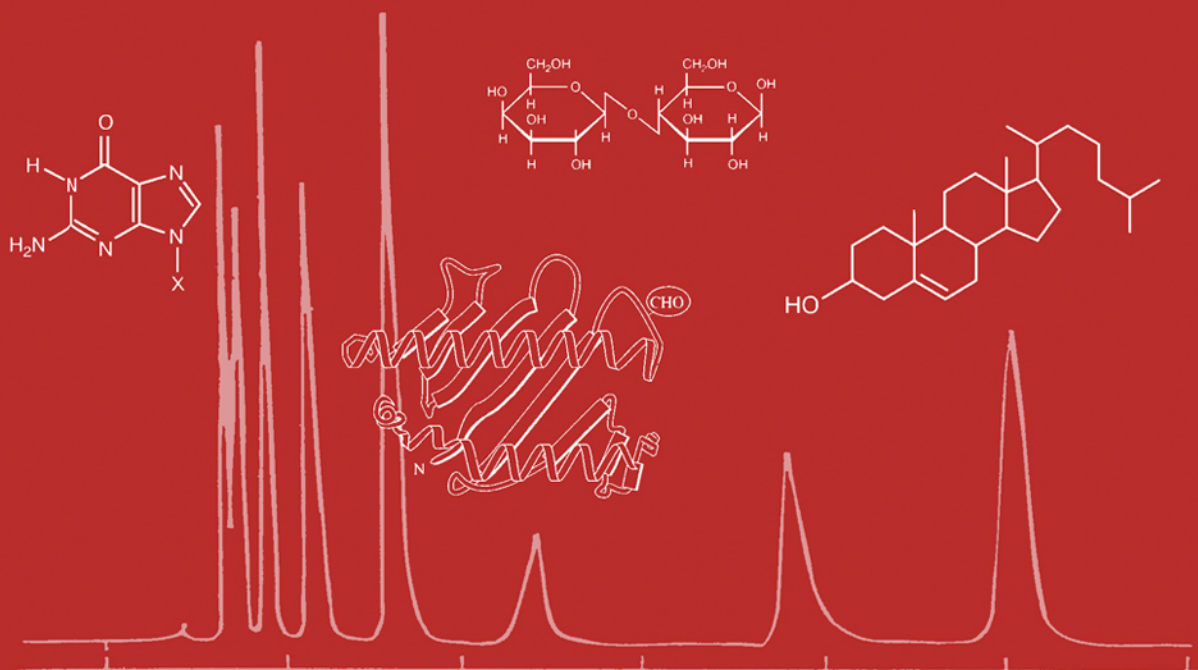


# BIOCHEMISTRY

## LABFAX

EDITED BY  
J.A.A. CHAMBERS & D. RICKWOOD



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# BIOCHEMISTRY

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# PREFACE

Biochemistry continues to be one of the most important areas of research in the life sciences. Indeed, with the need to characterize the diverse range of gene products generated as a result of genetic engineering techniques, there has been a resurgence of interest in biochemistry as molecular biologists examine the changing properties of modified proteins.

There have been handbooks on biochemistry, both encyclopedic and selective. However, the former type of book tests physical fitness and patience and the selection of topics for the latter often does not reflect the current biochemical practices and techniques because the books were published some time ago. We, as editors, have attempted to assemble the most important facts in a way that reflects current biochemical techniques to provide data that biochemists will need to use in their work on an almost daily basis. The length restriction of this book has required us to be very selective in terms of which topics to include and which to exclude. We have tried to emphasize those aspects of the subject that have not been included in previous books. We hope that this will prove to be a useful data book for everyone working in the area of biochemistry.

J.A.A. Chambers

D. Rickwood

## HAZARD WARNING

Some of the chemicals and procedures described in this book may be associated with chemical and biological hazards. In addition, the reader should be aware of the hazards associated with the handling of animal tissue samples. While efforts have been made to indicate the hazards associated with the different reagents and procedures covered in this book, it is the ultimate responsibility of the reader to ensure that safe working practises are used.

In several chapters Chemical Abstracts Service Registry numbers have been supplied for the reagents discussed. These numbers, found in square brackets and of the general formula XXXXX-YY-Z, are assigned to a unique chemical structure regardless of name and are of particular use in the literature searches and in the recovery of information from a number of chemical and biological databases. We decided to include these numbers when it became obvious that the number of names for some of the substances listed were in the hundreds and that the numbers provided another way to help the researcher find further information.

# CONTENTS

Contributors	xv
Abbreviations	xvii
<b>1. BUFFERS, CHELATING AGENTS AND DENATURANTS</b>	<b>1</b>
Buffers	1
Introduction	1
Goods' buffers	1
Preparation of buffers	1
Counter ions	1
Effects of temperature and concentration	1
Biological compatibility and chemical reactivity	2
pH ranges of non-zwitterionic buffers (Figure 1)	2
pH ranges of zwitterionic buffers (Figure 2)	3
Components of non-zwitterionic buffers (Table 1)	5
Zwitterionic (Goods') buffers (Table 2)	8
Preparation of phosphate buffers	9
Preparation of sodium phosphate buffer (Table 3)	9
Preparation of acetate buffers	9
Preparation of acetate buffer (Table 4)	10
Buffered salines, balanced salts and osmotic supports	10
Balanced salt solutions (Table 5)	11
Chelating agents	11
Chelating agents: solubility and $pK_s$ values (Table 6)	12
Chelating agents: stability constants (Table 7)	13
Denaturing agents for proteins	13
Mechanisms of denaturing agents	13
Mixing denaturants	14
Characteristics of denaturants and precipitants	14
Solubilizing denaturants (Table 8)	15
Precipitating denaturants (Table 9)	16
Thiol reagents	17
Thiol reagents (Table 10)	17
Detergents	17
Detergents and surfactants (Table 11)	19
Properties of acids, bases, salts and organic solvents	22
Properties of acids, bases, salts and organic solvents (Table 12)	23
Acid-base indicators (Table 13)	29
Amino acids	22
L-Amino acids: physical and chemical data (Table 14)	31
Amino acid classification by solution properties of side chains (Table 15)	33
Ammonium sulfate precipitation chart for proteins	33
Chart for ammonium sulfate precipitation of proteins (Table 16)	34
Saturated ammonium sulfate solutions at various temperatures (Table 17)	35
References	35
<b>2. RADIOISOTOPES IN BIOCHEMISTRY</b>	<b>37</b>
Definitions	37
Units of radioactivity	37
Specific activity	37
Electron volt (eV, or MeV = $10^6$ eV)	37
Gray	37
Dose equivalent man (sievert)	37



Radioisotopes used in biochemistry	37
Radioactive isotopes used in biochemical studies (Table 1)	38
Radioactive decay correction	39
Half-life activity corrections for selected radioisotopes (Table 2)	40
Autoradiography	39
Sensitivities of film detection methods for commonly used radioisotopes (Table 3)	41
Scintillation counting	41
Cerenkov counting	41
Counting efficiency using Cerenkov counting (Table 4)	41
Counting of finely dispersed or solvent-soluble substances	41
Structures of compounds used in scintillants (Figure 1)	42
Counting of aqueous samples	42
Gamma counting	43
Use of radioisotopes as tracers	43
Radiological protection	45
Shielding for $\beta$ -particles and $\gamma$ -rays	46
Shielding for $\beta$ -particle emitters (Table 5)	46
Shielding for $\gamma$ -ray emitters (Table 6)	46
Methods for decontaminating laboratories	46
Decontamination methods (Table 7)	47
References	48
Further reading	48

### 3. CHROMATOGRAPHIC FRACTIONATION MEDIA 49

Introduction	49
Media for size exclusion	50
Fractionation ranges of commercially available gel filtration matrices (Figure 1)	51
Carbohydrate-based column support materials for separation by size exclusion (Table 1)	52
Silica-based column support materials for size exclusion HPLC of proteins and peptides (Table 2)	55
Polymer-based column support materials for size exclusion HPLC of proteins and peptides (Table 3)	56
Controlled pore glass for permeation chromatography (Table 4)	57
Media for ion-exchange separations	50
Ion-exchange cellulose media: physical and chemical properties of Whatman cellulose media (Table 5)	58
Ion exchange: anion exchangers on polystyrene (Table 6)	59
Ion exchange: cation exchangers on polystyrene (Table 7)	61
Some commercially available column support materials for ion-exchange HPLC of proteins (Table 8)	62
Media for reversed-phase separations	50
List of silica-based reversed-phase column support materials (Table 9)	64
List of non-silica-based reversed-phase column support materials (Table 10)	66
Media for affinity chromatography	50
Some characteristics of commonly used matrices for affinity chromatography (Table 11)	67
Manufacturers and suppliers of chromatography column support materials	66
References	68
Further reading	68

### 4. ELECTROPHORESIS OF PROTEINS AND NUCLEIC ACIDS 69

Proteins	69
Separations on denaturing gels	69
Recipe for gel preparation using the SDS-PAGE discontinuous buffer system (Table 1)	70
Separations on non-denaturing gels	69
Buffers for non-denaturing discontinuous systems (Table 2)	71
Recipe for gel preparation using non-denaturing continuous buffer systems (Table 3)	72
Separations of proteins by isoelectric focusing	69
Commercially available carrier ampholytes (Figure 1)	72
Recipes for isoelectric focusing gels (Table 4)	73
Two-dimensional gel electrophoresis	71

Marker proteins	74
Standard marker proteins (Table 5)	74
Staining protein gels	74
Staining procedures for proteins separated on polyacrylamide gels (Table 6)	77
Nucleic acids	74
Gels for separating nucleic acids and nucleoproteins	74
Recipes for preparation of polyacrylamide gels for the electrophoresis of nucleic acids (Table 7)	78
Recipes of gels used for the electrophoresis of polysomes and ribosomes (Table 8)	79
Running buffers for the electrophoresis of nucleic acids (Table 9)	80
Denaturants used in denaturing gels for separating nucleic acids (Table 10)	80
Markers for nucleic acids	74
Molecular weight markers for gel electrophoresis of RNA (Table 11)	81
Sizes of the restriction fragments of pBR322 (Table 12)	82
Sizes of the restriction fragments of phage $\lambda$ cl ts 857 (Table 13)	83
Staining nucleic acid gels	74
Visualization of nucleic acids in gels (Table 14)	84
Methods manuals on electrophoresis	84

## 5. GENERAL CENTRIFUGATION DATA 85

Calculation of centrifugal force	85
Applications of centrifuge rotors	85
Applications of centrifuge rotors (Table 1)	85
Calculation of <i>k</i> -factors of rotors and pelleting times	85
Derating rotors for use with dense solutions	86
Properties of centrifuge tubes and bottles	86
Centrifuge tube and bottle materials (Table 2)	87
Centrifuge tube and bottle care and use (Table 3)	88
Chemical resistance chart (Table 4)	89
Sterilization and disinfection procedures	96
Sterilization techniques	96
Biological disinfection	96
Sterilization and disinfection procedures (Table 5)	97
Equations relating the refractive index to the density of solutions	98
Ionic gradient media (Table 6)	98
Non-ionic gradient media (Table 7)	99
Properties of sucrose solutions	99
Dilution of stock solutions of sucrose (Table 8)	99

## 6. ENZYMOLOGY 101

Introduction	101
Enzyme kinetics	101
Enzyme kinetics of single substrate reactions	101
Components of the Michelis-Menten reaction (Figure 1)	102
Initiation velocity versus substrate concentration (Figure 2)	103
Lineweaver-Burke plot (Figure 3)	105
Hane-Woolf plot (Figure 4)	105
Eadie-Hofstee plot (Figure 5)	106
Direct linear plot (Figure 6)	107
Alternative form of the direct linear plot (Figure 7)	108
Sigmoidal kinetics and allosteric enzymes	107
Hill plot (Figure 8)	109
Positive and negative homotropic cooperativity (Figure 9)	111
Enzyme kinetics of bisubstrate reactions	110
Types of Bi Bi reaction kinetics (Table 1)	112
Product inhibition for sequential bisubstrate mechanisms (Table 2)	115
Enzyme inhibitors	115
Reversible inhibition	115
Types of reversible inhibition (Table 3)	117
Irreversible inhibition	115
Inhibitors of specific enzymes (Table 4)	126
Diagnostic plot for irreversible inhibition (Figure 10)	116

Effects of pH on enzymes	130
Amino acid side-chain $pK_a$ values (Table 5)	130
Optimal pH of some important enzymes (Table 6)	131
Coenzymes — structure and functions	130
Structure and functions of some important coenzymes (Table 7)	132
Enzyme assays	130
Summary of main enzyme assay methods (Table 8)	140
Handling and storage of enzymes and coenzymes	141
References	142
Further reading	143

## **7. HYDROLYTIC ENZYMES** **145**

Introduction	145
Properties of selected nucleases (Table 1)	146
Inhibition of nucleases and proteases	145
Deoxyribonucleases	145
Selected nuclease inhibitors (Table 2)	147
Ribonucleases	145
Proteases	147
Broadly specific or nonspecific proteases (Table 3)	150
Endoproteases (Table 4)	151
Aminopeptidases (Table 5)	154
Carboxypeptidases (Table 6)	155
Inhibitors of proteases (Table 7)	156
Carbohydrases	147
Carbohydrate-degrading enzymes (Table 8)	161
Naturally occurring or physiological inhibitors	147
References	164

## **8. CHARACTERISTICS OF SELECTED PROTEINS** **167**

Properties of apolipoproteins (Table 1)	169
Structure of an IgG molecule (Figure 1)	179
Properties of human immunoglobulins (Table 2)	180
Prokaryotic and eucaryotic protein synthesis factors (Table 3)	186
References	190

## **9. GLYCOPROTEINS AND PROTEIN GLYCOSYLATION** **193**

Introduction	193
Occurrence of glycosylated proteins in nature	193
Range and types of glycosylated proteins	193
Occurrence of proteins in membranes (Figure 1)	194
Examples of glycosylated proteins in nature (Table 1)	194
Typical glycosylated proteins in the animal glycocalyx (Table 2)	196
Typical structural glycosylated proteins in animal membranes (Table 3)	197
Structural features of glycosylated proteins	196
Linkage of carbohydrate to proteins	196
Carbohydrate-protein linkages (Table 4)	198
Linkage and core structures in proteoglycans (Table 5)	199
Oligosaccharide structures	200
Linkages between monosaccharides in eucaryotic protein oligosaccharides (Table 6)	200
Examples of <i>N</i> -linked oligosaccharide structure (Figure 2)	201
Core structures in <i>O</i> -linked oligosaccharides (Table 7)	201
Repeating backbone carbohydrate structures in glycoproteins (Table 8)	202
Common repeating carbohydrate units in proteoglycans (Table 9)	203
Peripheral structures in protein-linked oligosaccharides (Table 10)	204
Post-translational modifications to glycosylated proteins (Table 11)	205
Enzymic glycosylation — synthesis of sequence	203
Monosaccharide transport, interconversion and activation	203
Carbohydrate transport systems in animal cell membranes (Table 12)	205
Metabolic routes in glycoconjugate biochemistry (Figure 3)	206

Glycosyltransferases	206
Glycosyltransferases — examples of transfer (Table 13)	207
Biosynthesis of an oligosaccharide (Figure 4)	209
Structure of a dolichol-phosphate-linked oligosaccharide (Figure 5)	210
Biosynthesis of a dolichol-linked oligosaccharide (Figure 6)	211
Processing pathways for <i>N</i> -linked oligosaccharides (Figure 7)	212
Examples of functional roles for protein glycosylation	211
Functions of some glycosylated proteins (Table 14)	213
References	214

## 10. CHEMICAL AND POST-TRANSLATIONAL MODIFICATION OF PROTEINS 215

Chemical modification of proteins	215
Reagents for selective chemical modification of proteins (Table 1)	216
The specificity of reagents used to chemically modify proteins (Table 2)	221
Enzyme-catalyzed covalent modification reactions	215
Introduction	215
Methods for identification of modified amino acids (Table 3)	233
Influence of modification	234
Characteristics of modification reactions	234
Recognition sequences and donors for protein modification (Table 4)	235
Physiological role of the modification	235
Inhibitors of post-translational modifications (Table 5)	237
Reversibility of reactions	238
Examples of reversible post-translational modifications (Table 6)	238
Summary	239
References	239

## 11. NUCLEIC ACIDS AND THEIR COMPONENTS 247

Nucleosides and nucleotides	247
Basic structures	247
Bases and sugars of nucleic acids (Figure 1)	248
Unusual bases of nucleic acids (Figure 2)	249
Base pairing in DNA (Figure 3)	250
Nucleotides as acids	247
Optical density of bases, nucleosides and nucleotides	247
Physical properties (Table 1)	250
Nucleotide-derived compounds	247
Nucleotide-derived compounds (Table 2)	252
Selected nucleotide analogs	247
A selection of nucleotide analogs (Table 3)	255
DNA of selected organisms	251
Bacteria (Table 4)	256
Protozoa, algae, fungi, echinoderms, arthropods and Insecta (Table 5)	257
Chordata (Table 6)	258
Animal viruses (Table 7)	260
Plants (Table 8)	260
The genetic code	251
The genetic code (Table 9)	261
Abbreviations of amino acids	261
Amino acid abbreviations (Table 10)	261
Assays for nucleic acids	262
Assays for DNA and RNA (Table 11)	262
References	262

## 12. LIPIDS 267

Introduction	267
Structure and characteristics of acyl lipids	267
Fatty acids	267
Selected saturated and monoenoic fatty acids (Table 1)	268
Selected naturally occurring polyunsaturated fatty acids (Table 2)	269

Neutral acyl lipids — wax esters, acylglycerols and glycerol ethers	270
Structures of common wax esters and acylglycerols (Table 3)	271
Glycerophospholipids	272
Structure and distribution of membrane glycerophospholipids (Table 4)	273
Glycerophospholipids containing structural variations of phosphatidyl moiety (Table 5)	275
Glyceroglycolipids	275
Structures of major glycosylglycerolipids of higher plants and bacteria (Figure 1)	276
Sphingolipids	277
Sphingolipid structures (Figure 2)	277
Structures of some major gangliosides (Figure 3)	278
Structure and distribution of terpenoid constituents of membranes	278
Sterols	279
Structures of major membrane sterols (Figure 4)	279
Chlorophylls and carotenoids	279
Structures of plant and bacterial chlorophylls (Figure 5)	280
Structures of carotenoids of plants, algae and bacteria (Figure 6)	281
Composition and distribution of lipids in membranes	282
Composition of membrane lipids	282
Fatty acid composition of membrane lipids	282
Rat liver preparations (Table 6)	283
Sphingolipids of rat liver cells (Table 7)	283
Representative higher plants, algae and cyanobacteria (Table 8)	284
Chloroplast lipids (Table 9)	286
Selected fungi (Table 10)	287
Selected bacterial membrane systems (Table 11)	288
Structure and properties of bioactive lipids	288
Eicosanoids	288
Structures of the prostanoids (Figure 7)	289
Pathways of eicosanoid formation (Figure 8)	291
Structures of leukotrienes and hydroxyeicosatetraenoic acids (Figure 9)	292
Biological effects of leukotrienes and HETEs (Table 12)	293
Platelet activating factor	294
Biological effects of PAF (Table 13)	294
Diacylglycerol	294
Steroid hormones	297
Structures of steroid hormones and analogs (Figure 10)	296
Properties of steroid hormone systems (Table 14)	298
Structure and composition of bile acids and bile salts	300
Structure of primary and secondary bile acids and bile salts (Figure 11)	300
Chemical Abstracts Registry Numbers of lipids cited	301
References	301

### 13. CARBOHYDRATES AND SUGARS

305

Introduction	305
Structures and characteristics of monomeric carbohydrates	305
Classification of monosaccharides	305
Classification of monosaccharides (Table 1)	306
Distribution and properties of some monosaccharides	306
Origin and properties of some monosaccharides (Table 2)	307
Stereoisomerism	309
Formation of the hemiacetal forms of D-glucose (Figure 1)	310
Oligosaccharides	310
Classification	310
Classification of simple oligosaccharides (Table 3)	311
Distribution and properties	310
Structures of some common disaccharides (Figure 2)	311
Structures and characteristics of polysaccharides	312
Classification	312
Classes of common polysaccharides (Table 4)	312
Plant polysaccharides	313
Examples of common polysaccharides (Figure 3)	314
Bacterial polysaccharides	313

Animal polysaccharides	313
DNA, RNA, nucleosides and nucleotides	313
Other saccharide derivatives	315
Further reading	315

## **14. SAFETY AND THE DISPOSAL OF TOXIC AND INFECTIOUS MATERIALS 317**

Protection from chemical hazards	317
Risk and safety classification systems	317
Hazard symbols (Table 1)	317
UN Chemical Hazard Classification (Table 2)	318
European Commission Risk and Safety Phrases (Table 3)	319
Disposal of toxic and infectious materials	322
Disposal of toxic materials	322
Toxic materials: effects and methods of disposal (Table 4)	323
Disposal of biohazardous materials	329
Pressure-temperature relationships for autoclaves (Table 5)	329
Effectiveness of disinfectants against infectious agents (Table 6)	329
References	330

## **15. SOURCES OF FURTHER BIOCHEMICAL DATA 331**

Reference books	331
Databases	331
Nucleic acid sequence databases	342
Contact addresses	343

## **16. ATOMIC WEIGHTS AND MATHEMATICAL FORMULAE 345**

Atomic weights	345
Atomic weights (Table 1)	345
Mathematical formulae	347
Lengths, areas and volumes in some common geometric figures	347
Inter-relations of sides and angles in a plane triangle	349
Trigonometrical data	350
Mathematical series	352
Mathematical constants	353
Standard equations	353
Differentials and integrals	355

## **INDEX 357**

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# ABBREVIATIONS

AA	amino acid
Aces	<i>N</i> -(2-acetamido)-2-aminoethanesulfonic acid
ADP	adenosine diphosphate
AMP	adenosine monophosphate
APMSF	amidino-phenylmethylsulfonyl fluoride
APS	adenosine phosphosulfate
Asn	asparagine
ATP	adenosine triphosphate
ATPase	adenosine triphosphatase
Bes	<i>N,N</i> -bis(2-hydroxyethyl)-2-aminoethanesulfonic acid
Bicine	<i>N,N</i> -bis(2-hydroxyethyl)glycine
Bis-Tris	bis(2-hydroxyethyl)imino-tris(hydroxymethyl)methane
butyl PBD	2-(4'- <i>t</i> -butylphenyl)-5-(4"-biphenyl)-1,3,4-oxadiazole
cAMP	cyclic adenosine 3',5'-monophosphate
Caps	3-(cyclohexylamino)-1-propanesulfonic acid
CAT	chloramphenicol acetyl transferase
CDP	cytosine diphosphate
Cer-gal	monogalactosylcerebroside
Cer-glu	glucosyl cerebroside
CHAPS	3-[(3-cholamidopropyl)-dimethylammonio]-1-propanesulfonate
CHAPSO	3-[(3-cholamidopropyl)-dimethylammonio]-2-hydroxy-1-propanesulfonate
Ches	2-(cyclohexylamino)-ethanesulfonic acid
CMC	critical micellar concentration
CMP	cytosine monophosphate
CPB	cetylpyridinium bromide
CPI	carboxypeptidase inhibitor
CTAB	cetyltrimethylammonium bromide
CTP	cytosine triphosphate
DABA	diaminobenzoic acid
DAGs	diacylglycerols
DAPI	4,6-diamidino-2-phenylindole
DGDG	digalactosyldiacylglycerol
DHA	docosaheanoic acid
DHFA	dihydrofolate
DMAPN	3-dimethylaminopropionitrile
DMF	dimethylformamide
DMSO	dimethylsulfoxide
DNA	deoxyribonucleic acid
Dol	dolichol
DOPA	3,4-dihydroxyphenylalanine
DPG	diphosphatidylglycerol (cardiolipin)
DTNB	5,5'-dithiobis (2-nitrobenzoic acid)

DTT	dithiothreitol
$\epsilon_{\max}$	extinction coefficient (molar)
EACA	$\epsilon$ -amino caproic acid
EDTA	ethylenediaminetetraacetic acid
EFA	essential fatty acid
EGF	epidermal growth factor
EGTA	ethyleneglycol-bis( $\beta$ -aminoethylether) <i>N,N,N',N'</i> -tetraacetic acid
EPA	eicosapentaenoic acid
EtOH	ethanol
FAD	flavin adenine dinucleotide
FMN	flavin mononucleotide
FMPI	<i>N</i> <sub>2</sub> -( <i>N</i> -phosphono-L-phenylalanyl)-L-arginine
Fuc	fructose
GABA	$\gamma$ -aminobutyric acid
Gal	D-galactose
GalNAc	<i>N</i> -acetyl-D-galactosamine
GDP	guanosine diphosphate
GLA	$\gamma$ -linolenic acid
Glc	D-glucose
GlcN	D-glucosamine
GlcNAc	<i>N</i> -acetyl-D-glucosamine
GlcUA	D-glucuronic acid
GM-CSF	granulocyte-macrophage colony-stimulating factor
GMP	guanosine monophosphate
GPI	glycosyl phosphatidylinositol
GSH	glutathione
GTP	guanosine triphosphate
HDL	high-density lipoprotein
Hepes	4-(2-hydroxyethyl)piperazine-1-ethanesulfonic acid
Hepps	4-(2-hydroxyethyl)piperazine-1-propanesulfonic acid
HETEs	hydroxyeicosatetraenoic acids
HiPIP	high-potential iron-sulfur protein
HIV	human immunodeficiency virus
HLB	hydrophile-lipophile balance
HMG	high-mobility group proteins
HMG-CoA	hydroxymethylglutarate-CoA
HPLC	high-pressure liquid chromatography
Hyl	hydroxy-L-lysine
ICAMs	intercellular adhesion molecules
IDL	intermediate-density lipoproteins
IdUA	L-iduronic acid
IEF	isoelectric focusing
IL	interleukin
Ins	1D-myo-inositol
$\lambda_{\max}$	maximum wavelength
LDL	low-density lipoprotein
LiDS	lithium dodecyl sulfate
LT	leukotriene
LXA	5,6,15-L-trihydroxy 7,9,11,13-eicosatetraenoic acid
MAGs	monoacylglycerols
Man	D-mannose
ManNAc	<i>N</i> -acetyl-D-mannosamine

MAP	microtubule-associated protein
MeOH	methanol
Mes	2-morpholinoethanesulfonic acid monohydrate
MGDG	monogalactosyldiacylglycerol
MGP	matrix $\gamma$ -carboxyl glutamic acid protein
Mops	3-morpholinopropanesulfonic acid
NAD	nicotinamide adenine dinucleotide
NADP	nicotinamide adenine dinucleotide phosphate
NANA	<i>N</i> -acetylneuraminic acid (NeuAc)
NDP	nucleotide diphosphate
NEFA	non-esterified fatty acid
NeuAc	<i>N</i> -acetylneuraminic acid (NANA)
Neu5Gc	<i>N</i> -glycolylneuraminic acid
NHS	<i>N</i> -hydroxysuccinimidyl
P	phosphate
PA	phosphatidic acid
PAF	platelet activating factor
PAGE	polyacrylamide gel electrophoresis
PAPS	adenosine-3'-phospho-5'-phosphosulfate
PAS	<i>p</i> -aminosalicylic acid
PBD	2-phenyl-5-(4-biphenyl)-1,3,4-oxadiazole
PC	phosphatidylcholine
PCA	perchloric acid
PCMB	<i>p</i> -chloromercuribenzoate
PCNA	proliferating cell nuclear antigen
PE	phosphatidylethanolamine
PG	phosphatidylglycerol
PGs	prostaglandins
PI	phosphatidylinositol
Pipes	piperazine-1,4-bis(2-ethanesulfonic acid)
PKC	protein kinase C
PKI	protein kinase inhibitor
PMA	phorbol myristate acetate
PMSF	phenylmethylsulfonylfluoride
POPOP	1,4-di-(2-(5-phenyloxazolyl))-benzene
PPO	2,5-diphenyloxazole
PS	phosphatidylserine
psi	lb/in <sup>2</sup>
PtdIns	phosphatidylinositol
PtdIns(4)P	phosphatidyl- <i>myo</i> -inositol 4-phosphate
PtdIns(4,5)P <sub>2</sub>	phosphatidyl- <i>myo</i> -inositol 4,5-bisphosphate
PUFA	polyunsaturated fatty acid
RNA	ribonucleic acid
SAM	<i>S</i> -adenosylmethionine
SDS	sodium dodecyl sulfate
Ser	L-serine
SLS	sodium lauryl sulfate (SDS)
SM	sphingomyelin
SQDG	sulfoquinovosyldiacylglycerol
SRS-A	slow release substances of anaphylaxis
TAGs	triacylglycerols
Taps	<i>N</i> -[tris(hydroxymethyl)methyl]-3-aminopropanesulfonic acid