Some Common Biochemical Abbreviations[a]

A	adenine
aa	amino acid
aaRS	aminoacyl–tRNA synthetase
ACAT	acyl-CoA:cholesterol acyltransferase
ACh	acetylcholine
AChE	acetylcholinesterase
ACP	acyl-carrier protein
ADA	adenosine deaminase
ADH	alcohol dehydrogenase
AdoCbl	5′-deoxyadenosylcobalamin
AdoMet	adenosylmethionine
ADP	adenosine diphosphate
ADPNP	adenosine-5′-(β,γ-imido)triphosphate
AIDS	acquired immunodeficiency syndrome
AKAP	A-kinase anchoring protein
ALA	δ-aminolevulinic acid
AMP	adenosine monophosphate
AMPK	AMP-dependent protein kinase
AMPPNP	adenosine-5′-(β,γ-imido)triphosphate
ARS	autonomously replicating sequence
ATCase	aspartate transcarbamoylase
ATP	adenosine triphosphate
BAC	bacterial artificial chromosome
BChl	bacteriochlorophyll
BCKDH	branched chain α-keto acid dehydrogenase
BH_4	5,6,7,8-tetrahydrobiopterin
bHLH	basic helix–loop–helix
bp	base pair
BPG	D-2,3-bisphosphoglycerate
BPheo	bacteriopheophytin
BPTI	bovine pancreatic trypsin inhibitor
C	cytosine
CaM	calmodulin
CAM	crassulacean acid metabolism
cAMP	3′,5′-cyclic AMP
CAP	catabolite gene activator protein
CCV	clathrin-coated vesicle
CD	circular dichroism
CDK	cyclin-dependent protein kinase
cDNA	complementary DNA
CDP	cytidine diphosphate
CDR	complementarity-determining region
CE	capillary electrophoresis
cGMP	3′5′-cyclic GMP
CGN	cis Golgi network
Chl	chlorophyll
CM	carboxymethyl
CMP	cytidine monophosphate
CoA or CoASH	coenzyme A
COP	coat protein
CoQ	coenzyme Q (ubiquinone)
COX	cyclooxygenase *or* cytochrome *c* oxidase
CPS	carbamoyl phosphate synthetase
CTD	C-terminal domain
CTP	cytidine triphosphate
D	dalton
d	deoxy
DAG	1,2-diacylglycerol
dd	dideoxy
DEAE	diethylaminoethyl
DG	*sn*-1,2-diacylglycerol
DHAP	dihydroxyacetone phosphate
DHF	dihydrofolate
DHFR	dihydrofolate reductase
DMF	*N,N*-dimethylformamide
DMS	dimethyl sulfate
DNA	deoxyribonucleic acid
DNP	2,4-dinitrophenol
dNTP	2′-deoxynucleotide triphosphate
Dol	dolichol
L-DOPA	L-3,4-dihydroxyphenylalanine
dsDNA	double-stranded DNA
DUB	deubiquitinating enzyme
EF	elongation factor
EGF	epidermal growth factor
ELISA	enzyme-linked immunosorbent assay
EM	electron microscopy
emf	electromotive force
E4P	erythrose-4-phosphate
EPR	electron paramagnetic resonance
ER	endoplasmic reticulum
ESI	electrospray ionization
EST	expressed sequence tag
ETF	electron-transfer flavoprotein
FAD	flavin adenine dinucleotide, oxidized form
FADH·	flavin adenine dinucleotide, radical form
$FADH_2$	flavin adenine dinucleotide, reduced form
FAS	fatty acid synthase
FBP	fructose-1,6-bisphosphate
FBPase	fructose-1,6-bisphosphatase
Fd	ferredoxin
FGF	fibroblast growth factor
FH	familial hypercholesterolemia
fMet	*N*-formylmethionine
FMN	flavin mononucleotide
FNR	ferredoxin-$NADP^+$ reductase
F1P	fructose-1-phosphate
F2,6P	fructose-2,6-bisphosphate
F6P	fructose-6-phosphate
G	guanine
GABA	γ-aminobutyric acid
Gal	galactose
GalNAc	*N*-acetylgalactosamine
GAP	glyceraldehyde-3-phosphate
GAP	GTPase activating protein
GAPDH	glyceraldehyde-3-phosphate dehydrogenase
GDH	glutamate dehydrogenase
GDP	guanosine diphosphate
GEF	guanine nucleotide exchange factor
GK	glucokinase
Glc	glucose
GlcNac	*N*-acetylglucosamine
GLUT	glucose transporter
GMP	guanosine monophosphate
gp	gene product
G1P	glucose-1-phosphate
G6P	glucose-6-phosphate
G6PD	glucose-6-phosphate dehydrogenase
GPI	glycosylphosphatidylinositol
gRNA	guide RNA
GSH	glutathione
GSSG	glutathione disulfide
GTF	general transcription factor
GTP	guanosine triphosphate
HA	hemagglutinin
Hb	hemoglobin
HDL	high density lipoprotein
HGPRT	hypoxanthine-guanine phosphoribosyl transferase
HIV	human immunodeficiency virus
HMG-CoA	β-hydroxy-β-methylglutaryl-CoA
hnRNA	heterogeneous nuclear RNA
HPETE	hydroperoxyeicosatetraenoic acid
HPLC	high-performance liquid chromatography
Hsp	heat shock protein
HTH	helix–turn–helix
Hyl	5-hydroxylysine
Hyp	4-hydroxyproline
IDL	intermediate density lipoprotein
IF	initiation factor
IgG	immunoglobulin G
IHP	inositol hexaphosphate
IMP	inosine monophosphate
IP_3	inositol-1,4,5-trisphosphate
IPTG	isopropylthiogalactoside
IR	infrared
IS	insertion sequence
ISP	iron–sulfur protein
ITP	inosine triphosphate
JAK	Janus kinase
K_M	Michaelis constant
kb	kilobase pair
kD	kilodalton
KF	Klenow fragment
LCAT	lecithin:cholesterol acyl transferase
LDH	lactate dehydrogenase
LDL	low density lipoprotein

[a]The three-letter and one-letter abbreviations for the "standard" amino acid residues are given in Table 4-1.

(table continued on following page)

LHC	light-harvesting complex
LT	leukotriene
LX	lipoxin
MALDI	matrix-assisted laser desorption/ionization
Man	mannose
MAPK	mitogen-activated protein kinase
Mb	myoglobin
MHC	major histocompatability complex
miRNA	microRNA
MKK	MAP kinase kinase
mRNA	messenger RNA
MS	mass spectrometry
MurNAc	*N*-acetylmuramic acid
NA	neuraminidase
NAD^+	nicotinamide adenine dinucleotide, oxidized form
NADH	nicotinamide adenine dinucleotide, reduced form
$NADP^+$	nicotinamide adenine dinucleotide phosphate, oxidized form
NADPH	nicotinamide adenine dinucleotide phosphate, reduced form
NAG	*N*-acetylglucosamine
NAM	*N*-acetylmuramic acid
NANA	*N*-acetylneuraminic (sialic) acid
NDP	nucleoside diphosphate
NEM	*N*-ethylmaleimide
NER	nucleotide excision repair
NeuNAc	*N*-acetylneuraminic acid
NMN	nicotinamide mononucleotide
NMR	nuclear magnetic resonance
NOESY	nuclear Overhauser effect spectroscopy
NOS	nitric oxide synthase
NRK	nonreceptor tyrosine kinase
NSAID	nonsteroidal anti-inflammatory drug
NSF	NEM-sensitive fusion protein
NTP	nucleotide triphosphate
OEC	oxygen-evolving complex
OMP	orotidine monophosphate
ORF	open reading frame
P or p	phosphate
P_i	orthophosphate ion
PAGE	polyacrylamide gel electrophoresis
PAP	poly(A) polymerase
PBG	porphobilinogen
PC	plastocyanin
PCNA	proliferating cell nuclear antigen
PCR	polymerase chain reaction
PDB	Protein Data Bank
PDC	pyruvate dehydrogenase multienzyme complex
PDE	phosphodiesterase
PDGF	platlet-derived growth factor
PDI	protein disulfide isomerase
PE	phosphatidylethanolamine
PEP	phosphoenolpyruvate
PEPCK	PEP carboxykinase
PFGE	pulsed-field gel electrophoresis
PFK	phosphofructokinase
PG	prostaglandin
2PG	2-phosphoglycerate
3PG	3-phosphoglycerate
PGI	phosphoglucose isomerase
PGK	phosphoglycerate kinase
PGM	phosphoglycerate mutase
PH	phenylalanine hydroxylase *or* pleckstrin homology
Pheo	pheophytin
PhK	phosphorylase kinase
PIC	preinitiation complex
PI3K	phosphoinositide 3-kinase
PIP_2	phosphatidylinositol-4,5-bisphosphate
PK	pyruvate kinase
PKA	protein kinase A
PKB	protein kinase B
PKC	protein kinase C
PKU	phenylketonuria
PLC	phospholipase C
PLP	pyridoxal-5′-phosphate
pmf	protonmotive force
PMP	pyridoxamine-5′-phosphate
PNP	purine nucleotide phosphorylase
Pol	DNA polymerase
PP1	phosphoprotein phosphatase-1
PP_i	pyrophosphate ion
PPI	peptidyl prolyl cis–trans isomerase
PrP	prion protein
PRPP	5-phosphoribosyl-α-pyrophosphate
PS	photosystem
PtdIns	phosphatidylinositol
PTK	protein tyrosine kinase
PTP	protein tyrosine phosphatase
Q	ubiquinone (CoQ) or plastoquinone
QH_2	ubiquinol
QSAR	quantitative structure–activity relationship
r	ribo
RC	photosynthetic reaction center
RER	rough endoplasmic reticulum
RF	release factor *or* replicative form
RFLP	restriction-fragment length polymorphism
RK	HMG-CoA reductase kinase
RNA	ribonucleic acid
RNAi	RNA interference
RNAP	RNA polymerase
RNR	ribonucleotide reductase
R5P	ribose-5-phosphate
RPC	reverse phase chromatography
RRM	RNA-recognition motif
rRNA	ribosomal RNA
RS	tRNA synthetase
RSV	Rous sarcoma virus
RT	reverse transcriptase
RTK	receptor tyrosine kinase
RuBisCO	ribulose-1,5-bisphosphate carboxylase–oxygenase
RuBP	ribulose-1,5-bisphosphate
Ru5P	ribulose-5-phosphate
S	Svedberg unit
SAM	*S*-adenosylmethionine
SAR	structure–activity relationship
SCAP	SREPB cleavage-activating protein
SCID	severe combined immunodeficiency disease
SDS	sodium dodecyl sulfate
SH2	Src homology domain 2
SH3	Src homology domain 3
siRNA	small interfering RNA
SNAP	soluble NSF attachment protein
SNARE	SNAP receptor
snoRNA	small nucleolar RNA
snRNA	small nuclear RNA
snRNP	small nuclear ribonucleoprotein
SOD	superoxide dismutase
S7P	sedoheptulose-7-phosphate
SR	SRP receptor
SRE	sterol regulatory element
SREBP	SRE binding protein
SRP	signal recognition particle
SSB	single-strand binding protein
ssDNA	single-stranded DNA
STAT	signal transducer and activator of transcription
STC	sequence-tagged connector
STS	sequence-tagged site
SV40	simian virus 40
T	thymine
TAF	TBP-associated factor
TBP	TATA box-binding protein
TBSV	tomato bushy stunt virus
TCA	tricarboxylic acid
TGN	trans Golgi network
THF	tetrahydrofolate
TIM	triose phosphate isomerase
TLC	thin layer chromatography
TM	transmembrane
TMV	tobacco mosaic virus
topo	topoisomerase
TPP	thiamine pyrophosphate
tRNA	transfer RNA
TS	thymidylate synthase
TTP	thymidine triphosphate
U	uracil
UCP	uncoupling protein
UDP	uridine diphosphate
UDPG	uridine diphosphate glucose
UMP	uridine monophosphate
UTP	uridine triphosphate
UV	ultraviolet
V_{max}	maximal velocity
VLDL	very low density lipoprotein
XMP	xanthosine monophosphate
XP	xeroderma pigmentosum
Xu5P	xylulose-5-phosphate
YAC	yeast artificial chromosome
YADH	yeast alcohol dehydrogenase