

ENZYME NOMENCLATURE

1984



RECOMMENDATIONS OF THE NOMENCLATURE COMMITTEE
OF THE INTERNATIONAL UNION OF BIOCHEMISTRY
ON THE NOMENCLATURE AND
CLASSIFICATION OF ENZYME-CATALYSED REACTIONS

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GLOSSARY

The inevitable use of trivial names to describe the enzyme reactions listed may in some cases be readily interpreted only by experts in that field. To help other readers, systematic names are listed below for many trivial names used in this volume. The reader is reminded that the *Compendium* produced by the International Union of Biochemistry (*Biochemical Nomenclature and Related Documents* (The Biochemical Society, London, WC1R 5DP, 1978)) includes detailed recommendations for amino acids, nucleic acids, lipids, steroids, carbohydrates, vitamins (e.g. pyridoxine) and other classes of biochemical compounds. Most compounds listed there are not repeated in this glossary. Details of systematic organic nomenclature may be found in the *Nomenclature of Organic Chemistry A B C D E F and H*, issued by the Commission on the Nomenclature of Organic Chemistry (Pergamon Press, Oxford, 1979). In selecting the systematic name, in most cases where there is a choice the more systematic version has been selected.

o (-)-acetoin	(R)-3-hydroxybutan-2-one
N-acetylindoxyl	N-acetylindol-3-ol
N-acetylisatin	N-acetyl-1H-indole-2,3-dione
cis-aconitate	(Z)-prop-1-ene-1,2,3-tricarboxylate
acrolein	prop-2-enal
acrylate	prop-2-enoate
Adrenalin	(R)-2-(methylamino)-1-(3,4-dihydroxyphenyl)ethanol
agaritine	glutamic 5-[N'-(4-(hydroxymethyl)phenyl)hydrazine]
agmatine	(4-aminobutyl)guanidine
alanopine	meso-2,2'-iminodipropionate
alizarin	1,2-dihydroxyanthracene-9,10-dione
allantoate	diureidoacetate
allantoin	(2,5-dioxoimidazolidin-4-yl)urea
allyl alcohol	prop-2-en-1-ol
L-2-aminoadipate 6-semialdehyde	(S)-2-amino-6-oxohexanoate
2-aminomuconate 6-semialdehyde	2-amino-6-oxohexa-2,4-dienoate
androsterone	3 α -hydroxy-5 α -androstan-17-one
anserine	N $^{\alpha}$ -(β -alanyl)-N $^{\pi}$ -methylhistidine
anthranilate	2-aminobenzoate
arachidonate	(all-Z)-icosa-5,8,11,14-tetraenoate
L-argininosuccinate	N $^{\omega}$ -[(S)-1,2-dicarboxyethyl]-L-arginine
asparaguate	1,2-dithiolane-4-carboxylate
L-aspartate 4-semialdehyde	(S)-2-amino-4-oxobutanoate
aspulvinone E	5-(4-hydroxybenzylidene)-2-(4-hydroxyphenyl)-5H-furan-2-one
atropine	tropine ester of (\pm)-tropate (see below)
bactoprenol	2,3-dihydroundecaprenol
barbituric acid	pyrimidine-2,4,6-(1H,3H,5H)-trione
bergaptol	4-hydroxy-7H-furo[3,2-g][1]benzopyran-7-one
betaine	N,N,N-trimethylammonioacetate
betaine aldehyde	N,N,N-trimethyl-2-oxoethylammonium
(+)-borneol	(1R,2S,4R)-1,7,7-trimethylbicyclo[2.2.1]heptan-2-ol
cadaverine	pentane-1,5-diamine
trans-cafeate	(E)-3-(3,4-dihydroxyphenyl)prop-2-enoate
(+)-camphor	(1R,4R)-1,7,7-trimethylbicyclo[2.2.1]heptan-2-one
L-5-carboxymethylhydantoin	(S)-5-carboxymethylimidazolidine-2,4-dione
(-)-carnitine	(R)-3-hydroxy-4-(trimethylammonio)butanoate
carnosine	N $^{\alpha}$ -(β -alanyl)-L-histidine

- catechol
 chalcone
 chlorogenate
 cholesterol
 choline
 chorismate

 cinnamyl alcohol
 (+)-citramalate
 citrate
 (+)-citronellol
 L-citrulline
 cocaine

 coniferyl alcohol
 cortisol
 cortisone
 4-coumaryl alcohol
 creatine
 creatinine
 cystathionine
 daphnin
 11-deoxycorticosterone
meso-2,6-diaminopimelate
 7,8-dihydrobiopterin

 dihydroadipicinate
 2,3-dihydroadipicinate
 7,8-dihydroxykynurenate
 (+)-2,5-diketocamphane
 dimethylmaleate
S,S-dimethyl- β -propiethetol
 dolichol
 L-dopa
 dopaquinone
 α -ecdysone
 (-)-ephedrine
 ergosterol
 estradiol-17 α
 estradiol-17 β
 estriol
 estrone
 ethanolamine
 etiocholanolone
 farnesol
 (-)- α -fenchol
 (+)-fenchone
 ficaprenol
 4-fumarylacetoacetate
 3-fumarylpyruvate
 gallate
 gentisate

 benzene-1,2-diol
 1,3-diphenylprop-2-en-1-one
 5-cafeate ester of quinic acid (*see below*)
 cholest-5-en-3 β -ol
 (2-hydroxyethyl)trimethylammonium
 (3*R*,4*R*)-3-[(1-carboxyvinyl)oxy]-4-hydroxycyclohexa-1,5-diene-1-carboxylate
 3-phenylprop-2-en-1-ol
 (*S*)-2-hydroxy-2-methylbutanedioate
 2-hydroxypropane-1,2,3-tricarboxylate
 (*R*)-3,7-dimethyloct-6-en-1-ol
 (*S*)-2-amino-5-ureidopentanoic acid
 methyl (2*R*,3*S*)-3-benzoyloxy-8-methyl-8-azabicyclo[3.2.1]octane-2-carboxylate
 3-(4-hydroxy-3-methoxyphenyl)prop-2-en-1-ol
 11 β ,17,21-trihydroxypregn-4-ene-3,20-dione
 17,21-dihydroxypregn-4-ene-3,11,20-trione
 3-(4-hydroxyphenyl)prop-2-en-1-ol
 (1-methylguanidino)acetate
 2-amino-1,5-dihydro-1-methylimidazol-4-one
 2-amino-4[(2-amino-2-carboxyethyl)thio]butanoate
 7-(β -D-glucopyranosyloxy)-8-hydroxy-2*H*-1-benzopyran-2-one
 21-hydroxypregn-4-ene-3,20-dione
 (2*R*,6*S*)-2,6-diaminoheptanedioate
 2-amino-7,8-dihydro-6-[(1*S*,2*R*)-1,2-dihydroxypropyl]-1*H*-pteridin-4-one
 (2*S*)-2,3-dihydropyridine-2,6-dicarboxylate
 2,3-dihydropyridine-2-carboxylate
 4,7,8-trihydroxyquinoline-2-carboxylate
 (1*R*,4*R*)-1,7,7-trimethylbicyclo[2.2.1]heptan-2,5-dione
 (*Z*)-2,3-dimethylbut-2-enedioate
 3-(dimethylsulfonio)propanoate
 2,3-dihydropolyprenol (C₅₅-C₁₀₀)
 (*S*)-2-amino-3-(3,4-dihydroxyphenyl)propanoate
 (*S*)-2-amino-3-(3,4-dioxocyclohexa-1,5-dien-1-yl)propanoate
 (22*R*)-2 β ,3 β ,14,22,25-pentahydroxy-5 β -cholest-7-en-6-one
 (1*R*,2*S*)-2-(methylamino)-1-phenylpropan-1-ol
 (22*E*,24*S*)-24-methylcholesta-5,7,22-trien-3 β -ol
 estra-1,3,5(10)-triene-3,17 α -diol
 estra-1,3,5(10)-triene-3,17 β -diol
 estra-1,3,5(10)-triene-3,16 α ,17 β -triol
 3-hydroxyestra-1,3,5(10)-trien-17-one
 2-aminoethan-1-ol
 3 α -hydroxy-5 β -androstane-17-one
 3,7,11-trimethyldodeca-2,6,10-trien-1-ol
 (1*S*,2*S*,4*R*)-1,3,3-trimethylbicyclo[2.2.1]heptan-2-ol
 (1*S*,4*R*)-1,3,3-trimethylbicyclo[2.2.1]heptan-2-one
tri-trans,*poly-cis*-undecaprenol
 (*E*)-4,6-dioxooct-2-enedioate
 (*E*)-4,6-dioxohept-2-enedioate
 3,4,5-trihydroxybenzoate
 2,5-dihydroxybenzoate

- geraniol
 glutaconate
 L-glutamate 5-semialdehyde
 glutarate semialdehyde
 sn-glycerol 3-phosphate
 glycerone
 glycolaldehyde
 glycolate
 glyoxylate
 guaiacol
 heteropyrithiamin
 hippurate
 homogentisate
 hydroxyacetone phosphate
 (+)-5-*exo*-hydroxycamphor
 2-hydroxy-3-carboxyadipate
 3 α -hydroxy-5 β -cholanate
 4-hydroxyhydratropate
 3-hydroxyisobutyrate
 2-hydroxy-4-methyl-3-carboxyvalerate
 D-2-hydroxystearate
 hypotaurine
 hypotaurocyamine
 isochorismate

 isocitrate
 isophenoxazine
 itaconate
 (1*R*)-5-keto-1,2-camphanolide
 kynurenate
 L-kynurenine
 L-lactaldehyde
 L-lactate
 licodione
 linamarin
 linoleate
 lipoamide
 lipoate
 lombricine
 lumazine
 lumichrome
 D-lysopine
 L-malate
 maleamate
 2-maleylacetate
 4-maleylacetoacetate
 3-maleylpyruvate
 malonate semialdehyde
 L-mandelate
 mandelonitrile
 melilotate
 (-)-menthol

 (*E*)-3,7-dimethylocta-2,6-dien-1-ol
 pent-2-enedioate
 (*S*)-2-amino-5-oxopentanoate
 5-oxopentanoate
 (*R*)-glycerol 3-phosphate
 1,3-dihydroxypropan-2-one
 2-hydroxyethanal
 2-hydroxyacetate
 2-oxoacetate
 2-methoxyphenol
 1-[(4-amino-2-methylpyrimidin-5-yl)methyl] pyridinium
N-benzoylglycine
 (2,5-dihydroxyphenyl)acetate
 2-oxopropyl phosphate
 (1*R*,4*R*,5*R*)-5-hydroxy-1,7,7-trimethylbicyclo[2.2.1] heptan-2-one
 1-hydroxybutane-1,2,4-tricarboxylate
 3 α -hydroxy-5 β -cholan-24-oate
 2-(4-hydroxyphenyl)propanoate
 3-hydroxy-2-methylpropanoate
 2-hydroxy-3-isopropylbutanedioate
 (*R*)-2-hydroxyoctadecanoate
 2-aminoethanesulfinate
 2-guanidinoethanesulfinate
 (5*S*,6*S*)-5-[(1-carboxyvinyl)oxy]-6-hydroxycyclohexa-1,3-diene-
 -1-carboxylate
 1-hydroxypropane-1,2,3-tricarboxylate
 2-amino-3*H*-phenoxazin-3-one
 2-methylenebutanedioate
 (1*R*,5*R*)-1,8,8-trimethyl-2-oxabicyclo[3.2.1]octane-3,6-dione
 4-hydroxyquinoline-2-carboxylate
 3-(2-aminobenzoyl)-L-alanine
 (*S*)-2-hydroxypropanal
 (*S*)-2-hydroxypropanoate
 2,4,4'-trihydroxydibenzoylmethane
 2-(β -D-glucopyranosyloxy)-2-methylpropanenitrile
 (9*Z*,12*Z*)-octadeca-9,12-dienoate
 5-(1,2-dithiolan-3-yl)pentanamide
 5-(1,2-dithiolan-3-yl)pentanoate
*O*³-(2-guanidinoethoxy) phosphono)-L-serine
 1*H*,3*H*-pteridine-2,4-dione
 7,8-dimethyl-1*H*,3*H*-benzo[*g*]pteridine-2,4-dione
*N*²-(D-1-carboxyethyl)-L-lysine
 (*S*)-2-hydroxybutanedioate
 (*Z*)-3-carbamoylprop-2-enoate
 (*Z*)-4-oxohex-2-enedioate
 (*Z*)-4,6-dioxooct-2-enedioate
 (*Z*)-4,6-dioxohept-2-enedioate
 3-oxopropanoate
 (*S*)-2-hydroxy-2-phenylacetate
 2-hydroxy-2-phenylacetone nitrile
 3-(2-hydroxyphenyl)propanoate
 (1*R*,2*S*,5*R*)-2-isopropyl-5-methylcyclohexanol

- mesaconate
 methylglyoxal
N-methylhydantoin
 methylitaconate
 methylmalonate semialdehyde
 3-methyloxindole
 mevaldate
 (–)-mevalonate
cis,cis-muconate
 naringenin chalcone
 (+)-neomenthol
 nerol
 L (–)-nicotine
 D -nopaline
 noradrenalin
 (+)-norephedrine
 norvaline
 D -octopine
 oleate
 orcinol
 orotate
 orsellinate
 oxaloacetate
 oxalocrotonate
 oxaloglycolate
 oxalomalate
 oxalureate
 2-oxoisocaproate
 2-oxosuccinamate
 pantetheine
 (R)-pantoate
 pantothenate
 pantoyl lactone
 perillyl alcohol
 phloretate
 phloretin
 phloroglucinol
 phosphoenolpyruvate
 L -pipecolate
 pregnenolone
 prephenate
 presqualene diphosphate
 progesterone
 protocatechuate
 2-protocatechuoylphloroglucinol-
 carboxylate
 (+)-pseudoephedrine
 putrescine
 pyrogallol
 L -pyroglutamate
 (E)-2-methylbut-2-enedioate
 2-oxopropanal
 1-methylimidazolidene-2,4-dione
 2-methyl-3-methylenebutanedioate
 2-methyl-3-oxopropanoate
 1,3-dihydro-3-methylindol-2-one
 3-hydroxy-3-methyl-5-oxopentanoate
 (R)-3,5-dihydroxy-3-methylpentanoate
 (2Z,4Z)-hexa-2,4-dienedioate
 3-(4-hydroxyphenyl)-1-(2,4,6-trihydroxyphenyl)prop-2-en-1-one
 (1S,2S,4R)-2-isopropyl-5-methylcyclohexanol
 (Z)-3,7-dimethylocta-2,6-dien-1-ol
 (S)-3-(*N*-methylpyrrolidin-2-yl)pyridine
 N²-(*o*-1,3-dicarboxypropyl)-L -arginine
 2-amino-1-(3,4-dihydroxyphenyl)ethanol
 (1S,2R)-2-amino-1-phenylpropan-1-ol
 2-aminopentanoic acid
 N²-(*o*-1-carboxyethyl)-L -arginine
 (Z)-octadec-9-enoate
 5-methylbenzene-1,3-diol
 1,2,3,6-tetrahydro-2,6-dioxypyrimidine-4-carboxylate
 2,4-dihydroxy-6-methylbenzoate
 2-oxobutanedioate
 5-oxohex-2-enedioate
 2-hydroxy-3-oxobutanedioate
 1-hydroxy-3-oxopropane-1,2,3-tricarboxylate
 2-oxo-2-ureidoacetate
 6-methyl-2-oxoheptanoate
 3-carbamoyl-2-oxopropanoate
 amide of pantothenate (*see below*) with 3-aminopropane-1-thiol
 (R)-2,4-dihydroxy-3,3-dimethylbutanoate
 amide of pantoate (*see above*) with 3-aminopropanoate
 (R)-2-hydroxy-3,3-dimethylbutan-4-olide
 mentha-1,8-dien-7-ol
 3-(4-hydroxyphenyl)propanoate
 3-(4-hydroxyphenyl)-1-(2,4,6-trihydroxyphenyl)propan-1-one
 benzene-1,3,5-triol
 2-(phosphonoxy)prop-2-enoate
 (S)-piperidine-2-carboxylate
 3 β -hydroxypregn-5-en-20-one
 3-(*r*-1-carboxy-*c*-4-hydroxycyclohexa-2,5-dien-1-yl)-2-oxopropanoate
 [(1R,2R,3R)-2-[(*E*)-4,8-dimethylnona-3,7-dienyl]-2-methyl-3-
 -[(2*E*,6*E*)-2,6,10-trimethylundeca-1,5,9-trienyl] cyclopropan-
 -1-yl] methyl diphosphate
 pregn-4-ene-3,20-dione
 3,4-dihydroxybenzoate
 2,4-dihydroxy-6-(3,4-dihydroxybenzoyloxy)benzoate
 (1S,2S)-2-methylamino-1-phenylpropan-1-ol
 butane-1,4-diamine
 benzene-1,2,3-triol
 5-oxo-L -proline

pyruvate	2-oxopropanoate
(-)-quininate	(3 <i>R</i> ,5 <i>R</i>)-1(OH),3,4/5-tetrahydroxycyclohexanecarboxylate
ricinine	1,2-dihydro-4-methoxy- <i>N</i> -methyl-2-oxopyridine-3-carbonitrile
saccharopine	<i>N</i> ⁶ -(α -1,3-dicarboxypropyl)- α -lysine
sarcosine	<i>N</i> -methylglycine
sepiapterin	1-(2-amino-7,8-dihydro-4-hydroxypteridine-6-yl)-2-hydroxypropan-1-one
(-)-shikimate	(3 <i>R</i> ,4 <i>R</i> ,5 <i>R</i>)-3,4,5-trihydroxycyclohex-1-ene-1-carboxylate
sinapate	3-(4-hydroxy-3,5-dimethoxyphenyl)prop-2-enoate
sinapyl alcohol	3-(4-hydroxy-3,5-dimethoxyphenyl)prop-2-en-1-ol
solanesol	<i>all-trans</i> -nonapentaol
spermidine	<i>N</i> -(3-aminopropyl)butane-1,4-diamine
spermine	<i>N,N'</i> -bis(3-aminopropyl)butane-1,4-diamine
squalene	(<i>all-E</i>)-2,6,10,15,19,23-hexamethyltetracos-2,6,10,14,18,22-hexaene
stipitate	3,6-dihydroxy-5-oxocyclohepta-1,3,6-triene-1-carboxylate
stipitate acid	4,7-dihydroxy-1 <i>H</i> -cyclohepta[<i>c</i>] furan-1,3,6-trione
succinate semialdehyde	4-oxobutanoate
sulfoacetaldehyde	2-oxoethylsulfonate
(-)-sympatol	(<i>R</i>)-1-(4-hydroxyphenyl)-2-methylaminoethan-1-ol
α -(+)-tartrate	(2 <i>R</i> ,3 <i>R</i>)-2,3-dihydroxybutanedioate
tartronate semialdehyde	2-hydroxy-3-oxopropanoate
taurine	2-aminoethanesulfonate
taurocyamine	2-guanidinoethanesulfonate
testololactone	3-oxo-13,17-secoandrost-4-ene-17,13 α -lactone
testosterone	17 β -hydroxyandrost-4-en-3-one
α -thalassemine	<i>N,N</i> -dimethyl- <i>O</i> ³ -([2-guanidinoethoxy]phosphono)- α -serine
thetin	<i>S,S</i> -dialkyl-1,2,4-oxathietan-4-one, e.g. dimethylsulfonioacetate
(+)-thujan-3-ol	(1 <i>S</i> ,3 <i>S</i> ,4 <i>S</i> ,5 <i>R</i>)-1-isopropyl-4-methylbicyclo[3.1.0]hexan-3-ol
(-)-thujol	(1 <i>S</i> ,3 <i>S</i> ,4 <i>R</i> ,5 <i>R</i>)-1-isopropyl-4-methylbicyclo[3.1.0]hexan-3-ol
triacetate lactone	4-hydroxy-6-methylpyran-2-one
(-)-tropate	(<i>S</i>)-2-(hydroxymethyl)-2-phenylacetate
tropine	(3 <i>R</i>)-8-methyl-8-azabicyclo[3.2.1]octan-3-ol
uric acid	7,9-dihydro-1 <i>H</i> -purine-2,6,8(3 <i>H</i>)-trione
ureidoglycolate	2-hydroxy-2-amidoacetate
urocanate	3-(1 <i>H</i> -imidazol-4-yl)prop-2-enoate
α -usnic acid	(<i>S</i>)-2,6-diacetyl-3,7,9-trihydroxy-8,9b-dimethyldibenzofuran-1(9 <i>bH</i>)-one
5-valerolactone	pentan-5-olide
xanthopterin-B ₂	1-(7,8-dihydro-2,4-dihydroxypteridin-6-yl)-2-hydroxypropan-1-one
xanthotoxol	9-hydroxy-7 <i>H</i> -furo[3,2- <i>g</i>][1]benzopyran-7-one

ABBREVIATIONS USED IN THE ENZYME LIST

ADP	adenosine 5'-diphosphate
AMP	adenosine 5'-monophosphate
ATP	adenosine 5'-triphosphate
dATP	deoxyadenosine 5'-triphosphate
<i>B. cereus</i>	<i>Bacillus cereus</i>
<i>B. subtilis</i>	<i>Bacillus subtilis</i>
CDP	cytidine 5'-diphosphate
CMP	cytidine 5'-monophosphate
dCMP	deoxycytidine 5'-monophosphate
CoA	coenzyme A
CTP	cytidine 5'-triphosphate
dCTP	deoxycytidine 5'-triphosphate
DFP	diisopropyl fluorophosphate
DNA	deoxyribonucleic acid
<i>E. coli</i>	<i>Escherichia coli</i>
FAD	flavin-adenine dinucleotide
FMN	flavin mononucleotide (riboflavin 5'-monophosphate)
GDP	guanosine 5'-diphosphate
dGDP	deoxyguanosine 5'-diphosphate
GMP	guanosine 5'-monophosphate
dGMP	deoxyguanosine 5'-monophosphate
GTP	guanosine 5'-triphosphate
dGTP	deoxyguanosine 5'-triphosphate
IDP	inosine 5'-diphosphate
IMP	inosine 5'-monophosphate
ITP	inosine 5'-triphosphate
NAD ⁺	oxidized nicotinamide-adenine dinucleotide
NADH	reduced nicotinamide-adenine dinucleotide
NADP ⁺	oxidized nicotinamide-adenine dinucleotide phosphate
NAD(P) ⁺	indicates either NAD ⁺ or NADP ⁺
NADPH	reduced nicotinamide-adenine dinucleotide phosphate
NAD(P)H	indicates either NADH or NADPH
<i>N. crassa</i>	<i>Neurospora crassa</i>
NDP	nucleoside 5'-diphosphate
NMN	nicotinamide mononucleotide
NMP	nucleoside 5'-monophosphate
dNMP	deoxynucleoside 5'-monophosphate
NTP	nucleoside 5'-triphosphate
P	phosphate residues
poly(C)	synthetic polynucleotide composed of cytidylate residues
poly(G)	synthetic polynucleotide composed of guanylate residues
<i>P. putida</i>	<i>Pseudomonas putida</i>
<i>P. notatum</i>	<i>Penicillium notatum</i>
<i>P. roqueforti</i>	<i>Penicillium roqueforti</i>
RNA	ribonucleic acid
tRNA	transfer ribonucleic acid
TDP	ribosylthymine 5'-diphosphate

dTDP	thymidine 5'-diphosphate
TMP	ribosylthymine 5'-monophosphate
dTMP	thymidine 5'-monophosphate
TTP	ribosylthymine 5'-triphosphate
dTTP	thymidine 5'-triphosphate
UDP	uridine 5'-diphosphate
UMP	uridine 5'-monophosphate
dUMP	deoxyuridine 5'-monophosphate
UTP	uridine 5'-triphosphate
dUTP	deoxyuridine 5'-triphosphate

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