

## Peptide Modification List

Last updated 2018-06-06

N terminus Modification	Symbol
H	Free amino group
Ac	{Ac}, Acetylation
Fmoc	{Fmoc}, 9-Fluorenylmethyloxycarbonyl
CBZ	
Bz	
Bz(4-F)	
Bz(4-NO <sub>2</sub> )	
Pyr	
D-Pyr	D-Pyr
LA-	{LA}, Lipoic acid
Mpa-	
Mal-b-Ala	Maleoyl-b-Ala
Mal-Acp	
Aoa	amino-oxyacetic acid
N terminus Fatylation	Symbol
For	{For}, Formylation
2-Br-Ac	
2-Cl-Ac	
2-I-Ac	
OH-Ac-	
But-	
Suc	
MeOSuc	
Iba	
Hex-	
5-heptenoic acid	
5-Hexynoic acid	
heptanedioic acid	
Oct-	
Dec-	
Sebacic Acid	
Lau-	
Myr-	
Pal-	
Ste-	
Octanedioic acid	

Oleic Acid-	
<b>C terminus Modification</b>	
-OH	
-NH <sub>2</sub>	amidation
Cysteamide, -Cya	{Cya}
-AMC	
-OMe	
-OEt	
-OBzl	
-OtBu	
-NHMe	
-NHEt	
-TBzl	
p-Nitroanilide	pNA
<b>D form normal amino acid</b>	<b>Symbol</b>
{D-Ala}	{D-Ala}
{D-Arg}	{D-Arg}
{D-Asp}	{D-Asp}
{D-Asn}	{D-Asn}
{D-Cys}	{D-Cys}
{D-Glu}	{D-Glu}
{D-Gln}	{D-Gln}
{D-His}	{D-His}
{D-Allo-Ile}	{D-Allo-Ile}
{D-Ile}	{D-Ile}
{D-Leu}	{D-Leu}
{D-Lys}	{D-Lys}
{D-Met}	{D-Met}
{D-Pro}	{D-Pro}
{D-Phe}	{D-Phe}
{D-Ser}	{D-Ser}
{D-Tyr}	{D-Tyr}
{D-Thr}	{D-Thr}
{D-Trp}	{D-Trp}
{D-Val}	{D-Val}
<b>Unusual amino acid</b>	<b>Symbol</b>
{Beta-Asp}	{Beta-Asp}
{D-Beta-Asp}	{D-Beta-Asp}
{Gamma-Glu}	{Gamma-Glu}

{D-Gamma-Glu}	{D-Gamma-Glu}
Cys(Cam)	{Cys(Cam)}
D-Cys(Cam)	D-Cys(Cam)
{Cys(Acm)}	{Cys(Acm)}
{Cys(tBu)}	{Cys(tBu)}
{Met(O)}	{Met(O)}
{D-Met(O)}	{D-Met(O)}
{Met(O)2}	{Met(O)2}
{D-Met(O)2}	{D-Met(O)2}
{Lys(Ac)}	{Lys(Ac)}
{Ac-Lys}	{Ac-Lys}
{Lys(Dde)}	{Lys(Dde)}
{Tle}	
{D-Ser(octanoic acid)}	{D-Ser(octanoic acid)}
2-Thi	3-Ala(2-thienyl)-OH
3-Thi	3-Ala(3-thienyl)-OH
{Aib}	{Aib}
{Abu}	{Abu}
{D-Abu}	{D-Abu}
{Hyp}	{Hyp}
{Phg}	{Phg}
{D-Phg}	{D-Phg}
{Nva}	{Nva}
{D-Nva}	{D-Nva}
{Norleucine}	{Nle}
{D-Nle}	{D-Nle}
{Cit}	{Cit}
{D-Cit}	{D-Cit}
{Orn}	{Orn}
{D-Orn}	{D-Orn}
{Pen}	{Pen}
{D-Pen}	{D-Pen}
{Cpg}	{Cpg}, cyclopentylglycine
{Cha}	{Cha}
{D-Cha}	{D-Cha}
{Chg}	{Chg}
{D-Chg}	{D-Chg}
{Dab}	{Dab}
{Dap}	{Dap}
Pra	Pra
D-Pra	D-Pra
Allo-Thr	

D-Allo-Thr	
{D-1-Nal}	{D-1-Nal}
{L-1-Nal}	{L-1-Nal}
{D-2-Nal}	{D-2-Nal}
{L-2-Nal}	{L-2-Nal}
{D-2-Pal}	{D-2-Pal}
{L-2-Pal}	{L-2-Pal}
{D-3-Pal}	{D-3-Pal}
{L-3-Pal}	{L-3-Pal}
{D-4-Pal}	{D-4-Pal}
{L-4-Pal}	{L-4-Pal}
{Oic}	{Oic}
{Tic}	{Tic}
{D-Tic}	{D-Tic}
X	20 kinds equal mol mix amino acid
<b>Fluorescence/Dye labeling</b>	<b>Symbol</b>
Biotin-	Biotin (N-Terminal)
-Lys(Biotin)-	Lys(Biotin) (middle)
-Lys(Biotin)	Lys(Biotin) (C terminus)
Biotin-Ahx-	Biotin-LC (N-Terminal)
FITC-	FITC (N-Terminal)
-Lys(FITC)-	Lys(FITC) (middle)
-Lys(FITC)	Lys(FITC) (C terminus)
FITC-Ahx-	FITC-LC (N-Terminal)
5-FAM-	5-FAM (N-Terminal)
5,6-FAM	5,6-FAM
6-FAM	6-FAM
-Lys(5-FAM)-	Lys(5-FAM) (middle)
Lys(5,6-FAM)	Lys(5,6-FAM)
-Lys(5-FAM)	Lys(5-FAM) (C terminus)
5-FAM-Ahx-	5-FAM-LC (N-Terminal)
Dansyl-	Dansyl (N-Terminal)
-Lys(Dansyl)-	Lys(Dansyl) (middle)
-Lys(Dansyl)	Lys(Dansyl) (C terminus)
Dansyl-Ahx-	Dansyl-LC (N-Terminal)
5-TAMRA-	
5(6)-TAMTA-	5(6)-TAMTA-
-Lys(TAMRA)-	Lys(TAMRA) (middle)
-Lys(5-TAMRA)	Lys(5-TAMRA) (C terminus)
{5-TAMRA-Acp}	5-TAMRA-Acp
{Lys(Dnp)}	{Lys(Dnp)}

{D-Lys(Dnp)}	D-Lys(Dnp) (middle or C terminus)
{Dab(Dnp)}	Dab(Dnp) (middle or C terminus), 3-[2,4-dinitrophenyl]-L-2,4-diaminobutyric acid
Dap(Dnp)	Dap(Dnp) (middle or C terminus), Dpa, 3-[2,4-dinitrophenyl]-L-2,3-diaminopropionyl
MCA-	MCA (N-Terminal)
-Lys(MCA)-	
-Lys(MCA)	-Lys(MCA) (C-terminal)
Rhodamine B-	
Lys(Rhodamine B)	
<b>Phe/Tyr Analogs amino acid</b>	<b>Symbol</b>
{D-2-Cl-Phe}	{D-2-Cl-Phe}
{L-2-Cl-Phe}	{L-2-Cl-Phe}
{D-3-Cl-Phe}	{D-3-Cl-Phe}
{L-3-Cl-Phe}	{L-3-Cl-Phe}
{D-4-Cl-Phe}	{D-4-Cl-Phe}
{L-4-Cl-Phe}	{L-4-Cl-Phe}
{D-3,4-DiCl-Phe}	{D-3,4-DiCl-Phe}
{L-3,4-DiCl-Phe}	{L-3,4-DiCl-Phe}
{D-4-Br-Phe}	{D-4-Br-Phe}
{L-4-Br-Phe}	{L-4-Br-Phe}
{D-3-F-Phe}	{D-3-F-Phe}
{L-3-F-Phe}	{L-3-F-Phe}
{D-4-F-Phe}	{D-4-F-Phe}
{L-4-F-Phe}	{L-4-F-Phe}
{D-4-NO <sub>2</sub> -Phe}	{D-4-NO <sub>2</sub> -Phe}
{L-4-NO <sub>2</sub> -Phe}	{L-4-NO <sub>2</sub> -Phe}
{D-4-I-Phe}	{D-4-I-Phe}
{L-4-I-Phe}	{L-4-I-Phe}
{D-3-CN-Phe}	{D-3-CN-Phe}
{L-3-CN-Phe}	{L-3-CN-Phe}
{D-4-CN-Phe}	{D-4-CN-Phe}
{L-4-CN-Phe}	{L-4-CN-Phe}
{D-2-Me-Phe}	{D-2-Me-Phe}
{L-2-Me-Phe}	{L-2-Me-Phe}
{D-4-Me-Phe}	{D-4-Me-Phe}
{L-4-Me-Phe}	{L-4-Me-Phe}
{D-4-NH <sub>2</sub> -Phe}	{D-4-NH <sub>2</sub> -Phe}
{L-4-NH <sub>2</sub> -Phe}	{L-4-NH <sub>2</sub> -Phe}
{D-3-Cl-Tyr}	{D-3-Cl-Tyr}
{L-3-Cl-Tyr}	{L-3-Cl-Tyr}
{D-3,5-DiCl-Tyr}	{D-3,5-DiCl-Tyr}

{L-3,5-DiCl-Tyr}	{L-3,5-DiCl-Tyr}
{D-3,5-DiBr-Tyr}	{D-3,5-DiBr-Tyr}
{L-3,5-DiBr-Tyr}	{L-3,5-DiBr-Tyr}
{D-3-I-Tyr}	{D-3-I-Tyr}
{L-3-I-Tyr}	{L-3-I-Tyr}
{D-3,5-Dil-Tyr}	{D-3,5-Dil-Tyr}
{L-3,5-Dil-Tyr}	{L-3,5-Dil-Tyr}
{D-3-NO2-Tyr}	{D-3-NO2-Tyr}
{L-3-NO2-Tyr}	{L-3-NO2-Tyr}
{D-3,5-DiNO2-Tyr}	{D-3,5-DiNO2-Tyr}
{L-3,5-DiNO2-Tyr}	{L-3,5-DiNO2-Tyr}
{L-3-F-Tyr}	L-3-F-Tyr
<b>Homo amino acid</b>	<b>Symbol</b>
{Har}	{Har}, HomoArg
{D-Har}	{D-Har}, D-HomoArg
{HomoCit}	{HomoCit}
{D-HomoCit}	{D-HomoCit}
{HomoLeu}	{HomoLeu}
{HomoPro}	{HomoPro}
{D-HomoPro}	{D-HomoPro}
{beta-Homolle}	{beta-Homolle}
{beta-HomoLeu}	{beta-HomoLeu}
{beta-HomoMet}	{beta-HomoMet}
{beta-HomoPro}	{beta-HomoPro}
{beta-HomoVal}	{beta-HomoVal}
Quenched fluorescent peptide	Symbol
{Abz}	Abz
o-Abz- (o-aminobenzoic acid)	o-Abz
{Tyr(3-NO2)}	Tyr (3-NO2)
{Glu(EDANS)}	
{DABCYL}	DABCYL
{Lys(DABCYL)}	
{Lys(Abz)}	{Lys(Abz)}
MAPS and Carrier Complex	Symbol
{Symmetric 2 Branches}	
{Symmetric 4 Branches}	
{Symmetric 8 Branches}	
Lys(Maleimide)	
Lys(Mpa)	
Lys(Pra)	
Lys(Suc)	

Lys(glutaryl)	
Lys(pGlu)	
Lys(For)	
Lys(2-Br-Ac)	
Lys(Butanoyl)	
Lys(Crotonyl)	
{Lys(octenyl)}	
lys(Ma)	
Lys(Pal)	
Lys(Oleic Acid)	
Lys(Acryl)	
Lys(alkine)	
Lys(Alloc)	
Lys(Aoa)	
Lys(cyclopropanecarboxyl)	
{Lys(3,5-diiodo-4-hydroxybenzoyl)}	
Lys(Methacryl)	
Lys(propargyl)	
Lys(propionyl)	
Lys(Pyruvoyl)	
{BSA-Peptide N terminus}	{BSA-Peptide N terminus}
{BSA-peptide C terminus}	{BSA-peptide C terminus}
{BSA-Peptide via Cys}	{BSA-Peptide via Cys}
{KLH-Peptide N terminus}	KLH-Peptide N terminus
{KLH-Peptide C terminus}	{KLH-Peptide C terminus}
{KLH-peptide via Cys}	{KLH-peptide via Cys}
{OVA-Peptide N terminus}	OVA-Peptide N terminus
{OVA-peptide C terminus}	{OVA-peptide C terminus}
{OVA-peptide via Cys}	{OVA-peptide via Cys}
<b>Atom Linker</b>	<b>Symbol</b>
{betaAla}	
{Ava}	{Ava}, 5 atoms
{Ahx}	{Ahx}, 6 atoms
{8-Aoc}	
{AEA}	aminoethoxyacetic acid
{Ado}	
{ANP Linker}	
<b>Methyl amino acids</b>	<b>Symbol</b>
{Lys(Me)}	{Lys(Me)}

{Lys(Me2)}	{Lys(Me2)}
{Lys(Me3)}	{Lys(Me3)}
N-Methyl amino acid	Symbol
{N-Me-Ala}	{N-Me-Ala}
{N-Me-Phe}	{N-Me-Phe}
{N-Me-Leu}	{N-Me-Leu}
{N-Me-Ile}	{N-Me-Ile}
{N-Me-Val}	{N-Me-Val}
{N-Me-Met}	{N-Me-Met}
{N-Me-Nle}	{N-Me-Nle}
{N-Me-Nva}	{N-Me-Nva}
{Sar}	
{N-Me-Ser}	{N-Me-Ser}
{N-Me-Tyr}	{N-Me-Tyr}
{N-Me-Thr}	{N-Me-Thr}
{N-Me-Asp}	{N-Me-Asp}
{N-Me-Glu}	{N-Me-Glu}
N-Me-beta-Ala	N-Me-beta-Ala
<b>Cyclic peptide</b>	<b>Symbol</b>
{Mono Disulfide bridge}	
{Double Disulfide bridge}	
{Triple Disulfide bridge}	
{Random Disulfide bridge}	
{Same Seq. Inter-Disulfide bridge }	
{Different Inter-Disulfide bridge}	
{Amide cyclic (end)}	
<b>Phosphorylation</b>	<b>Symbol</b>
{pSer}	{pSer}
{pTyr}	{pTyr}
{pThr}	{pThr}
{D-pSer}	{D-pSer}
{D-pTyr}	{D-pTyr}
{D-pThr}	{D-pThr}
{Di-sites in sequence}	
{Tri-sites in sequence}	
<b>PEG</b>	<b>Symbol</b>
{Mini-PEG}	{Mini-PEG}, AEEA 9 atoms
{Mini-PEG2}	{Mini-PEG2}, AEEEP 13 atoms



{Mini-PEG3}	{Mini-PEG3},AEEEEEP 16 atoms
{PEG4}	PEG4
{PEG-6}	PEG-6
{PEG8}	PEG-8
{PEG-11}	PEG-11
{PEG-12}	PEG-12
<b>Isotope Labeling</b>	<b>Symbol</b>
H2 (deuterium)	
N15	
C13	
13C15N-K (C-terminal)	
13C15N-R (C-terminal)	
13C15N-A (C-terminal)	
13C15N-I (C-terminal)	
13C15N-L (C-terminal)	
13C15N-F (C-terminal)	
13C15N-P (C-terminal)	
13C15N-V (C-terminal)	
<b>Stapled Peptides</b>	<b>Symbol</b>
Single stapled S5 and S5	
Single stapled S5 and R8	
Single stapled R8 and R8	
<b>Misc</b>	<b>Symbol</b>
FMK, CMK	
N6-Octanoyl	
Photocleavable peptides	
propargyl-gly	
Lys(Myristoyl)	
pNA	
Lys(N3)	